THE INTERTEXTUAL PRESENCE OF CYBERPUNK IN CULTURAL AND SUBCULTURAL ACCOUNTS OF SCIENCE AND TECHNOLOGY

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This thesis looks at the relationship between cyberpunk science fiction and those sections of cyberculture most interested in the computer networks. This relationship is investigated in order to understand the nature of a recent cultural formation developed around the use of computer-mediated communications (CMC).

By means of a textual analysis of pamphlets, books, articles, and electronic discussion groups, the thesis establishes the existence of an articulate cultural consensus among groups/theorists/practitioners involved in the politics of CMC. This consensus reveals a consistent opposition between the technology of industrialisation, which is characterised by uniformity and hierarchy, and a new technology defined in terms of diversity, and autonomy.

The thesis argues that the political discourse of cyberculture is structured by an opposition between 'good' and 'bad' uses of technology. CMC can be used to establish a regime of decentralised surveillance or to promote a more democratic political participation. In the narratives elaborated by cyberculture, the technology of CMC is represented as being intrinsically democratic. Cyberculture also suggests that advanced technological skills can be used to counteract the most repressive uses of technology and to foster its more intrinsic progressive possibilities.

These narratives are explored through the statements expressed by a series of groups, who are particularly active in relation to technology. The thesis investigates the ways in which Internet communities responded to the first laws which aimed to regulate the Internet. These were proposed by the Clinton administration in the US. The 'posthuman philosophy', a current of thought which believes in evolving humans into posthumans by using advanced technology, is also analysed in the accounts offered by the Extropy group and the magazine *Mondo 2000*. The notion that the technology of CMC is inherently self-regulating and democratic is criticised in relation to 'cyberevolutionism', a popular discourse which sees the Internet as a self-regulating organism. Finally, the thesis argues that gender is the subject of much controversy in Internet culture.

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Introduction

In this thesis I focus on the relationship between cyberpunk and cyberculture. I analyse the ways in which the two came to be understood as connected and the context in which this relation was formed. Cyberpunk is used as an interpretive device to understand the nature of stories about science and technology that are told within cyberculture. I ask how cyberculture defines the 'new' technologies, especially computer-mediated communications (CMC), and how we can understand the context in which these definitions are formulated.

Cyberculture has been described as a 'cultural formation'. A cultural formation 'describes the lines that distribute, place, and connect cultural practices, effects and social groups. Such an articulation not only involves a selection and configuration from among the available practices but also a distribution of the formation itself within the social space' (Grossberg 1992: 71).

In recent writings on technology, cyberculture has come to designate '...a far-flung, loosely knit complex of sublegitimate, alternative and oppositional subcultures [whose common project is the subversive use of technocommodities, often framed by radical body politics]' (Dery 1993c: 566). The cultural formation called 'cyberculture' is a specific version of 'technoculture', a label used to indicate the general field 'which covers the complex psychosocial process by which people, either individually or in groups make their independent sense of the stories that are told within and about an advanced technological society' (Penley and Ross 1991: xv). If technoculture covers all aspects of the cultural relationship to technology, cyberculture is a more specific phenomenon. It indicates a particular culture of high-tech, which favours technologies such as computer networks, smart drugs, and biotechnological implants[1]. Cyberculture is usually associated with the American West Coast (Sirius 1992; Rushkoff 1994; Barbrook 1995) but it is a larger phenomenon; the circulation of cybercultural magazines and the diffusion of computer networks are spreading many of its ideas across the most technologised areas of the world (Berardi 1992, 1994; Caronia 1992; Scelsi 1990; Plant 1996; Tatsumi 1991).

Mark Dery divides cyberculture 'into several major territories: visionary technology, fringe science, avant-garde art, and pop culture' (Dery 1993c: 566). Rather than looking at cyberculture as a whole, I have focused on those

segments which are particularly involved in the culture of computer-mediated communications. Unlike other areas of cyberculture, these are not generally involved in performing arts or in practices involving the display of the physical body, but concern themselves almost exclusively with the status and potential of CMC; they express themselves mainly through pamphlets, magazines, and electronic discussion groups.

My point of entry into this formation has been through the work of a group of writers associated with cyberpunk science fiction. In the mid-eighties the label cyberpunk was coined to indicate a 'movement' in the science fiction genre which included authors such as William Gibson, Lewis Shiner, John Shirley, Bruce Sterling, Rudy Rucker and Pat Cadigan (Swanwick 1986; McCaffery 1991). In spite of the variety of styles represented by these writers, cyberpunk soon came to signify a representational style which featured technologies like Virtual Reality, computer networks and biotechnology situated in often ruthless urban settings and represented through a punk sensibility. Following on from its origins as a form of science fiction literature, cyberpunk emerged as a cultural discourse in its own right and was variously appropriated by groups interested in computers and the human applications of biotechnology (Dery 1993; Balsamo 1993; Sirius 1992; Rushkoff 1994; Hafner and Markoff 1991; Stone 1991). This process of dispersion, and the development of cyberpunk science fiction into cyberculture indicates a new and interesting juncture between literature and society. Much of the current critical literature on cyberpunk and/or cyberculture has been sadly deficient in understanding the peculiarity of this juncture. Most of these critiques, in fact, are concerned with analysing the ways in which cyberpunk represents a new experience of technology, but rarely bother to explore its specific entanglement with cultural practices related to the use of high-tech. One of the interventions made in this thesis is an examination of the relationship between cyberpunk science fiction and the specific cultural milieu which produced it.

I see cyberpunk SF and cyberculture as two phenomena derived from a common ground. Cyberpunk SF both fed on the early cyberculture and fed back into it; it absorbed and creatively expressed the major concerns of cyberculture and was then reabsorbed and reinterpreted in its turn. I justify establishing a relationship between cyberpunk science fiction and cyberculture on the basis of their participation in a common cultural milieu; I explore this relationship by means of a textual analysis of pamphlets, articles, books, and statements expressed on the Internet. Cyberpunk SF explicitly

aimed to portray a near future, located twenty or thirty years hence, and based this claim on its 'closeness' to those groups and individuals who were using the latest technologies (Sterling 1986b; Gibson 1991, 1993b). The thesis explores how this 'present future' is imagined and enacted by groups who see themselves as the pioneers and visionaries of a new technological age.

By reading cyberculture through cyberpunk, the thesis puts forward an account of the stories produced by groups with a high cultural and material investment in contemporary technology. By focusing on intertextual relations, I formulate a possible methodology to understand the features of a new cultural formation developed around the use of CMC.

I maintain that the relationship between literature, technology and culture operates through language. Therefore I concentrate on 'stories', on linguistic representations of a particular relationship to technology. These stories are not simply a passive representation of the real, but are 'effective'; they produce not only a particular understanding of technology, but also technology itself. By this I mean that many of the groups/theorists/practitioners discussed within this thesis are particularly active in the cultural politics of CMC. Through their magazines, lobbies, and political activism they are shaping the public perception of CMC and its political and economic regulation (Barlow 1990; Barlow and Meeks 1994; Rheingold 1994). My research questions are: what kind of discourses structure the the cybercultural experience? How does cyberculture define the nature of advanced technology? What kind of political possibilities are imagined for this technology? What kind of human subject is going to interface with it?

The narratives analysed in this project are located in the context of the emergence of great political, cultural, and social interest in the technology of CMC. The thesis responds to the uniqueness of the moment by analysing how the groups and theorists most involved with CMC describe this technology as a new medium with enormous potential to change the shape of society as we know it.

As I explain in the following pages, I started with cyberpunk SF and worked my way back through the history of its production and its relationship with cyberculture. This thesis was also profoundly shaped by recent developments in the culture of high-tech, specifically by the increasing popularity of computer-mediated communications. It is an account of a cultural formation in a phase of transition from being an underground phenomenon to the centre of widespread social, political, economic and

cultural attention. By drawing on the tools of textual analysis, I have traced the outlines of an unstable consensus about the nature of contemporary technology from the perspective of those groups who are most passionately involved in it.

The research process

The thesis started as a project on cyberpunk SF after a long research involvement with American science fiction: my BA dissertation was an analysis of feminist SF and my MA thesis used Philip K. Dick's writings as a reflection on the 'state of the real' in a supposed age of simulation. My interest in cyberpunk SF was twofold: as somebody recently introduced to postmodern theory I was affected by the widespread perception at the time that cyberpunk SF could provide a fruitful insight into the technologically mediated aspects of the postmodern experience. This position has been widely expressed by authors such as Fredric Jameson, Larry McCaffery, Scott Bukatman, Veronica Hollinger, and Istvan Csicsery-Ronay, Jr. (Jameson 1991; McCaffery 1991; Bukatman 1993; Hollinger 1991; Csicsery-Ronay, Jr 1991).

This line of enquiry was conveniently located in the tradition of literary criticism, which was my original disciplinary location. I planned to extend the academic literature on the subject by producing a study of how cyberpunk could be read in relation to the status of science and technology in the eighties and to postmodern and feminist criticisms, particularly of the subject/object dualism in modernist epistemology.

Secondly, in the early nineties I was intrigued by the intense interest shown by the Italian extra-parliamentary left in cyberpunk as an overtly political form of fictional writing. In 1991, major protests against the privatisation of higher education were launched by the Italian student movement and resulted in four months of uninterrupted occupations of universities and high schools all over Italy. This movement, which I joined while at the Orientale University in Naples, adopted communication technology as a useful organisational weapon; faxes and video-conferencing facilities were used to organise the protest in conjunction with other occupied institutions across the country. The experiences engendered by this use produced much discussion about how technology could enable a new kind of democratic experience (Lotti 1994; Bortoli 1994). The students' participation in the democratic life of the institution through their elected representatives was the object of much disenchantment; it was deemed to be

ineffectual and, like society at large, to promote disengagement and passivity. The technological network of communication, it was argued during heated assemblies, allowed everybody to witness and participate in the national meetings and therefore bypass the hated principle of representation. Although not everybody was aware of it at the time, the theme of the 'electronic democracy' was an 'old' New Left theme and was undergoing an extraordinary renaissance in the North American communities of activists collected around the use of CMC (Rheingold 1994; Barbrook 1995). In this context, 'truths' celebrating the radical political possibilities inherent in new technologies were widely circulated through the construction of cyberpunk as a reappropriated discourse.

Early Italian treatises on cyberpunk stressed the necessity of confronting a new economic order based on the commodification and control of information by developing new forms of politics through advanced forms of technologically-mediated communication. In the early 90s Italy witnessed a wave of independent publications, unrelated to official research institutions, which explored cyberpunk as an imaginative commentary on the nature of politics in the information age. The aspiring knowledge workers of the Italian academic system—disenfranchised and facing a future with little prospect of secure employment—were particularly receptive to this discourse which emphasised the importance of knowledge and information in advanced capitalist societies.

The transformations recently undergone by capitalism, the new status of the knowledge class, and the possibilities of cyberpunk were shaping a debate which crossed the barriers of institutional knowledge by including student networks, squatters, and the 60s and 70s generation of radical intellectuals. The prestigious group of thinkers from *Luogo Comune,* including figures of the 60s and 70s such as Tony Negri and Franco Berardi, wrote on similar themes in the journal *Derive e Approdi* (Berardi 1992, 1994; Negri 1994). Short-lived journals like *Alphaville* and desk-top publishing enterprises like *Codici Immaginari* started crowding the most progressive bookstore-chains (Caronia 1992; Vitale 1993). But it was *Decoder,* the official Italian cyberpunk magazine, and the affiliated publishing house Shake, which proposed that cyberpunk was the key to interpreting the present mutation of capitalism (Scelsi 1990).

The Decoder group comprises the occupants of a squat in Milan, La Conchetta, which includes veterans of the 70s extra-parliamentary left and younger members related to the recent student movement. Decoder and the

Chaos Computer Club in Hamburg offer the strongest expressions of cyberpunk as a political movement in Europe (Scelsi 1990). The Decoder group was responsible for translating a well developed American tradition into the language of the Italian extra-parliamentary left. By combining the experience of the Italian autonomist groups, the 1991 student movement, and an international network of support centred around the USA, they claimed to have found in cyberpunk SF a fertile commentary on the new strategies needed by the radical left in the Information Age (Scelsi 1990) The Decoder group contends that cyberpunk demonstrates the obsolescence of the factory, and the necessity of developing new strategies in relation to computer networks, which are the real centre of power in the nineties.

Although I was initially working in the well-established tradition of post-structuralist literary criticism, the interpretation of cyberpunk offered by the Decoder group kept resurfacing in my mind. Decoder was interpreting cyberpunk for the Italian public not just as a set of novels and short stories, but also as a whole political tradition which included the American and German hackers, the Californian cyberculture and British punk. Although I thought it was productive and enabling for them to look at cyberpunk SF as a political fiction representing the true state of postindustrial society, I was also strongly aware that the relationship between literature and society is never simply an issue of 'true' representation.

For quite some time I was prevented from proceeding by the (non)choice between more respectable academic criticism and some very lively and imaginative subcultures. The first suggested that cyberpunk SF could be read in terms of the technological experience of postmodernism and it could be used to explain the collective mutations of consciousness experienced by citizens of advanced capitalist societies (McCaffery 1991; Bukatman 1993). The second suggested that cyberpunk was a political guidebook to the information age and it should be used to formulate new directions for an oppositional politics adequate to a new kind of society. During my first year of research I had considerable difficulties in trying to reach a compromise between the two positions and I finally decided it could not be solved from inside the parameters of literary analysis. I seriously considered the Italians' assumption that cyberpunk could be read as a political fiction and turned my research project around. Rather than looking at the fiction and trying to understand its political implications, I would look at the groups who had interpreted its politics; I would look at the cyberpunks instead of at cyberpunk alone.

The influential nature of cyberpunk SF made this course of action easier and at the same time even more complicated; it was impossible for any group interested in high-tech in the early nineties not to know about cyberpunk. Dery's definition of cyberculture also indicates the diversity of cultural practices influenced by cyberpunk: '[cyberculture] is divisible into several major territories: visionary technology, fringe science, avant-garde art and pop culture' (Dery 1993c: 566).

To add to the confusion, I also came to discover in the next two years that the act of 'knowing' about cyberpunk (the 'c-word' as it came to be referred to) was far from unambiguous. Some groups such as the Italians, the Californian group collected around the magazine *Mondo 2000*, and the community of VR engineers were explicit about their endorsement of cyberpunk SF (Scelsi 1990; Sirius, Mu, and Rucker 1992; Rheingold 1991). Some others, I found out later, were particularly resistant to it and sometimes downright hostile. Everybody, however, felt various degrees of wariness about the media's use of cyberpunk as a reductionist label for the high-tech culture at large. At this stage the second turning point in the development of this thesis occurred, namely the explosion of the Internet phenomenon between 1993 and 1994 and my introduction to the electronic networks[2].

The Internet

The main problems I encountered when I decided to research the cyberpunks were geographical and methodological. In the first place, the European cyberpunks were located in Milan and Hamburg; London was not a central location in the development of a cyberpunk subculture, although mavericks like Tom Vague in his fanzine *Vague* had dedicated considerable time and energy to the development of cyberpunk themes (Downham 1988). Most of the other cyberpunk activity was located on the American West Coast, an unaffordable location for fieldwork. The methodological problem was related to the scattered nature of cyberpunk subcultures. Is textual analysis an adequate methodology when magazines are rare and difficult to find? It was particularly hard to get hold of fanzines and countercultural magazines coming from the US; interviewing was an alternative, but the cyberpunk field, even in Europe, was excessively dispersed. In this context, between late 1993 and 1994, the public explosion of the Internet phenomenon and my first Internet account solved most of my problems. These events shaped this thesis in two ways.

In the first instance, they changed my position as a researcher. Getting an Internet account meant that I had immediate access to a great variety and wealth of material, whereas before I had had to struggle to obtain every copy of the small circulation magazines I owned. Suddenly everything was available on the Internet. As I soon found out, print media is an obsolete medium when it comes to cyberculture. This also meant that for the first time I had direct access to groups of people, mostly American, who discussed the contours of a cyberpunk experience and a cyberpunk outlook on life. This electronic landscape of textual abundance was simultaneously exhilarating and overwhelming; before I had had to fight with the scarcity of material, now I was suddenly suffering from information overload. It took some time before I could see the connections, the outlines of a distinct cultural formation which was part of cyberculture but was not all cyberculture was made of. These groups made up the sections of cyberculture who used the Internet as a preferred medium of communication to talk about technology. Not all of them were cyberpunks, but they acknowledged cyberpunk as part of their cultural legacy. They had their magazines (among others *Mondo 2000, Phrack, 2600, bOING bOING, Future Sex,* and later *Wired*) but they came alive as groups in their own right by way of the Net. In the Autumn of 1994 I decided to start a fieldwork investigation of some of the most outspoken Internet communities. This fieldwork was designed to help substantiate, problematise, or challenge the narratives I could isolate by way of a more traditional analysis of pamphlets, articles, and books. The nature of this fieldwork is discussed in chapter 1.

These events also changed the object of my research. The Internet significantly altered the cultural landscape initially marked by cyberpunk SF. When I started in 1992, cyberpunk had been the literature of cyberspace (alias Virtual Reality); in the mass media at large and in the cybercultural communities who expressed themselves via the press, Virtual Reality, cyberspace, and cyberpunk were almost interchangeable terms (Benedikt 1991; Rheingold 1991; Heims 1993). Although the computer networks were always a central concern of cyberpunk-related subcultures, they did not appear as frequently in the mass media at large, with the exception of some coverage of computer viruses and hackers (Elmer-DeWitt 1988; Markoff 1988; Hafner and Markoff 1991). This has changed since late 1993 when the Clinton/Gore administration in the US started campaigning for the 'National Information Infrastructure', immediately renamed the Information Superhighway (Rheingold 1994; Schiller 1995; Besser 1995). This much

publicised initiative, and the leaks to the press about multi-million dollar mergers between companies interested in bidding for it, affected my research enormously.

In the first place there was an obvious proliferation of books, new magazines, and features in the mainstream media. Then all the material published on-line, the debates taking place in the electronic sites and in the magazines became more and more focused around CMC; issues such as the problems of corporate and government intervention, the possibilities of the new medium, and its proper use became central in all the areas I was researching. These debates were filtered to me especially through the cyberpunk netsites and the cyberpunk discussion groups, but it soon became clear that there was a fragmented but consistent consensus across all the most self-reflexive high-tech subcultures. At this point it also became increasingly obvious how different the European and the American interpretations of cyberpunk were. Because of the centrality of the American technological groups in this moment of transition, I decided to focus exclusively on them. It is a sign of the changed nature of space in the age of CMC that I was able to study what is substantially an American phenomenon while being for the most part physically located in a European nation.

Methodological approach: situated knowledges and the use of textual analysis in an interdisciplinary context.

The structure of this thesis is the result of the research process outlined above. Cyberpunk SF was my point of entry, cyberpunk-related subcultures my early path, and cyberculture my final research object. This process of progressive expansion and consolidation is reflected at the level of the general structure of this thesis and its individual chapters. Cyberpunk SF in general, and cyberpunk as an object of criticism in particular, were very useful in enabling me to isolate and understand some of the recurrent themes elaborated within cyberculture.

Cyberpunk writers abundantly extrapolated from the literature and the experiences shared by the high-tech subcultures of the time. They read the same books, picked up the most recurrent themes, and gave them imaginative literary expression. Once published and circulated, cyberpunk literature influenced the very subcultural groups from which it had drawn its ideas and images. Cyberpunk SF was not only my point of entry into a

culture of technology; a whole generation of young technoliterates and academic analysts of cyberculture use cyberpunk science fiction as a way to talk about the cultural experience of technology (Dery 1993; Balsamo 1993; Herz 1994). The demise of cyberpunk as a marketing label through over-exposure in the media is also indicative of a new stage in the development of contemporary technoculture, something that Arthur and Marilouise Kroker have called 'the end of the charismatic phase of digital reality, and the beginning of the iron law of technological normalization' (Kroker and Kroker 1995: 1).

The use of cyberpunk science fiction to understand cyberculture is therefore historically and methodologically motivated: cyberpunk science fiction is historically related to cyberculture (Sirius, Mu, Rucker 1992; Sterling 1986, 1992; Markoff and Hafner 1991; Herz 1994) and has been used as a useful analytical category in recent studies of cyberculture (Stone 1991; Dery 1993, 1993c; Balsamo 1993). Unlike cyberculture, a relatively new field of enquiry, cyberpunk science fiction has been intensely analysed by academic criticism (McCaffery 1991; Bukatman 1993; Csicsery-Ronay Jr, 1991, 1991b; Fitting 1991; Ross 1991; Suvin 1991, 1991b; Hollinger 1991). Much of this specific debate is concerned with understanding how cyberpunk SF has portrayed a new experience of technology. The analyses often subscribe to poststructuralist and/or postmodern ideas, contending that cyberpunk science fiction is a postmodern genre which truthfully represents the effects of contemporary technology on the postmodern subject.

However, I object to the generalising tone which often pervades these analyses of cyberpunk SF. Although my methodological approach has been marked since its inception by a poststructuralist sensibility to textual analysis, poststructuralism is too large a label to indicate a single style of scholarly enquiry. The distinctive focus of this project was shaped by a firm rejection of the bulk of poststructuralist criticism of cyberpunk SF. Poststructuralist and postmodern analyses of cyberpunk such as those carried out by Scott Bukatman and Larry McCaffery, for example, strike me as falling into the typical postmodern trap: they celebrate difference and fragmentation while simultaneously engaging in the production of universalising theories (McCaffery 1991; Bukatman 1993). In these texts, cyberpunk is interpreted as 'the' literature of postindustrial society, representing the technologically-mediated aspects of the postmodern experience. 'Postmodern', 'poststructuralist', and 'postindustrial' are used as almost interchangeable terms, and there is no attempt to understand the specificity of the cultural

imaginary proposed by cyberpunk SF.

In opposition to these studies, I take postmodernism and poststructuralism to mean a complete rejection of metanarratives, including the idea that there is something like a universal spirit of the age. My theoretical point of reference for this thesis has been Donna Haraway's epistemological proposal in her essay 'Situated Knowledges' (Haraway 1991). In many ways, 'Situated Knowledges' is a powerful synthesis of several epistemological positions elaborated by feminists, anti-racists, and postcolonial writers (Flax 1990; Harding 1986; Braidotti 1991; Spivak 1988). Haraway starts from the postmodern claim that there is no absolute and objective truth and no unified and consistent subjectivity. At the same time, she refuses to give in to relativism, one of the most dreaded consequences of the postmodernist trend. Haraway claims that the end of the great metanarratives of the modern age need not result in relativism: like Rosi Braidotti (1994), she reads postmodernism as the moment of the emergence of new kinds of 'situated' and embodied knowledges.

> Such preferred positioning is as hostile to various forms of relativism as to the most explicitly totalizing versions of claims to scientific authority. But the alternative to relativism is not totalization and single vision, which is always finally the unmarked category whose power depends on systematic narrowing and obscuring. The alternative to relativism is partial, locatable, critical knowledges sustaining the possibility of webs of connection called solidarity in politics and shared conversations in epistemology....
>
> So with many feminists, I want to argue for a doctrine and practice of objectivity that privileges contestation, deconstruction, passionate construction, webbed connections, and hope for transformation of systems of knowledge and ways of seeing. (Haraway 1991: 191-192)

My position is aligned with this more political and committed reading of the meaning of poststructuralism and postmodernism. I think that the nature of this 'situated' project is also perfectly compatible with the interdisciplinary field covered by cultural studies; cultural studies has always been concerned with specificity and, in its best moments, renders itself politically accountable to the object of study.

Following Haraway's theory and the tradition of cultural studies, I have tried to return to specificity and partial perspective as a way of building a more accountable knowledge. My critical position has been articulated as clearly as possible in terms of my allegiances to a feminist and socialist

perspective. I have been particularly concerned to show the historical, contextual, located nature of these cultural practices and I have clearly expressed my objections to their silence on issues of class, gender and race. In opposition to the humanist rhetoric of these groups, I see class, gender, and race as the basis of structural and historical differences produced by the economic and cultural relations of capitalist societies.

Since I deal exclusively with texts, my main methodology has been textual analysis, but I have also tried to integrate this within a larger interdisciplinary approach. In particular I have drawn on aspects of subcultural theory (Thornton 1994), the sociology of science and technology (Wajcman and MacKenzie 1985; Latour and Woolgar 1979; Winner 1985, 1993), the political economy of the information society (Robins and Webster 1986; Robins 1992); the sociology of work (Aronowitz and DiFazio 1994) and of course cultural studies of science and technology (Ross 1991; Dery 1993; Haraway 1992). I have also developed my own methodology for fieldwork on the Internet, which I explore in chapter 1.

The main methodological tools, however, have been the concepts of 'story', 'narrative' and 'discourse'. The term 'discourse' is associated with the work of Michel Foucault, (1963, 1970, 1972, 1975, 1976) and the anti-humanist premises of Foucault's theories are certainly fundamental to this work. However, this project is not based on Foucault's theoretical understanding of the operations of power. I have used the term 'discourse' in relation to the larger meaning it has acquired in recent cultural studies; that is, as a set of regulatory stories that a society or group uses to make sense of their world *and*, at the same time, to produce the experience of that world. As Aronowitz and DiFazio put it, discourses

> signify the ways in which we narrate and, through reflection, give meaning to our everyday relations as well as public life. Cultural and political discourse shapes our world through the power of socially situated language to signify as well as to form experience. So it is not only that we *interpret* experience in terms of the categories of discourse, but also that discursive practices constitute what we call "experience". (Aronowitz and DiFazio 1994: 175)

Foucault recognised and approved of this flexible use of the term discourse; in an interview quoted by Mark Poster (1995: 82), he stated that '...instead of making the rather hazy meaning of the word "discourse" more distinct, I think that I have multiplied its meanings: sometimes using it to

mean a general domain of all statements [énoncés], sometimes as an individualisable group of statements [énoncés], and sometimes as an ordered practice which takes account of a certain number of statements. [énoncés]'

Although I am fully aware of the complex theoretical position framing the notion of 'discourse', I want to specify that my own use of the term is more inspired by its use in recent cultural studies. Donna Haraway in particular has used the term 'discourse' together with 'narratives' and 'stories' in her critical history of primatology *Primate Visions* (1989). She refers to 'constrained and contested story-telling' (Haraway 1989: 8) as a way of producing reliable accounts of particular histories. Here I use 'stories' and 'narratives' to refer to linguistic constructions circulated between and outside certain groups and individuals. I take 'discourses' to be recognisable groups of statements or stories, more or less ordered, which are used by these groups and individuals to make sense of and produce an experience of technology. I therefore look for recurrences and patterns, and try to understand how they can be understood as particular answers to specific problems. My study proceeds by focusing on a particular theme of cyberpunk SF and examining whether this theme is further articulated in the groups analysed. Stories and narratives are told within discourses and are interpreted as ways of making meaning, of organising the world so as to rationalise both problems and solutions in their relationship with technology.

In this thesis, then, I look at texts produced by these high-tech groups as examples of particular kinds of stories told about the nature of science and technology in the nineties. These stories are produced by groups who hold more power in describing the nature of these technologies than those who are less technologically literate. I maintain that cyberculture is rooted in a particular work culture, such as the more technical end of the population of knowledge workers in the US (Kroker and Weinstein 1994; Pearce 1995). The subjects of cyberculture are privileged, but not all powerful; they are subordinated to and often in tension with larger political and economic powers who regulate other kinds of discourses about technology and science, such as corporations or national governments.

The subject of this thesis is therefore a fragile, temporary historical moment in the development of a culture of technology, but one that is also a particularly powerful moment since it is located at the beginning of the mass expansion of CMC. The locations I have focused on are situated in a border

zone between an older phase of a technocultural formation coalesced in the eighties, and a new phase of relative mass involvement in high-tech centred around the use of information and communication technologies (ICT). These are years which see the transition of CMC from a fringe phenomenon to its expansion into a central economic and cultural event. This project uses cyberpunk SF to understand the way in which this transition is articulated.

More specifically, I demonstrate how the political imagination of these groups is structured by a discourse which uses the technology and political organisation of the industrial age as a consistent foil against which to build one's identity. The familiar oppositions between industrial and postindustrial, big and small, centralised and decentralised, hierarchical and connected form a unified motif running through the whole thesis. Against this background the 'new' is imagined and elaborated, and it is this 'new' which I focus on. 'New' in this sense does not describe the ontological reality of something radically different, but only the ways in which a set of events and circumstances are described as such—their discursive construction as something 'new'.

The first section of the thesis offers a discussion of more theoretical and methodological issues. Following this in chapters 5, 6, 7, and 8 respectively I discuss the new politics, the new body, the new technology and the new gender of the Age of the Internet. Although every chapter is self-contained, they are also strongly connected. Throughout I argue that there is a general consensus among the most aware, mostly American, groups interested in CMC. This consensus is based on the assumption that the new wave of cybernetic technologies (from CMC to artificial life) represents the emergence of a new historical moment; this new moment is mainly defined in opposition to the 'old' one generated by the industrial revolution.

The dominant discourse of cyberculture argues that industrial technology has emphasised uniformity, hierarchy, centralisation, and rigid control and produced a similarly organised society. The first famous commercial for the computer company Apple is a perfect example of this representation of the Industrial age; in a grey amphitheatre a group of people in drab uniforms watch a big screen from which Big Brother tells them what to think. A young female athlete runs into the theatre and breaks the screen releasing people from the slavery of mass culture. In the commercial Big Brother (or Big Blue) clearly represents IBM—the computer company that is the epitome of industrial organisation in the computer world (Poster 1995).

According to cyberculture, this industrial world of mass media and rigid

control has left us the legacy of television, repressive governments, and bureaucratic corporations such as IBM. Cyberculture sees its historical duty as one of preventing these leftovers of the industrial age from hijacking the natural development of the new technologies towards decentralisation, flexibility, and community. The narratives of resistance and political agency told within cyberculture stress the importance of a more decentralised production and distribution of knowledge. This emphasis on the radical possibilities of CMC is always opposed by a paranoid discourse, which dreads the perversion of 'good' technologies into bad ones, and the transformation of technologies of decentralised democracy into technologies of decentralised surveillance.

In order to exorcise the spectre of what Poster has called the 'superpanopticon' (Poster 1995)—a model of electronic surveillance which operates across the whole spectrum of human activity—cyberculture stresses the necessity for a new kind of subject and a new model of organisation modelled on the horizontal and decentralised structure of the computer networks. Both this new subject and this new structure emphasise the irreversible contamination of the natural and artificial—another fundamental theme of cyberpunk science fiction. I therefore analyse the two most articulate formulations of the new subject and the new structure of the information age: posthuman philosophy and cyberevolutionist theory. The first stresses the necessity of entering into a new relationship with technology, a masterful relationship that will eventually result in the evolution of humanity into a technologically hybrid 'posthumanity'. The second celebrates a new model of organisation which replicates the evolutionary principles ruling the natural world across technological, economic, and social systems.

I find that the new 'posthuman' subject replicates the characteristics required of the knowledge worker in advanced capitalist societies: advanced technological skills, flexibility, and adaptiveness. Much of the rhetoric employed by cyberevolutionist accounts, echoes a recent tendency towards economic restructuring: the flexible economy of the high-tech industry necessitates a different organisational model, one that leaves its worker with the illusion of freedom and creativity while re-establishing control at the level of the rules governing the system. Decentralisation, therefore, does not necessarily imply more justice and equal distribution of resources; on the contrary, here it articulates a redefinition of power as that which operates by invisible rules.

Both these narratives completely overlook the notion of 'structural difference', that is the structural conditions that allocate power and material resources differently across contemporary societies. In my final chapter, therefore, I look at the problem of gender in cyberculture, since gender is the only category which troubles the cybercultural rhetoric of equality in difference. Feminist interventions in the debate around CMC and women's experience of electronic communication are used to show how the only structural difference operating within cyberculture disrupts its myth of the 'utopia of cyberspace'.

Each chapter takes a theme of cyberpunk SF and tests it against some segment of cyberculture. This focus on one or two groups per chapter is intended to avoid an excessive dispersion of ideas, and thus to allow the argument to emerge more clearly. Every chapter is related to the others in pursuing the characteristics of the 'new order' produced by a 'new technology', and tackles some of the themes and problems which are left unanswered.

Chapter Outlines

I have divided the thesis in two sections: the first section, which includes chapters 1, 2 and 3, is more concerned with methodological and theoretical questions; the second discusses the features of the cybercultural discourse.

In chapter 1, I review the existing literature on the subject of 'cyberculture' in order to conceptualise the object of my research and assess the best theoretical tools available. I start from the assumption that objects in a research project never come complete and ready to be analysed. Much of the work in this thesis has gone into establishing limits while respecting the complexity of the connections. I am very aware of Haraway's observation that "objects' do not pre-exist as such. Objects are boundary projects'. (Haraway 1991: 201). This chapter then deals with the methodological problems involved in analysing a cultural formation which expresses itself through books, magazines, electronic documents and exchanges on the Internet. Here I assess the scarce literature on the subject and evaluate the usefulness of the categories 'intertextuality', 'subculture', and 'cultural formation' for this project. I also look at the nature of my fieldwork on the Internet and justify my choice of four particular newsgroups—alt.cyberpunk, alt.net.media.coverage. alt.cyberspace and alt.politics.data.highway—by looking at the different technical protocols

structuring the Internet. Lastly, I also assess the problems of researching a disembodied environment where the identity of the subject is always in question.

In chapter 2, I discuss the possible class location of the participants in these cultural practices; I look at theories of work experience in advanced capitalist societies predominantly oriented towards the production of information and advanced technology. I think that the specificities of the class and geopolitical location of the cybercultural subjects are of fundamental importance for situating the ways in which they make sense of technology and their position in it. By relying on various understandings of the social constitution of the 'virtual class' (Kroker and Weinstein 1994; Barbrook 1995; Barbrook and Cameron 1994; Pearce 1995), I make an argument for understanding cyberculture as the expression of a particular work experience.

Chapter 3 is an analysis of the current state of the theoretical debate about science and technology and the perspectives on CMC offered by different theories of technology.

Chapter 4 opens the more interpretive and analytic part of the thesis. In this chapter I provide a general overview of the history of the word 'cyberpunk' from a literary movement to its various cultural incarnations. Here I explain how cyberpunk came to be associated with cyberculture, while introducing for the first time some of the groups this thesis focuses on. In particular, I look at how the association between hacker and cyberpunk was established, and how in the late eighties cyberpunk was grafted onto the legacy of the sixties counterculture by the Californian magazine *Mondo 2000*. I conclude by discussing the controversial status of cyberpunk as a label for CMC in some of the Internet newsgroups I have researched.

Chapter 5 elaborates the argument for the whole thesis. By using Fredric Jameson's analysis of the 'paranoia' of cyberpunk SF, it looks at the widespread alarm in Internet culture at the time of the first legislation on cyberspace between late 1994 and early 1995. Here I argue that paranoia is certainly a component of cyberculture at large but that it is also balanced by an 'ecstatic' discourse, which emphasises the pleasures of technology and its radical political possibilities. In particular, Internet communities responded to the threat of surveillance and censorship by underlining the possibilities of the new medium and the character of its users. They stressed how the subjects of electronic communication constituted a community of skilled users who could come up with various strategies of resistance on the grounds of their superior knowledge of the medium. This technological

mastery helped them to resist repressive legislation, but was not just a defensive weapon. In their opinion, the real possibilities of a skilled use of the new technologies will inevitably undermine the old industrial order by destroying its monopolistic practices on information. Skilled users can create their own knowledge and distribute it for free, therefore undermining the old order in one of its most strategic areas.

In the next two chapters, I use the common observation that cyberpunk SF disrupts the boundaries between nature and technology to understand the meaning of this emphasis on technomastery and technological resilience. I demonstrate how science is a fundamental tool in supporting the cybercultural claims to truth. Here the first problem with cybercultural ideas of technological mastery emerge: what happens when technological mastery is naturalised as something almost genetic? What happens when technological knowledge is presented as both an evolutionary and economic necessity?

Chapter 6 is an analysis of posthumanism, a philosophy which argues that technology will assist the human species in its leap to a new evolutionary stage—the post-biological. Posthumanism is analysed in two sites: in the magazine *Mondo 2000*, and the Extropian group, a high-tech subculture from the American West Coast. I read posthumanism in the light of the scientific theories which justify and support it, to demonstrate how it can be interpreted as the most conservative aspect of the technological mastery analysed in chapter 5. Here technological mastery is not the key to resistance but to adaptation; posthumanism is couched in terms of an economic evolutionism that can also be related to the ambiguous promises of knowledge work in postindustrial societies.

Chapter 7 investigates the same theme, but from a different perspective: instead of looking at the human body, it analyses the ideology of cyberevolutionism, which claims that natural and technological systems are governed by the same rules. I focus on cyberevolutionism because it represents the most original and articulate narrative about the nature of the 'new' technologies. Cyberevolutionism claims that contemporary technology is more natural, since it uses the same spontaneous, self-organising logic of natural systems. Here I look at the history of the introduction of cyberevolutionism through the activity of the group of journalists, writers, and activists collected around *The Whole Earth Review* (*WER*) and its electronic site, the WELL. In particular by looking at the work of Kevin Kelly, ex-editor of the *WER* and current executive editor of *Wired*, I

hope to show how the language of cyberevolutionism implies a redefinition of control and responds to the need for flexibility and creativity in a post-Fordist economy.

Finally, chapter 8 discusses the issue of gender and the technology of CMC. This chapter leaves the cybercultural groups analysed in chapters 5, 6, and 7, to look at how feminists who are often simultaneously users and theorists of CMC have read technology in relation to gender. Most of the narratives analysed above avoid any discussion of gender, since gender as a structural difference undermines the narratives of the autonomous and egalitarian nature of these new technologies. This chapter looks at the ways in which the feminist debate around gender and the Internet has mobilised different definitions of gender and of gendered technology, and suggests the ways in which gender in Internet culture can be read as a structural problem.

Summary

By using cyberpunk as a key to cyberculture, I have been able to answer my main research questions. These questions concern on the one hand the relationship between cyberpunk and cyberculture, and on the other, the nature of the stories told within cyberculture about technology, especially about computer-mediated communications.

The research engendered by these questions has produced an account of the discourses structuring the experience of groups central to the development of a culture of CMC. This thesis makes an original contribution to the debate around cyberpunk science fiction by underlining the depth of its involvement in the cultural milieu of the time. It also contributes to cybercultural studies by providing a complex assessment of the hegemonic narratives structuring the experience of groups associated with cyberculture, and adds to current studies of computer-mediated communications by engaging critically with those groups who are monopolising the discussion on 'new technologies'.

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1 'Smart drugs' are chemicals that supposedly enhance intelligence. Smart drugs include such chemicals as 'centrophenoxine... an intelligence booster and also an effective anti-aging therapy... choline [which] enhances memory by increasing the amount of acethylcholine available for memory and thought processes.... DHEA... an important player in cognitive enhancement....' (Morgenthaler 1992: 230-231). The 'smart drugs' trend started in the 70s, when Durk Pearson and Sandy Shaw's book *Life Extension* 'first publicized the existence of smart chemicals and the notion of nutrient-enhanced 'designer beings'' (Rushkoff 1994: 132). Some smart drugs are

called 'nootropics (*noos*, 'mind' and *tropein*, 'to turn' - that is, 'acting on the mind'), the new class of drugs that provide cognitive enhancement with no toxicity' (*ibid.*: 133). On the subject see also McKenna (1992).

[2] A data search of the worlds newspapers and magazines for the number of articles written about the Internet during the 90's, posted online, demonstrates the exponential increase of public interest in the phenomenon. In 1990 there were 2,579 articles; in 1991 3,289; in 1992 5,578; in 1993 11,244; and in 1994 79,513.

Chapter 1
Analytical tools and fieldwork

In this chapter I look at definitions of 'cyberculture' and at the nature of my fieldwork on the Internet. Since this thesis is about cyberpunk and cyberculture, I feel I need to be as clear as possible about what exactly I mean by these terms.

Cyberpunk SF is easily identifiable as a SF subgenre of the mid-eighties characterised by its interest in technologies like Virtual Reality, computer networks, and biotechnology.[1] The meaning of cyberculture is not quite as clear or consolidated as cyberpunk, but it has recently been used in cultural studies as a useful analytical concept designating a new set of cultural practices centred around the use of high-tech. Here I assess the advantages and disadvantages of the term and the usefulness of categories such as 'cultural formation', 'subculture' and 'intertextuality' for this project. The purpose of this section is to understand how such an elusive label can be conceptualised in more theoretical terms. Although I will only concentrate on some segments of cyberculture, I still feel that it is important to give a sense of how many different groups can be conceptualised in relation to a single cultural formation. If groups as different as *Mondo 2000*, Usenet newsgroups, the Extropians, and *Wired* are part of a single cultural field, which analytical instruments are most helpful in understanding the nature of this field?

In the second part of this chapter I discuss the nature of my fieldwork on the Internet. Since many of the groups I analyse are deeply involved in the technology of computer-mediated communications (CMC), I have sometimes deemed it necessary to quote from discussions taking place on the Internet to support my argument. In this chapter I explain the nature of my fieldwork and my choice of a particular area of the Internet, Usenet.

In contrast to this more theoretical approach, the historical relationship between cyberpunk and cyberculture will be explored in chapter 4. There I will trace the chronology of cyberpunk as a SF movement, its subcultural development, and the groups who appropriated or rejected it as part of their cultural project.

Cyberculture

Until this moment, the nature of cybercultural groups and the best

theoretical and methodological ways to research them have not been exhaustively theorised. The publication in 1993 of a special issue of the *South Atlantic Quarterly* titled *Flame Wars: The Discourse of Cyberculture* seems to offer what is currently the closest term of reference. *Flame Wars* is the only effort to date to theorise the role of cyberpunk science fiction in relation to a wider cultural formation, which Mark Dery calls 'cyberculture' (Dery 1993c).

In this diverse anthology, I could trace just three authors who seem to directly tackle the existence of a cultural sensibility which includes cyberpunk as part of its legacy but which is generally related to the use of high-tech: Vivian Sobchack, Mark Dery, and Anne Balsamo. Out of the three, only Dery and Balsamo make some larger theoretical statements about the nature of 'cyberculture'—the alleged object of the issue.

In his introduction, Mark Dery sets the terms of the debate by referring to 'cyberculture' as a network of cultural practices related to the use of high-tech. By quoting a previous article from the *South Atlantic Quarterly* , Dery defines cyberculture as:

> ...a far-flung, loosely knit complex of sublegitimate, alternative and oppositional subcultures [whose common project is the subversive use of technocommodities, often framed by radical body politics].... [Cyberculture] is divisible into several major territories: visionary technology, fringe science, avant-garde art, and pop culture. (Dery 1993c: 566)

Although I do not agree with Dery in his understanding of cyberculture as an intrinsically subversive movement, I also take the term to indicate a loose set of cultural practices associated with high-tech. As it is, however, the term is still very vague. In her article on *Mondo 2000,* for example, Vivian Sobchack only briefly refers to a 'novel and electronically configured social formation called 'cyberculture' ' (Sobchack 1993: 570).

More interestingly, Anne Balsamo seems to make an effort to conceptualise cyberculture in theoretical terms. Balsamo's work is particularly relevant to this project in as much as she is the only writer in the anthology to specifically point at cyberpunk science fiction as a possible entry into the 'interpretive and social dimensions of contemporary cyberculture' (Balsamo 1993: 683). What she defines as 'cyberpunk mythologies' can be productively located in relation to 'the emergence of a new cultural formation built in and around cyberspace' (*ibid.*). In her view, cyberpunk science fiction is the object of 'practices of dispersion and

interpretation that serve as the infrastructure of a much broader formation' (*ibid.*). In her article Balsamo uses 'cyberculture' and 'the New Edge' interchangeably, but I take the term 'New Edge' to be more specifically related to the Californian magazine *Mondo 2000,* which I describe in chapter 4.

> To fully investigate the *cultural* formation of what *Mondo 2000* calls 'the new edge' would require an investigation of related discursive forms, such as comic books, 'zines, and other form of popular print culture, as well as new hybrid social-textual forms, such as electronic newsgroups, bulletin boards, discussion lists, MUDs (multi-user domains), on-line journals, E-zines, and IRChats. Given that these textually-mediated social spaces are often constructed and populated by those who participate in related subcultural practices, such as CONS, raves, body alteration, smart drugs, computer hacking, and video-art, what is needed for a more developed and historically specific analysis of the New Edge as a cultural formation is a multidisciplinary analysis of other spaces of popular culture where material bodies stage cybercultural identities. (Balsamo 1993: 683)

Balsamo's definition of the relationship between cyberculture and cyberpunk is the most pertinent to the scope of this thesis and as such it deserves a closer analysis. I will accomplish this by breaking down her complex statement:

a) Cyberpunk can productively be located in relation to a new cultural formation built in and around cyberspace. In other words Balsamo situates some of the most interesting and unexplored history of cyberpunk not in relation to science fiction but to cultural practices which are placed far outside it.

b) Cyberpunk is not left untouched by its location in this wider cultural formation. As an original corpus of texts, it is subject to a process of interpretation and dispersion. This mutated and dispersed object has become the 'infrastructure' of a much broader social and cultural formation.

c) There are several ways in which the cultural analyst can gain access to this formation: he/she can look at various kinds of print culture, especially 'zines (desktop magazines in general or glossier magazines such as *Mondo*), and 'new hybrid social-textual forms such as electronic newsgroups, bulletin boards, discussion lists, MUDs and so on' (Balsamo 1993: 683).

d) Research carried out on these groups will inevitably concern itself with other subcultural practices other than those taking place in the disembodied

space of electronic communication or even print media—such as raves, body alteration, smart drugs, and computer hacking.

I am very interested in Balsamo's statement that cyberpunk science fiction can provide a useful entry into cyberculture. I do agree that such an effort would require a vast amount of interdisciplinary work and this thesis is an attempt to formulate at least part of this project. My research, however, is not concerned with subcultural practices such as raves or body alterations, whose incorporation would probably require another thesis.[2] I am also uncomfortable with the idea of cyberpunk as 'infrastructure', with its connotation of a deeper, sustaining configuration at the heart of the confusion of surface(s). In the title of this thesis I have referred to the 'intertextual presence' of cyberpunk, but I think the relationship between cyberpunk science fiction and this wider cultural formation deserves more careful attention. In my chapter on the history of the term cyberpunk in association with specific groups and communities, I give a sense of the complexity and the history of the term: the historical convergences, the cultural exchanges and the process of naming which has produced some of the connotations of cyberpunk outside the science fiction genre. These exchanges are enormously simplified if they are placed exclusively in the category of intertextuality, unless of course we redefine the 'intertext'. Before going back to this relation, however, I would like to focus in some detail on the source of Balsamo's use of the periphrasis 'cultural formation' and its applicability to Dery's definition of cyberculture.

The idea of a 'cultural formation', the conceptual core of Balsamo's argument, is part of Lawrence Grossberg's proposal for a new kind of cultural studies; Grossberg's main objection to mainstream cultural studies is its totalitarian identification of culture with the process of communication and production of meaning. According to Grossberg, this identification has resulted in 'a theory in which social and material realities disappear into the plane of meaning. Meaning becomes the totality of human existence because it mediates an otherwise inaccessible and unknowable reality'. (Grossberg 1992: 43)

Grossberg's proposal is an ambitious attempt to theorise some different tools for the analysis of cultural forms; drawing on the work of Michel Foucault, Gilles Deleuze, and Felix Guattari, he aims to formulate a theory that would look at cultural phenomena as complex, multidimensional, contextual, and effective events and practices. In this context he elaborates

his theory of the 'cultural formation' which provides the basis for Balsamo's argument about cyberpunk:

> A cultural formation describes the lines that distribute, place, and connect cultural practices, effects and social groups. Such an articulation not only involves a selection and configuration from among the available practices but it also a distribution of the formation itself within the social space. That is, a formation—and the practices within it—is not equally available at every social site, nor to every fraction of the population. Different social groups have differential access to specific clusters of practices and these relations are themselves part of the determination or articulation of the formation. (Grossberg 1992: 71)

Grossberg complements his concept of the 'cultural formation' with the notion of 'sensibility', which defines the dominant configuration of a formation. Such a notion is explicitly inspired by Raymond Williams' 'structure of feeling':

> Every formation puts into place a particular sensibility, which describes its effects in people's daily lives and thus the way in which a particular formation is lived.... For the individuals living within it, it defines a historically determined and socially distributed mode of engagement with (or consumption of) particular practices. It determines the 'proper' and accurate way of selecting cultural practices, of relating to them, and of inserting them into daily life. (Grossberg 1992: 72)

Balsamo uses the analytical category 'cultural formation' in order to emphasise adequately the feeling of fragmentation *and* articulation of what Dery, Sobchack, and Balsamo agree to call 'cyberculture'. In the emphasis given by these authors, 'cyberculture' cannot be anything else but a 'cultural formation'. Grossberg's stress on articulation and on lines connecting different cultural practices in a non-linear fashion is certainly more adequate in describing the complex configuration of cyberculture than the concept of 'subculture', whose applicability I will look at later on in this chapter. 'Cultural formation' on its own, though, does not seem sufficient in accounting for some of the relations established not only between these groups, but between these groups and their 'others', very often mass media. In this sense I have found some recent work on subcultures more useful. In particular, the concept of 'cultural formation' does not resolve my need to convey the sense of an ongoing power-sensitive dialogue between these groups and their outside.

After this lengthy introduction, I am left with three terms: intertextual; subculture; and cultural formation. In a sense this is just the first level of my attempt to establish some clarity in a field which still proliferates with neologisms. Later I will look at some other terms such as technoculture, techno-counterculture, high-tech subcultures, Internet culture and computer culture .

In its larger structure, this thesis is about an 'intertextual presence' in the sense that it covers very different fields: mass media; specialist media; Internet communities; electronic documents; popular and academic writing. This work is obviously based on the premise that cyberpunk SF is a useful entry into cyberculture. Cyberpunk SF drew on a milieu which included a whole set of references to science, technology and cultural practices related to the use and interpretation of scientific literature and technological commodities. Bruce Sterling, the spokesperson of the cyberpunk movement in science fiction, claimed that cyberpunk helped to bridge the 'yawning cultural gulf between the sciences and the humanities, the formal world of art and politics, and the culture of science, the world of engineering and industry' (Sterling 1986b: xii). This combination worked so well that, as I explain in chapter 4, cyberpunk was immediately adopted by many technological subcultures of the 80s, such as hackers, VR engineers, and the hybrid techno-counterculture represented by the magazine *Mondo 2000*. These groups reabsorbed, so to speak, what had been taken from them in the first place. William Gibson, for example, claimed to have been inspired by the subculture of video-arcades and computer users, whose obsessive relation to the machine is portrayed in his novel *Neuromancer*:

> I was walking down Granville Street, Vancouver's version of "The Strip," and I looked into one of the video arcades. I could see in the physical intensity of their postures how *rapt* the kids inside were... These kids clearly *believed* in the space games projected. Everyone I know who works with computers seems to develop a belief that there's some kind of *actual space* behind the screen, some place you can't see but you know is there. (in McCaffery 1991b: 272)

The relationship between cyberpunk and cyberculture is not understandable in terms of the first influencing the latter, but more as a complex loop. In the mid-eighties cyberpunk authors based their work on the experience of contemporary high-tech subcultures and ten years later

cybercultural representatives such as J.C. Herz argue that for young technoliterates cyberpunk is 'a way to talk about the Big Picture' (Herz 1994: 222). One way to look at this loop is to say that it is an intertextual loop stretched out across time.

'Intertextuality', though, is an extremely inadequate concept on its own. If we define intertextuality as the simple presence of some texts amongst others, then there are lots of other dimensions that seem to be left out, such as the important differences between cybercultural groups, the different histories they refer to, and their relationship with other groups. These differences also refer to the status of the various rhetorical fields analysed, and their modalities of communication. The relationship between mass media, academic, and subcultural interpretations of cyberculture cannot be articulated without a sense of their radically different positions of power and their varied degrees of emotional investment. Furthermore, mass media, academic theory, underground press, and Internet discussion groups are discursive practices ruled by very distinct modes of communication, involved with largely different concerns, and with separate audiences in mind.

Some of the locales I have researched are subcultural; subcultural theory, on the other hand, covers only some of the areas included in this thesis, and even then is in urgent need of reformulation. Studies of subcultures have originated in the Chicago school and its work on delinquent or deviant youth cultures (Thrasher 1927; Whyte 1943).[3] In their translation into cultural studies they have come to signify some very embodied practices acted out in physical spaces and displayed in the material resignifications of style (Cohen 1972; Hall and Jefferson 1976; Hebdige 1979). The closest that cyberpunk-inspired groups come to this meaning of subculture is in the hacker communities collected around local Bulletin Board Systems (BBSs).[4]

In this project, however, I will tend to work with more open and global electronic sites. Groups such as those communicating on the Internet area called Usenet do present subcultural traits in the long-term crystallisation of small communities of regulars over the years: these groups are engaged in long and constant conversations, with the resulting build-up of common slang, jokes and innuendoes. There are substantial differences, though, between the nature of the communities crystallised around the Internet and classic subcultures such as those analysed by cultural studies in the seventies. Style, for example, is irrelevant in its strictest sense to the groups I have studied. I am sure that style plays an important part in the material practices

of cyberculture, such as those listed by Balsamo, but it is invisible on the Net. We might, of course, still talk about rhetorical style: the use of 'electronic signatures', such as quotes attached at the end of the message:[5] the adoption of certain rhetorical trademarks;[6] and the presence of a localised jargon coalesced through prolonged textual exchanges. In this sense, the textualisation of the subcultural body performed by cultural studies can be literalised again: in the case of Internet-centred subcultures, all we can rely on is text. Textual analysis is therefore a proper tool of critical investigation for a study of Internet subcultures.

Any perspective on electronic communication which focuses on subcultures will then have to face the material invisibility of the body and a different definition of identity. Electronic communication is generally based on a partial or total anonymity, a general mistrust about the 'real' identity of the interlocutor which, nevertheless, comprises various degrees of recognition. I will expand this point when talking about my fieldwork on the Internet.

I do find some recent subcultural theory useful, though, for understanding and framing some of the central issues of this thesis. When referring to individuals posting to Internet newsgroups, I have found their degree of interaction with print and mass media in general extremely lively. Sarah Thornton's article on rave culture and the media has proved quite enlightening in formulating this sense of tension between these groups and the mass media (Thornton 1994).

Thornton argues that subcultures do not exist in a media vacuum, although much of the subcultural rhetoric is based on protestations of 'media purity'. Traditionally, the authentic phase of a subcultural formation is placed before its popularisation and its appropriation by the mass media and mass marketing. In her work on the British rave phenomenon, Thornton argues that subcultures live from their very beginning in a relationship with mass media that can only be described as constitutive. Thornton also distinguishes between 'micromedia', 'niche media', and 'mass media'. For ravers, micromedia are flyers and listings, which help them to organise and meet. Niche media, in her example of the music press, 'construct and document subcultures; mass media develop as much as distort them' (Thornton 1994: 176). Thornton bases her understanding of subculture on Pierre Bourdieau's analysis of taste. Without adopting the whole conceptual structure that informs her account, I find her description of how different media help a subculture to construct its own identity compelling.

In my chapters focusing specifically on subcultural practices this has proved to be very much the case; cyberpunk-inspired subcultures live through the media and in opposition to the media in a much stronger sense than ravers. In the first place, most of the participants in these subcultural practices draw their identity from their special relation to a new kind of medium—electronic communication. A whole portion of their rhetoric is about the demonisation of mass media and the celebration of electronic communication as a truly democratic medium—as I will discuss in detail in my fifth chapter. The micromedia identified by Thornton are seen here as a powerful new technology with ambition to become the dominant form of communication in the near future. Mass media are the enemy in a larger, more structural sense than for ravers. Internet users, for example, see it as their historical duty to oppose the monopoly on information held by traditional mass media, such as the press and television. As a not so paradoxical result, mass media are always present in the imaginary realm of these communities; media coverage of science and technology, especially of the Net, is scrutinised to a fault.

Niche media also play an important role; publications such as *Wired* magazine or *Mondo 2000* literally 'live off' cybercultural communities; they write about cyberculture and are read by people involved in cyberculture. Like the music press, high-tech niche media have to fight for recognition, and the degree of approval they are granted by their intended audience varies enormously. Intertextuality does not pay justice to the complex nature of these exchanges and their role in crystallising particular and mobile cultural identities. Generally speaking, subcultural theory has been useful in the theoretical formulation of some of my objects, but does not exhaustively cover all its areas of concern.

The last notion I will assess is Grossberg's 'cultural formation'. As I have mentioned above, this concept does seem to provide a framework which at least takes into account the fissures and the continuities between all these different practices. In the process of writing I have come to feel that in spite of the diversity of my different fields, they are in fact connected; academic theory does refer to subcultural practices and is occasionally filtered back to these groups, a process particularly evident for feminism which I discuss in chapter 8. All of the groups treated in this thesis know of each other, and ideas are often circulated among them—a process certainly encouraged by the common use of CMC.

This focus on fragmentation and articulation implicit in the idea of 'cultural

formation' is essential to this thesis: every single chapter concentrates on a segment of cyberculture and at the same time tries to provide a sense of how this segment makes sense in relation to the others—how they are mutually articulated. The resulting portrait shows a high degree of fragmentation but also deep consistencies which might be attributed to the fact that the cybercultural community is still fairly cohesive.

I also appreciate Grossberg's stress on the distribution of the cultural formation across the social space. Nevertheless with its conspicuous emphasis on spatiality, the notion of cultural formation somewhat overshadows the historical context of these practices and the power-sensitive nature of their conversations.

I will summarise my speculations about the best theoretical notions to frame this thesis in this way:

'Intertextuality': With all its limits, intertextuality is the thread binding this thesis together. The generative point of this project is the sense that all the sites investigated communicate with each other by exchanging, referring to, using and modifying texts.

'Subculture': Subcultural studies is an inescapable area of reference for some of the sites investigated in this thesis. However, it needs to be selectively applied and adapted to the specificity of the mode of communications adopted by these communities. I will try to develop this point when discussing the nature of my fieldwork.

'Cultural formation': Grossberg's concept is useful in as much as it accounts for the fragmentation and articulation between these practices. It needs nevertheless some further theoretical work in order to be of any use to my project at all. In particular, it needs to incorporate some of the insights of subcultural studies and recover some sense of the history of these discursive practices and tropes. Even if these conditions were fulfilled, however, I would not feel justified in defining this project as the analysis of a 'cultural formation'. If I were to offer this thesis as a study of cyberculture as a cultural formation, there would be too much of that formation that it could not cover. Cyberculture includes some cultural practices which are not central to the particular focus of this project, such as dance, smart drugs, and body alteration, shortly all those areas which involve the staging of and the physical communication between material bodies.

Having established that this thesis deals mainly with texts, I need to specify what kind of texts I am referring to. This is a fundamental question

since there are important qualitative differences in the shape, format, and status of the texts analysed.

a) Mainstream press. I will occasionally refer to articles and features published in weekly magazines such as *Time* or *Newsweek*. These publications have dedicated considerable space to electronic communication in the past two years.

b) Niche media. The term actually covers a remarkable variety of publications. I will give some background to the main magazines considered here.

Whole Earth Review. A Californian magazine which aims to develop a continuity between sixties countercultural values and eighties technoculture. It has stronger allegiances to environmentalism and green politics than any of the other magazines. The *Whole Earth Review* also runs the WELL (Whole Earth 'lectronic Link), a bulletin board accessible through gopher which hosts a number of articles and interviews about cyberpunk.[7]

Mondo 2000. Another Californian magazine founded by Ken Goffman (aka R. U. Sirius) in Berkeley in 1989. *Mondo* was one of the first magazines to appropriate and give its own interpretation of cyberpunk outside the science fiction genre. I will describe *Mondo'* s style and orientation in chapter 4.

bOING bOING. A more modest magazine appreciated by cyberpunk fans. It is closer to the 'fanzine' status than to the professional magazine.

Adbusters. A Canadian magazine interested in mobilising cultural resistance against the marketing and advertising industry. Mark Dery, one of the leading commentators on cyberculture, used to write a regular column.

Wired. A highly successful, professional monthly magazine started in 1993. It can be described as the magazine of the transition of CMC from a minority phenomenon to an aspiring mass medium. *Wired* is highly ideological and argumentative in its libertarian orientation.

c) Electronic articles and documents. These are articles, interviews and sometimes even whole books available on the Internet. Some articles published in print form can also be retrieved from some electronic sites. *Mondo 2000* , for example, has an Internet site on the WELL accessible through a common device called gopher; *Wired* has a very active Web site called *HotWired* which publishes articles sometimes not available in the magazine; even *Time* magazine has its own Internet site where is possible to

retrieve articles. Bruce Sterling, one of the founders of the cyberpunk movement in science fiction, has made all his work, including his book *The Hacker Crackdown*, available on the Internet.

d) Books. This is of course the most obvious material for a thesis of this kind: beyond academic critiques, I will also use less specialised books addressing a general audience interested in science and technology.

d) Newsgroups. Electronic discussion groups. I will discuss in detail the nature of these groups and my methodological approach to the subject in the last part of this chapter.

Finally, in an area where neologisms are coined every day, I have to define some of the terms I will use. I have already discussed the term 'cyberculture' at the beginning of this chapter; in Mark Dery's definition it is a 'complex of sublegitimate, alternative and oppositional subcultures' interested in high-tech. In this project I am focusing on some segments of this 'subcultural complex': Internet communities, alternative press and mainstream computer press (alt.cyberpunk; *Mondo 2000, Wired, bOING bOING, Whole Earth Review, Adbusters*).

Another well known term I will use occasionally is 'technoculture', which Constance Penley and Andrew Ross have used to describe a general 'culture of technology'; technoculture 'is located as much in the work of everyday fantasies and actions as at the level of corporate or military decision making' (Penley and Ross 1991: xiii). I will use this term to define the general cultural aspects of human engagement with technology.

'Techno-countercultures' is also a term used by Penley and Ross to describe alternative technological cultures, focused on a distinct oppositional politics. I will use it more narrowly to describe those groups involved in high-tech who are explicitly connected to the sixties counterculture, especially its Californian version (Roszack 1968). *Mondo 2000* and *Whole Earth Review*, for example, offer different versions of a technological counterculture in the late eighties.

'High-tech subcultures' refer to groups actively involved in the politics of high-tech. Hackers, software developers and computer hobbyists are all examples of high-tech subcultures. Early hackers working on big computers were physically collected around the mainframe and would see each other daily. As a high-tech subculture they were crystallised by physical, not virtual, proximity. Most contemporary high-tech subcultures, however, use electronic communication. CMC has effectively created many high-tech

subcultures out of geographically dispersed individuals.

'Internet culture' is more my own neologism. By this term, I want to refer to cultural practices related to the use of electronic communication. Internet culture is very fragmented, but it does share a certain consensus about the nature of the medium.[8] Its fragmentation is usually related to two aspects of CMC: the presence of different technical protocols (each with its own fans and regulars) which I will explain later; and a tendency to fragment in smaller communities interested in the same subjects. Recent media exposure has created more exchanges between different communities by mobilising a common political consciousness across different protocols and interest groups. There is also a growth in magazines dealing specifically with the Net (like *Wired* and the British *.net*), which I sometimes will refer to as the 'cyberpress'.

I will also use 'computer culture' to describe the cultural aspects of the computer as a technology in its own right, beyond electronic communication; computer culture includes every use of computers beyond that related to CMC (graphic, multi-media, word-processing, software development).

Fieldwork on Usenet

As I have explained before, cyberculture has become an articulate cultural formation mainly by way of the computer networks. As a result, CMC is central to this thesis not only as an object of study but also as a medium of research. Beyond using the Internet to download various articles and pamphlets, I have also used it to follow discussions taking place in a particular area of the Internet, Usenet. I have used these data to integrate the textual analysis of more traditional material such as books, articles, or pamphlets.

I have decided to justify my practice of quoting these statements not in terms of simple textual analysis, but in terms of fieldwork. I have opted for the definition of fieldwork because I believe that the nature of electronic communication, especially in computer-conferencing, suggests something that is not simply a collection of textual statements, but an act of communication between people. Here I justify this argument by explaining the technicalities of fieldwork on the Internet, and its differences from more traditional kinds of fieldwork; finally, I also define the ways in which fieldwork has been used in this thesis.

I started my fieldwork on the Internet as a way to provide another level of understanding of cyberculture at large. As I explain in chapter 4, cyberpunk SF was interpreted for a long time as the literature of Virtual Reality, but it was also the literature of the emergent computer networks, in particular of the hacker community. The Internet, the name for the largest of these networks, is undoubtedly one of the fields which has mobilised and most fully integrated cyberculture. The Internet has coalesced groups interested in high-tech both as a technology in its own right and as a way of talking about technology in general.

The groups I was interested in were readers of magazines such as *Mondo, Adbusters,* and *Wired,* but they were also often producers of their own statements by way of the computer networks. When I started in 1993, the Internet phenomenon had begun to achieve public prominence thanks to the plans for the National Information Infrastructure announced in the US by the Clinton administration (see chapter 5). *Wired* magazine was also started in 1993, and I take its spectacular debut and its specific focus on the Internet as a sign of a shift in the technologies privileged by the high-tech enthusiasts. It was very clear to me that after the investment in VR witnessed by the wave of literature on the subject between 1991 and 1993 (Helsek and Roth 1991; Benedikt 1991; Rheingold 1991; Heim 1993; Woolley 1993), most of the new popular books on technology were concerned with electronic communication (Rheingold 1994; Roszack 1994; Herz 1995).

In this context I had three options. Firstly I could have continued to look at cyberculture exclusively in terms of the printed material accessible through news-stands and bookstores. Secondly I could have extended this material with electronic publishing available on the Internet. Finally I could have supplemented the first two sources with fieldwork on some Internet locations involving discussions among different members of the public. I decided that the third option (printed and electronic texts *and* fieldwork) would provide me with a richer and more nuanced account than the other two. I would then look daily at one or two particular sites on the Internet and witness how these groups were reacting/appropriating/reinterpreting some of the issues I was encountering in the printed and electronic texts.

The questions I had in mind when I started my fieldwork were: how are these groups discussing science and technology? Are there any overlaps between their arguments and the more conventional material I was reading at the same time? Do they echo or deny some of the claims made for cyberculture by the specialised press (*Wired* and *Mondo* in the first place)?

Quite reductively, then, I started by asking whether or not the cyberpress was expressing a consensus among the larger constituency of netusers. In the process of researching, things turned out not to be so simple. Some of the arguments this thesis is concerned with (especially in chapter 5) were clarified more by my fieldwork than by the press. Especially in the case of the anti-censorship activism, my fieldwork helped me to understand its nature before reading the cyberpress. This is undoubtedly due to the fact the electronic communication works within a much faster temporality than the print media.

However, I would generally argue that the status of the data I have collected is subordinate to the more traditional material (such as articles and books), whether in a written or electronic form. The data coming from my fieldwork have been generally used to support and consolidate arguments drawn substantially from the print media. This process was not totally imposed on the subject; there was a considerable consistency between the statements expressed by print media and those expressed on the Internet. Most of all, there seemed to be a strong interaction between the two: in some cases certain themes would emerge first on the Internet and then appear literally the next month in the high-tech press. At other times netusers would explicitly discuss books and articles published in the more traditional format.

Since the particular focus of this project does not prioritise the Internet exchanges, I have emphasised more consistency than dissent, but I have also chosen to quote statements expressed on the Internet only when I had reason to believe that they were issues where a general consensus was more or less visible. I have not abstracted single sentences posted only once by isolated individuals. On the contrary, I have quoted particular examples only where there was a repeated emergence of the same feelings and opinions.

In the next section I will show how the fieldwork was carried out between the autumn of 1994 and the summer of 1995.

The structure of the Internet

The main locales I researched on the Internet were a few connected discussion groups on Usenet: alt.cyberpunk; alt.cyberspace; alt.net.media.coverage; alt.data.highway.politics. Usenet is just one of the very different technical protocols which constitute the totality of the Internet. By the term 'Internet' I refer to the larger collection of computer networks in the world, evolved out of the connection between ARPANET (Advanced

Research Projects Agency Network), the military network connecting all the major research centres in the USA (Hauben 1994b); the corporate and public databases linked through the telephone lines; and smaller networks mainly of an amateurish nature connecting personal computers originally on a local scale. Linda M. Harasim defines the Internet as 'a meganetwork, a network of networks connecting over two thousand smaller networks. The Internet provides access to e-mail, bulletin boards, databases, library catalogues, chat lines, multi-user domains, discussion groups, and, for scientists and researchers, access to supercomputers' (Harasim 1993: 6).[9]

First of all I started observing the activity of alt.cyberpunk, a cyberpunk discussion group. Cyberpunk on the Net has traditionally been a forum for the discussion of cyberculture at large. I came to alt.cyberpunk, and to Usenet in general, after having tried out other Internet protocols. The Internet comprises a variety of different domains and every single one of them contains some area devoted to cyberpunk: there are several 'cyberpunk unofficial pages' on the World Wide Web, not to mention FTP (File Transfer Protocol) sites, discussion areas in local bulletin board systems like the WELL and MindVox, gopher sites, cyberpunk-inspired MUDs and so on. Before starting, I will therefore try to describe the technical protocols of all these different devices and, in the process, I will also attempt to justify my choice of Usenet as a privileged area of research.

One of my fundamental requirements was an Internet site where people actually communicated and held discussions. I did not want to simply download manifestos and articles from various electronic sites (which I did anyway), but I wanted to be able to follow actual discussions, the development of ideas, the controversies and the convergences among people who explicitly acknowledged an interest in something that may or may not be explicitly called 'cyberculture'. The common requirement, however, was that they at least showed an interest in the cultural and political implications of high-tech. I also wanted to observe these discussions as they happened in order to compare them to the print material I had gathered, especially the mass and niche magazines I first started working on.

In order to explain how I came to privilege Usenet, I will first give a brief explanation of the different areas of what has come to be known as the Internet. Roughly, the Internet can be divided according to two different modalities of use: it can work as a database, by allowing users access to information stored in more or less distant terminals; or it can allow users to communicate with each other (whether or not this barrier will be eventually

displaced is a matter of technological developments). Information can be accessed by FTP, Gopher, or more recently through the World Wide Web (WWW).

I will not explain in detail the technical nature of these protocols since it is not central to this work. I think it is enough to say here that I used all of these channels to retrieve a series of electronic documents sometimes unavailable in print, including academic essays and journalistic reports. If we exclude the origins of such material, nothing much changes: they are texts, usually singly authored, and are quoted as if they were printed texts. Referencing them, though, might require a level of adjustment. For example, most of the electronic texts presented here were retrieved through FTP since the Web was very much in its infancy at the time. I have tried to locate them again since, and I have put down in the bibliography their most updated electronic addresses, but they are subject to change. Electronic documents have no pages in the traditional sense of the word; when downloaded they more or less follow the particular format the user decides to give them. In this thesis, therefore, quotations from electronic document will be followed by a reference to the author and the year, but will have no page number.

The other modality is that of the conversation, where we have to distinguish between two other variations: real time and delayed. MUDs, MOOs and IRC (Internet relay chat) are all real time protocols, where everybody can connect and chat in real time. MUDs (Multi-User Domains) and MOOs (MUDs which use object-oriented language) are 'imaginary worlds in computer databases where people use words and programming languages to improvise melodramas, build worlds and all the objects in them..'. (Rheingold 1994: 145). MUDs are built with different kinds of software languages and use textual descriptions of the place materially preserved in the memory of a central database: MUDs and MOOs are varieties of role-playing games performed on-line. Cyberpunk is certainly part of the collective Imaginary informing these spaces; some users choose cyberpunk-inspired pseudonyms (or 'handles') and some of the MUDs are actually elaborate renditions of cyberpunk atmospheres.

IRC, on the other hand, is much more mobile and flexible. There is no attempt to convey a sense of physical space: it is rather like a big electronic beehive, divided into several small 'channels', where users meet in an electronic void (MUDs and MOOs usually present descriptions of spaces such as rooms, castles, landscapes, and spaceships). Among IRC users there are a considerable numbers of cyberpunk fans, usually meeting on #cyberpunk,

#mindvox, or #hackers (# is the symbol for channel). Channels are dismantled and recreated every day, so it is actually difficult to keep track.

I have not used my experience on IRC, MUDs and MOOs for reasons of convenience; the conversations taking place in these areas of the Internet are extremely ephemeral and difficult to download. What is worse for this project is the fact that real-time, text-based communication does not encourage long-term debates about particular issues. Most of the conversations I witnessed were brief sparks, with no continuity. I have to add, however, that I do feel they have been an important aspect of my fieldwork; in their informality they have helped me to get a 'feel' for these communities and they have single-handedly provided me with most of the technical and logistic knowledge of electronic communication.

Having decided that MUDs, MOOS, and IRC did not provide me with material which could be more rigorously treated, I was left therefore with the BBSs, the newsgroups, and the electronic mailing lists. BBSs are local electronic bulletin boards which might or might not be connected to the Internet: originally a BBS consisted of a single personal computer with an incoming telephone line; users could dial its number by using a modem and leave electronically encoded messages in its memory; any other user who connected could retrieve these messages and eventually answer. Today, even major service providers like Compuserve, Prodigy, and America and UK On-Line are technically BBSs, although operating at a much bigger scale. Users who subscribe to the Internet through one of these services are channelled first to a common area, shared by all the other subscribers. From that specific area they can then launch into the Internet at large.

BBSs include real-time chat areas and delayed-conversation areas. Among the best known major BBSs we find commercial providers like those mentioned above; local and ideologically-oriented BBSs such as the WELL in California and Echo on the American East Coast; and finally small BBSs with a very strong group identity such as cyberpunk-hacker MindVox. Many of these BBSs comprise areas dedicated to cyberpunk, but I found the limitations of their users frustrating. Usenet and the mailing lists were at least features of the Internet at large, and the sense of continuity with other areas of the Net helped me to focus on that borderline between subcultural practices and other cultural locations I was interested in.

Both newsgroups and mailing lists allow for long-term discussions in delayed form, rather more like a correspondence than an oral conversation. Mailing lists have an easy technical structure: a central computer maintains a

software program which runs the list, mailing back to all the subscribers any message sent to the central database. Usenet has a longer history. It was started by programmers working for Bell Labs and AT&T as an alternative to the ARPANET computer network which connected only institutional research centres. When it started in 1980, it was based on UNIX, one of the oldest and more difficult computer systems; the basis for Usenet were laid in 1977 when programmers for Bell Laboratories created a utility called UUCP (UNIX-to-UNIX Copy): 'This utility made it possible for any computer that uses UNIX to automatically dial and connect via modem with any other computer using UNIX, and exchange files from one computer to another' (Rheingold 1994: 116). Today

> USENET (User's Network) is a series of *newsgroups* or discussion groups supported by a worldwide voluntary member network, with approximately 37,000 nodes in universities, government, business, and military sites (some commercial services and FidoNet bulletin boards also carry the newsgroups) (Harasim 1993b: 6-7).

Usenet was born when programmers using UNIX started communicating with each other in conference areas, exchanging information about the system. When, in 1981, the institutional network ARPANET was plugged into Usenet, more and more other sites established connections and Usenet grew exponentially. According to Rheingold, in 1979 there were just three sites and two articles per day; by 1992 there were more than 2.5 million people logging on Usenet and the daily news were up to 35 million bytes, several thousand times more words than in this thesis.

On Usenet there is no need to subscribe to a central institution, as in the case for electronic mailing lists, and there is no central monitoring. Maybe one of the best ways to explain some of the characteristic features of Usenet is by comparing it closely to electronic mailing lists. Mailing lists are based on a host institution which takes responsibility for daily remailing all the messages posted by its users; users have to subscribe and be accepted; once accepted they will receive in their e-mail box any message that any other member decides to post. Mailing lists can be a heavy burden on one's e-mail area and they can be controlled—one can get physically expelled from a mailing list. Usenet is a public area of the Internet composed by hundreds of discussion groups, the so-called newsgroups. One needs to log on specifically to be able to read any messages at all: messages are ordered by heading

(topic), every heading constitutes a 'thread' which can cover several messages. As a result of particularly obnoxious behaviour it is possible to be ostracised by other posters on a newsgroup who can use 'killfile' applications to censor any message posted from a particular e-mail address off their screen, but nobody can expel anybody directly.[10]

The main reason why I chose the newsgroups over the electronic mailing lists is because newsgroups are public and unmonitored: newsgroups allow long-term conversations and the crystallisation of communities over time. At the same time, they are also constantly open to anybody who would like to browse even for a few minutes. These two qualities (long-term conversations and permanent openness) contributed to my decision to focus on Usenet.

I started my work on the Internet by looking at alt.cyberpunk, the main forum on Usenet where people who identify with cyberpunk as a cultural attitude meet and discuss. Many of the discussions are about films, fiction, and music; others are on the nature of the cyberpunk experience; more still are on the philosophical dimensions of the experience of electronic communication and the nature of high-tech. On other occasions, as a response to particularly controversial political situations, they can be on current events that are seen to touch the concerns of its users closely (such as political debates about the regulation of CMC). Alt.cyberpunk, however, ended up being only the starting point. By virtue of the widespread tendency to 'crosspost', I ended up following three other newsgroups at the same time, all of which seem to be tied together tangentially: alt.cyberspace, alt.net.media.coverage, and alt.politics.data.highway.

In the next section I explain how, figuratively speaking, the field widened itself, and how this is related to the technical structure of Usenet.

The structure of Usenet

When we log on to Usenet for the first time, we are confronted by a virtually endless list of newsgroups, numbering several thousand, although not all of them available from a single site. Any quantitative assessment is approximate since newsgroups get started every week, and are frequently closed down when not enough people are posting. Once we go through the list we can choose to subscribe to any number we are interested in. Once we log on again, we will find on our screen a smaller list containing the newsgroups we subscribed to the first time. My list, for example, looked like this:

alt.activism
alt.cyberpunk
alt.cyberpunk.chatsubo
alt.cyberspace
alt.extropians
alt.feminism
alt.generation.X
alt.net.media.coverage
alt.politics.data.highway
alt.postmodernism
soc.cult.italy

Newsgroups are divided into several categories: the kind that start with alt (alternative), like mine, are the least controlled and anybody can create a new newsgroup, no matter how silly (Rheingold quotes alt.multi-level-marketing.scam.scam.scam). Other kinds of newsgroups can start with bis (business), comp (computers), misc (miscellaneous), rec (recreation), soc (society and culture), sci (science) and talk (general discussion). By clicking on one of these lines, such as alt.cyberpunk, my screen would change and I would probably face something like this:

1. What is cyberpunk? 1
2. Cyberpunk FAQ 1
3. Psychosonic 9
4. Re: Another Net Anarchy must end article... 5
5. Re: Crypto Anarchy and Virtual Communities 2
6. Futurist conservatives 7

Individual postings are the fundamental units of Usenet: 'Anyone with access to the network can send out a specific, signed electronic message to the rest of Usenet. The address of the message, however, is not to an individual or even a mailing list, but is the topic of discussion, known as a newsgroup'. (Rheingold 1994: 118) The headlines are named 'threads': a Usenet user can choose either to start a new thread by sending an e-mail message with a new heading or can answer somebody writing on another thread. His/her message will then become incorporated in the thread. The numbers on the right side indicate how many messages are incorporated in

that thread. If I click on '4. Re [ply] Another Net..'. I will be faced with something of this kind:

> From: Michael Howard <human@phantom.com
> Newsgroups: talk.politics.libertarian,alt.censorship,alt.privacy,alt.activism,alt.anonymous,alt.binaries.pictures.erotica.d,alt.current-events.net-abuse, alt.cyberpunk,alt.cyberspace,alt.internet.media-coverage,alt.politics.usa.misc,talk.politics.misc,alt.conspiracy,talk.politics.drugs
> Subject: Re: Another Net Anarchy must end article Date: 16 Jan 1995 16:44:18
> pwh@bradley.bradley.edu (Pete Hartman) writes:
> : > If the government tries to regulate particular segments of the backbone,
> : > what is going to stop people from a) setting up their own backbones,
> : > presuming someone with the money and political motivation (and I think
> : > they could be found out here somewhere) or b) going back to store-and- : > forward via phonelines?
> Net-Runner (tristan@news.dorsai.org) wrote:
> : Possible regulation from the government forbidding those things. If
> : they're going after usenet, they will probably make provisions to make
> : sure that they have control over ALL cyberspace.
> You seem to be assuming that government regulations against something actually prevent that something. For example, we all know that the laws against drugs actually *work*. There isn't anyone standing on street corners selling drugs. There are no children in schoolyards being cut down by the crossfire of the drug war. There is no incentive for kids to make gobs of money selling drugs instead of working at McDonald's for five bucks an hour. There is no organized crime capitalizing on the profits to be made, just like during alcohol prohibition.
>
> -- =: "Government is not reason, it is not eloquence, it is force!" := =: - George Washington
> := =: "Free men have arms; slaves do not." - William Blackstone
> := =: "A committee can come up with a solution
> := =: that is stupider than any of its members." - unknown
> := =: "The love of good is the root of all money." - Jon Galt
> := =: Jon Galt email: jongalt@pinn.net :=

The first line gives the name and the e-mail address of the poster; the second line, 'newsgroups', refers to the number of newsgroups the article has been cross-posted to. It was possible to read this particular thread

simultaneously from 'talk.politics.libertarian, alt.censorship, alt.privacy, alt.activism, alt.anonymous, alt.binaries.pictures.erotica.d, alt.current-events.net-abuse, alt.cyberpunk, alt.cyberspace, alt.internet.media coverage, alt.politics.usa.misc, talk.politics.misc, alt.conspiracy, talk.politics.drugs'. The second line refers to the subject , 'Re: Another Net..'. followed by the date, the time, the service provider and sometimes the corporate organisation, the number of lines and the e-mail address. In this case the symbol ': >' indicates that what follows is quoted from a previous message.

A characteristic of Usenet is that messages are often 'crossposted'. Crossposting involves sending the same message to different newsgroups which the writer assumes will be interested in the subject. Many of the messages posted to alt.cyberpunk (my original focus) were crossposted to similar newsgroups, in particular to alt.net.media.coverage, alt.cyberspace, and alt.politics.data.highway. In this way I came to follow discussions on all these newsgroups, which I identified with those more interested in the larger aspects of CMC. Although alt.cyberpunk was the central newsgroup I monitored, I ended up following discussions in all these other ones, which also gave me a sense of the debate on the Internet as a whole as expressed by those groups who claimed a strong interest in CMC per se.

These newsgroups had different degrees of participation which often peaked at particular times. Alt.cyberpunk usually contains anything from forty to seventy threads, and any one thread can be composed of between 1 and 30 messages. Messages get deleted after three or four days and preserved in the newsgroup archive, which can be reached through a device called FTP. Alt.cyberpsace usually contains twenty or less threads. Alt.net.media.coverage and alt.politics.data.highway had up to one hundred threads, probably due to the fact that at the time the problem of the politics of CMC and its media coverage was a particularly hot area of debate. In an average-sized group such as alt.cyberpunk, the turnover of messages can be anything from fifty to one-hundred per week.

I generally preferred to follow the discussions as they happened instead of using only the archive, except when it was necessary because I had missed some days. I wanted to be able to witness the development of the debate in direct relation to contemporary developments in niche and mass media, in order to be able to outline the connections I was interested in.

Having decided to follow all of these groups, I logged on Usenet every day for almost one year, from September 1994 to July 1995. Every day I

spent one hour or more reading the messages and the threads, downloading messages and getting to know the users (I will give details of this process of 'knowing' the users later on). I focused particularly on those threads which referred to net politics or to more abstract discussions about the future. I refer to this process as 'monitoring' for lack of a better word: obviously I could not read every single message every day for one year. Nevertheless I did read between ten and twenty messages a day, and downloaded at least six hundred messages in nine months. These messages where selected according to several criteria:

a) messages that dealt with the definition of 'cyberpunk'. Since I wanted to use cyberpunk as an access point into cyberculture, I was interested in understanding how and whether that relationship was consciously expressed. As expected, posters on alt.cyberpunk accepted it more than any of the other groups. On alt.net.media.coverage and alt.politics.data.highway, posters were more irritated by its widespread use in the media at large. Both, however, resented the mass media's 'mindless' use of cyberpunk to define CMC as a whole (I will expand this point in chapter 4)

b) messages which dealt with the politics of electronic communication (especially threads that dealt with anarchy and regulation), which I address in chapter 5.

c) messages which dealt with the users' experience of electronic communication and their feelings about the nature of the medium, which I quote mostly in chapter 7.

The first kind of messages helped me to understand the relationship between these users and the history of the various social constituencies associated with cyberpunk. The second group was most useful to confirm or problematise a wider discourse on technology and political agency, as expressed by academic writing, niche and mass media. The third sample helped me to formulate some of the connections between scientific theories of evolutionism and the Internet.

I spent quite some time trying to understand the recurring patterns of expression, the nature of the obsessive concerns formulated again and again, the play of the personalities, and the various sub-groups. Most newsgroups are constituted by a majority of 'lurkers', individuals who usually read without intervening; a consistent minority of irregular users; and a vociferous minority of frequent posters (see McLaughlin, Osborne, and Smith 1995).

It is on the basis of this experience that I felt I had to call my experience of

Usenet 'fieldwork' and not simple textual analysis: I was not just reading individual texts; I was following a conversation between groups of people who very often knew each other well. To be more precise it was a text-based fieldwork, in as much as the modality of communication was exclusively textual.

Fieldwork on the Internet: problems and possibilities

The nature of electronic communication in general and Usenet in particular makes Internet-fieldwork an activity requiring fresh theorisation. For some time I have considered the possibility of treating this material as another kind of text and subsuming the whole thesis under the methodology of textual analysis, but I have been increasingly troubled by the dissonances between the two modes of communication. In the first place texts are authored, almost always singly. Usenet messages are authored but not quite: they have a signature, but any assumption about who the subject is behind the signature involves a knowledge of the field, and even then we are always dealing with very shaky foundations. For example we might deduce from the e-mail of one of the posters quoted in the extract (pwh@bradley.bradley.edu) that he is posting from an educational institution (edu) called 'bradley'. He can be anything or anybody: a technician, an administrator, a student, a lecturer. This might cause doubts about the identity of these users.

The problem of individual identity assumes a whole new dimension in CMC; as Andrew Ross commented on computer hacking 'cybernetic identity is never exhausted; it can be recreated, reassigned, and reconstructed with any number of different names, under different user accounts' (Ross 1991: 89). Ross, however, is talking explicitly about computer hacking, where anonymity is a necessary quality; hackers are often involved in illegal activities and is therefore necessary for them to hide under as many accounts as possible. In general, it is actually possible to be more than one person on the Internet simply by opening an Internet account through several providers. On Usenet the only identification mark on a message is the e-mail address on top: since there is no law against possessing more than one e-mail address, it is theoretically possible that the same individual could go to the trouble of building two or more consistent on-line personas.

However, the motivations behind the activity of hacking and those behind the activity of posting to a newsgroup are very different. There is no intrinsic advantage in hiding behind several e-mail accounts when posting to

Usenet, except in the case of particularly violent 'flame wars', or personal vendettas against one of the other users. A consistent number of individuals demonstrate what is, in fact, a high emotional investment in the conversations carried on in a particular newsgroup. They might like the feeling of being recognised, of not having to re-establish their authority as speakers every time. Throughout the Internet there is a tension between 'the extreme mutability and multiplication of identity possible in cyberspace [and] the desire to build communities based upon honest communication with people of diverse backgrounds and interests. Role-playing, and the potential for dishonesty which goes with it, militates against community' (Stallabrass 1995: 16). Michele White, a member of an on-line MOO I logged on to for a while, defined this tension as that between 'anonymity' and 'pseudonymity': anonymity is when nobody at all knows who you are and you are free to assume any behaviour or identity you like; pseudonymity is when you are part of a community long enough for people to recognize you, even if under a pseudonym. Usenet encourages pseudonymity over anonymity. Richard MacKinnon has also described this pseudonymity as the construction of 'personae', which are dependent on three essential conditions for existence:

> The first condition is the continued association between the user and the persona. The loss of user's access to Usenet severs the association to his or her persona....
>
> The second condition is the visible demonstration of presence. While Usenet might have great utility to a passive user, the lack of interaction with other users does not create a persona....
>
> The third condition is that the participation is continuous. A persona belonging to a user who is prevented, unable, or unwilling to continue to participate will continure to exist until the memory of that existence is forgotten by the other users. (MacKinnon 1995: 120)

This means that there is usually a consistent persona played out on the screen, and it is quite common to see people identify themselves through their full name instead of the usual 'handles'.

I think that generally most posters on Usenet tend to keep a consistent e-mail address in time, and rather like being recognised and remembered by the others. Of course, there might also be cases of posters using two different e-mail addresses and on-line personas, and they might be extremely difficult to spot: a student might have an e-mail account with his/her university and another one with a private service; an employee in a

company with Internet access may also use a private service. In real time conversation areas which allow 'virtual sex' (text-based simulations of sexual intercourse), there might also be a motivation behind keeping two distinct on-line personas, but this seems not to be the case for Usenet. I have not found much evidence either of 'anon' sites within my newsgroups; that is e-mail coming from electronic sites which offer their services to individuals who definitely wish to remain anonymous. My newsgroups did not present any of these cases: anon posters are usually common in pornographic newsgroups or other hot spots arguably under police surveillance.

My conclusion after one year of intense monitoring of these Usenet newsgroups is that although there is no guarantee whatsoever that anybody actually is whoever they say they are, there are degrees of recognition. In the first place there are e-mail addresses, which usually give some indication about the institutional or commercial site an individual is posting from. I have noticed many university sites that usually mark young users, coming mostly from North American, Australian and Northern European sites. I have also noticed a few company logos, usually from some kind of computer-oriented firm: these users were inclined to be more reflexive and engage in long threads about political or philosophical questions. Many users also posted from various commercial services.

Beyond that, the experience of actually logging on every day made me witness to various autobiographical statements dropped here and there over a year, which referred to the user's work or geographical location. On this basis I have come to various conclusions about the social locations of the users of this particular newsgroup. For example, after one year on alt.cyberpunk I could identify a core of individuals who seemed to be particularly assiduous members. Some of these people use pseudonyms, others prefer their real names (or at least names with conventional forenames and surnames); some use university services, others commercial providers; some write from a company site and attach their company logos, still more prefer to remain anonymous.

In general, I think that the micro-society of these Internet newsgroups includes four main groups of people:

a) students in their late teens and early twenties, particularly common on alt.cyberpunk.

b) more mature, professional technicians and experts (people in this group are more likely be readers of the techno-yuppie *Wired*. or of mainstream magazines such as *Time* and *Newsweek*). There were a few of this group on

alt.cyberpunk, but they constituted the majority in the other groups. Alt.net.media.coverage also included journalists specialising in science and technology, whose signatures would sometimes reappear in the cyberpress.

c) radical technologists interested in the strategic uses of cyberpunk survivalist ethics, and influenced by people like the anarchist Hakim Bey. They were scattered across all these newsgroups, but were particularly active on alt.cyberpunk and alt.cyberspace

d) a consistent group that is fairly active is also constituted by European users, mainly from the newly connected sites in Scandinavia and in England, whose postings emphasize different political traditions[11].

The percentage of posters who claimed a female identity was in the order of 4 to 5%, but there are no guarantees that there could not be others posting under a male pseudonym. There was also no particular evidence showing the existence of posters from ethnic minorities (these points could be subject to controversy).

Finally, I would like to stress how all these messages have been downloaded as they were: there was no process of transcription, only of selection. This means that I have kept all the spelling mistakes and typographical errors. These mistakes are typical of electronic communication, where there is no editing and people are more interested in getting their message across than checking their grammar.

Situating Internet Fieldwork

Identity is just one of the categories in need of reconceptualisation in electronic fieldwork: how do I distinguish this kind of fieldwork from other kind of text-based research like, for example, Ian Ang's work on *Dallas'* audience? In that particular case Ang published an ad in a major newspaper asking for fans of the TV series *Dallas* to write to her about their favourite program (Ang 1985). As with Internet fieldwork, she had to deal with texts such as letters posted to her by fans.

There are important differences between her approach and mine: in a way, my work on the Internet is closer to an ethnography than any other kind of fieldwork. I have texts, but I did not ask for them. As in ethnographic research, I spent time literally spying on people (netusers would call it 'lurking'). My presence was invisible, the sheer amount of exchanges I witnessed over one year escapes any easy quantitative description. As in ethnographic research, a lot of my work was of a more intuitive kind: it involved the activity of getting to know people in ways different from other

formats like the letter or the questionnaire.

Unlike mainstream ethnographic work, however, I did not have to explain my presence or fight for recognition, confidence, or friendship. This decision involved quite some time and was fraught with ethical and moral dilemmas: did I have to inform my research subjects that they were being spied upon? Did I have to intervene, without revealing my identity as a researcher, and stir the debate in directions which would help me to clarify some of the issues I was concerned with?

After much thinking I decided not to. I thought that in many ways I was in an ideal position to research a group which did not suspect they were being studied and were therefore carrying on their usual activity uninterrupted. Two major considerations prevented me from actually asking people about their 'real' identities:

a) fear of provoking hostility. On Usenet academics and researchers are generally dreaded and despised as representative of institutional knowledge. I witnessed pretty soon the fate of some researchers who publicly asked for help in their work on cyberpunk. They were insulted and accused of feeding the hype. The stance of most posters on alt.cyberpunk on academic research of a sociological kind is similar to their stance towards mass media in general: it is considered exploitative, alien, and sterile. I would probably have received false information and much abuse.

b) fear of 'changing' the field. Since newsgroups are 'discussion groups' it is impossible to participate without expressing an opinion: one cannot be a neutral poster. If one's opinion is absorbed by the group, it might be referred to and eventually affect the balance of the group itself. If I had decided to participate I would have become a regular poster, part of the community and someone who affected it.

Furthermore, I was not planning to turn my thesis into a thick ethnography. Monitoring these newsgroups was a way to trace the presence or absence of certain leitmotifs particularly popular in niche media catering to net-users: these newsgroups are not the main focus of this project. I will use statements downloaded from these groups to support my hypotheses on the existence of some dominant discursive formations in cybercultural accounts of science and technology. These statements are incorporated as 'texts' (electronic texts produced out of a daily interaction) to substantiate

other 'texts' (electronic or printed texts, produced by an author and protected by copyright). Anne Balsamo has referred to these practices as 'hybrid textual-social forms' (Balsamo 1993: 683).

This textual quality of my material represents a consistent difference from ethnographic work performed in a physical space. The former usually relies literally on a process of translation from the oral to the written (Van Maanen 1988). This massive enterprise is a completely different project: it requires an elaboration and a translation in which nuances such as tone of voice, accents and intonations are lost. My problem was not so much translation but selection: there was no way I could download everything anybody said. This selection involved a longer process than might appear necessary; it took a few months before I could get an intuitive feeling about which topics were coming up again and again. I was also looking at niche magazines and very often I was drawn to those discussions which seemed to replicate or interact with some of the narratives I was encountering in my work on print media. The result of my concentration on lines of connection has resulted in a somewhat disagreeable feeling of convergence and uniformity. In much of my use of Internet postings I have tended to emphasise agreement between the members of that community, giving a somehow forced feeling of consistency.

I did not select the hundred of threads about music, films, and novels. For reasons of convenience I concentrated on those messages which addressed science and technology as political and cultural questions. Out of these messages I selected those which seemed to surface repeatedly and had some relation to issues developed in the technological press. As a result I cannot make claims of objectivity for my findings, but I hope to be able to produce at least some convincing accounts of selected leitmotifs.

Finally, after having worked out all these issues, I had to confront another problem: most ethnographic work has ethnography at its constitutive centre. The goals of these works is to explore and account for the cultural and social compositions of the groups researched. My project, on the other hand, uses my experience of Usenet as one of the elements among others belonging to very different formats. My focus was on the articulation between some of the narratives elaborated in these groups and larger cultural accounts of science and technology.

Although I am sure that there would be a lot to learn from an intensive ethnography of these groups, I am also convinced that there are strengths in working on the articulation between these subcultures and contemporary

technoculture at large. It is very often through the exchanges between the inside (limited groups) and the outside (media at large) that important cultural developments become visible.

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[1] The term 'biotech' indicates a specific scientific-industrial business, based around Research and Development into functional micro-organisms (such as bacteria able to clean polluted water); into new species of plant and animals, and into genetically-determined diseases (Krimsky 1991; Kenney 1986; Ross 1994; Levidow 1996). Cyberpunk science fiction was mainly concerned with the application of biotechnology to the human body, an area which is the subject of much caution and regulation.

[2] On the subject see Stelarc (1989); Pauline (1993); Rushkoff (1994); Rucker, Sirius and Mu (1992); Leary (1994).

[3] In the twenties and thirties, the Chicago School developed 'ethnographic studies of the relationship between neighbourhoods, life-styles and youth' (Brake 1980: 29). In *The City*, published in 1925, McKenzie, Burgess and Park developed a model of analysis of the city based on a naturalistic concept of ecological movements and flows—the so-called social ecology. Social unrest was the result of 'ecological unbalances' in the flow of people across the urban space. Subcultures, especially youth delinquent subcultures, were interpreted as a pathological result of such an ecological disequilibrium in the expansion of the city (Parker, Burgess and McKenzie 1925).

[4] One of the oldest technical protocols of grassroots electronic communication, a BBS consists of a single computer plugged into a phone line, which is usually set-up in a private house. Users can dial its number through a modem and connect to the central computer leaving a message in its memory. Other users can read and answer the message in the same way (just like a real bulletin board). BBSs are usually local, although they can be connected to larger networks, and cater for restricted groups of people, sometimes screening the users with different access levels. As I describe in chapter 4, this form of electronic communication actually coalesced tightly knit subcultures such as the early hacker groups.

[5] This quote was regularly attached to the messages posted by one particular user: '**I've got the strap-on connections in Lebos, and the KY trust in Sodom, I'm the only Man in Istanbul, I'm the only punk in Islam, I'm the only bar on Skid Row, I'm the only whore on the waterfront** _Cobble Stone Gardens_ William Seward Burroughs'.

[6] CMC tends to erase social cues about how a statement should be read; when a message is written and posted to a stranger, misunderstandings often occur about how the message should be read. Jokes are often taken for insults and irony is generally lost. Rather than accepting this erasure, CMC users invented the 'emoticons', signs which are used to convey these cues briefly and efficiently. 'Smiley faces, graphic icons built out of punctuation marks, are used for a variety of purposes often served by facial expressions or vocal intonations. They smile (:-)), wink mischievously (;-)) and frown(:-()' (Baym 1995: 152). Other common abbreviations are IHMO (in my humble opinion); and IRL (in real life).

[7] See chapter 7 for details.

[8] Howard Rheingold thinks that the 'porosity' of the Internet in this specific historical moment—the fact that it feels like a fragmented but connected space— might be due to the early stage of the phenomenon. 'The

present state of porosity between the boundaries of different online groups on the Net might be an artefact of the early stages of the medium—fragmentation, hierarchization, rigidifying social boundaries, and single-niche colonies of people who share intolerances could become prevalent in the future' (Rheingold 1994: 207).

[9] For a history of the technical development of the Internet see Rheingold (1994); Hauben (1994); and Quarterman (1993).

[10] Lazlo Nibble in *Wired* magazine has compared the difference between mailing lists and newsgroups to 'the difference between inviting a group of friends over for wine on a Sunday evening and putting a billboard that says 'Free Booze Here!!!' in your front yard'. (Lazlo Nibble 1996 cited in *Wired UK* 2.02: 49)

[11] These European users are quite different from more 'conscious', organised groups such as those revolving around the Computer Chaos Club in Hamburg (Germany) and Decoder in Milan (Italy) (see Scelsi 1990). Most of the European users on alt.cyberpunk showed a remarkable ignorance of the 'scene' and were often dismissed by the American users.

Chapter 2
The social location of cyberculture

Cyberculture is mainly defined by its interest in cybernetic technologies. The specific areas of cyberculture I research in this thesis are particularly involved in the use of Information and Communication Technologies (ICT), such as computer networks. Any attempt to frame cybercultural practices in a wider social and economic context will then inevitably touch on debates around the information society and the new importance of ICT. In this chapter I try to give a larger perspective on the debates around information technology and class. I will start with an overview of the literature on the composition of the audience of cyberpunk and proceed to outline briefly current debates on the nature of work in information societies. Finally I will look at recent accounts of the 'virtual class', those strata of the knowledge class who are the most likely users and supporters of computer-mediated communications. In the following chapters I refer to the ways in which the narratives deployed by these communities can be explained in terms of their work experience. In this chapter I explore how this work experience has been described in terms of its 'transience' (temporary nature of work); its reliance on the sharing of information; and its dependence on communities based on networking.

I think that this effort is necessary to counteract the disappearance of the social context in most critical accounts of cyberpunk and cyberculture. By removing cyberpunk-inspired practices from larger issues related to the transformation of work, these accounts often end up portraying them as a form of historical avant-garde. Mark Dery, for example, has stated that 'these subcultural practices offer a precognitive glimpse of mainstream culture a few years from now...' (Dery 1993: 564). Understanding the specificity of these practices in particular social contexts might help to avoid this image of the 'queue to the future'. By recuperating this specificity we might be able to build a better picture of the future of CMC, one that would help us to understand the specific relations which are producing the mystique of computer-mediated communications.

The audience of cyberpunk science fiction

The social location of cyberpunk science fiction and its audience was the object of some controversy in the early nineties. At least two authors, Darko

Suvin and Andrew Ross, tried to balance the wave of euphoria surrounding cyberpunk SF by pointing at the class constituency of its authors and audience.

Darko Suvin considered William Gibson to be the only real cyberpunk author, single-handedly responsible for the popular success of the subgenre. Therefore he focused exclusively on his work and came to the conclusion that its popularity was due to its ability to express a new 'structure of feeling' (Williams 1977):

> Based on external and internal evidence, I would speculate that cyberpunk SF is representative for the structure of feeling of an important but certainly not all-inclusive international social group. As I hinted at the beginning. this is some fractions of the youth culture in the affluent North of our globe. More particularly, cyberpunk is correlative to the technicians and artists associated with the new communication media, and to the young who aspire to such a status.... Now this group is widespread, international, and significant beyond its numbers as a cutting edge. However it is certainly a small, single-digit percentage even to the fifteen-to-thirty years' age group, even in the affluent North (never mind the whole world). (Suvin 1991b: 363)

Andrew Ross focused instead on the social location of cyberpunk authors and read their technological fantasies as rooted in their social, embodied experience of the world, marked by their class (middle), their age (young), their colour (white) and their gender (male). He argued that cyberpunk science fiction expresses 'the most fully delineated urban fantasies of white male folklore... a baroque edifice of adolescent male fantasies' (Ross 1991: 145).

> This urban fantasy, however countercultural its claims and potential effects, shared the dominant, white middle-class conception of inner-city life. In this respect, the suburban romance of punk, and, subsequently, cyberpunk, fashioned a culture of alienation out of their parents' worst fears about life on the mean streets. (Ross 1991: 146)[1]

The question of the social location of cyberpunk authors and cyberculture in general has not been answered or exhaustively theorised. One of the reasons for this neglect is undoubtedly a general fear of social reductionism, of reducing the complexity of cultural phenomena to the determinations of their class position. Cultural Studies, on the other hand, was born out of an intensely felt need to understand culture as a complex event, shaped but not

reducible to society and politics. Indeed, all the early subcultural studies carried on by the Centre for Cultural Studies in Birmingham assumed that class was a fundamental basis (Hall and Jefferson 1976) and class has always been a central concern of British Cultural Studies in general. In this sense, it might be argued that the absence of class in the debate around cyberpunk and cyberculture might be explained by its allegiance to the classless rhetoric of its American constituency.

The Italian Alberto Caronia is the only author I am aware of who replied to Suvin's argument about cyberpunk and the knowledge class. In his opinion, Suvin's dismissal of cyberpunk as the structure of feeling of a minority is typical of the shortcomings of a classic Marxist approach:

> The fact that a certain group is a minority *in a given historical moment* does not mean that it is irrelevant. Suvin's argument clearly represents how difficult it is for a classic Marxist approach to understand and analyse the social and cultural phenomena of the end of modernity.... [W]hen he argues that we should 'hold fast to a belief in really possible, even if statistically improbable radical changes' (Suvin 1991b: 357), he is still thinking of the proletariat as a general class. But in the age of the numerical and political decline of the proletariat as a class, the new subjects who occupy the scene are 'weak' on the traditional political and social level, but strong on that of the production of the Imaginary. (Caronia 1992: 14) [my translation]

In answering Suvin, Caronia singles out two social groups who were particularly attracted to the social Imaginary represented by cyberpunk: hackers and countercultural technological movements; and scientists and technicians working on Virtual Reality (*ibid.*: 11). Csicsery-Ronay Jr agrees in describing 'the actual subculture most affected by the SF ...[as] the engineers of virtual reality' (Csicsery-Ronay Jr. 1992: 408).

The impact of cyberpunk on virtual reality engineers has also been argued by Rosanne Alluquere Stone:

> During this period, when *Neuromancer* was published, 'virtual reality' acquired a new name and a suddenly prominent social identity as 'cyberspace'. The critical importance of Gibson's book was partly due to the way that it triggered a conceptual revolution among the scattered workers who had been doing virtual reality research for years: As task groups coalesced and dissolved, as the fortunes of companies and projects and laboratories rose and fell, the existence of Gibson's novel and the technological and social imaginary that it articulated enabled the researchers in virtual reality—or, under the new dispensation,

> cyberspace—to recognize and organize themselves as a community. (Stone 1991: 98/99)

Hackers and Virtual Reality engineers are not included in this thesis as specific groups. In the last two years, Virtual Reality has lost much of the public support and enthusiasm it enjoyed in the late eighties and early nineties.[2] As a technological product it keeps being developed, but it has definitely lost ground in defining the horizon of hope and enthusiasm for groups interested in high-tech. CMC (computer-mediated communications) has captured the passionate daily involvement of a far more consistent number of individuals than Virtual Reality. In spite of the early hype, VR products can be accessed only through selected video-arcades, and those few models available on the market are definitely too expensive even for the average professional. CMC, on the other hand, is cheap, in considerable expansion and development, and at the centre of international concern. CMC is also useful for developing work contacts and virtual communities which are particularly attractive to many workers in the information and communication industry. CMC is becoming part of many people's daily lives in ways unachievable for VR at this stage. As a result, as I have shown in chapter 1, popular writing about Virtual Reality was at its peak between 1991 and 1993, but since 1994 the bulk of publications about technology for the general public are concerned mainly with the Internet.

Hacker groups, who have been the most public representatives of a cyberpunk sensibility, have also lost ground. As a result of the expansion of the former beyond the early technical elites, they have receded from their position as monopolisers of the computer networks to their radical fringes. Hackers, of course, still exist and operate through their own electronic sites, but they are no longer seen as the main group involved in computer networks; cyberspace and hackers are no longer synonyms.

Instead of focusing on VR engineers and hackers I have decided to focus on those sections of cyberculture who have been particularly active in formulating a new culture of electronic communication. Across all these groups cyberpunk SF has often been a stimulating force, a dense concept that has been used in different ways to address some important issues associated with the uses of science and technology. For reasons of historical and political urgency, I have chosen to research some social and cultural spaces which might not be as obvious as hackers and VR engineers. My choices are fundamentally related to historical developments which are

contemporary to the process of researching this thesis, such as the explosion of the Internet phenomenon between 1993 and 1995. These are crucial years in the development of this project.

Cyberpunk SF was a useful means of tracking the centrality of different groups interested in technology. Since the mid-eighties, the heyday of cyberpunk science fiction, both the cutting-edge technology and the groups involved have been developing in unpredictable directions.

If we can draw some generalisations about the mixed-up flow of cultural history, we can detect some important shifts in the centrality of groups associated with cyberpunk and often simultaneously with cyberculture at large. Between 1985 and 1991 cyberpunk was adopted by and commonly associated with young hackers (Markoff 1988; Markoff and Hafner 1991). Between 1991 and 1993 Virtual Reality, Cyberspace, and Cyberpunk became almost synonyms in books, mass media, and academic reports: VR engineers such as Scott Fisher, Brenda Laurel, and Jason Lanier started using Gibson's cyberspace as a stimulating concept to work with (Benedikt 1992; Rheingold 1991; Helsel and Roth 1991). By the time I started researching cyberpunk, hackers had become the more or less malignant fringe of an expanding Internet culture; Virtual Reality had been labelled 'vapourware' (a bogus product sold before being actually developed)' and the Internet had become the centre of large political, economic and social attention (Rheingold 1994; Herz 1995). The years between 1993 and 1996 might also be the last years in which cyberpunk was used as a public label for CMC: the current marketing of CMC will certainly contribute to an expansion of its use beyond its original groups, such as computer hobbyists and hackers.

In analysing the role performed by cyberpunk in these developments, I have come up against some difficulties in conceptualising a possible class location which could help me to understand them contextually. By giving up my focus on virtual reality engineers and hackers, I have also lost a certain class specificity. Users of electronic communication are not blessed with the consistent social homogeneity of the former groups: generally highly technically literate, they are certainly not reducible to hackers or engineers. Of course this is not to imply that there are no hackers or engineers among the groups I have researched. On the other hand they do not exhaust the social spectrum covered by those involved in using or speculating about high-tech. In the next section I will try to clarify some of the connections between the original audience of cyberpunk SF, the current composition of cybercultural communities on the Net, and the debate around the subjects of

the Information Age.

Internet communities and the 'Virtual Class'

It might be useful to remember that cyberpunk science fiction never mobilised hackers or engineers alone. Cyberpunk was circulated in North America in the mid-80s at the beginning of the PC revolution and the economic boom of the Silicon Valley software industry. It also coincided with the fact that a new generation of techno-literates reached adolescence in a new intimacy with information technology. Video games and personal computers such as the Commodore, Atari, and Apple made IT a familiar feature of everyday life for many young people living in advanced capitalist societies. The cyberpunk audience was the first large group who reasonably expected to make a living out of computers in the new personal computer age. In this context cyberpunk literature, written by authors in their mid- and late twenties, came to provide a generation of techno-literates with symbolic ammunition to understand and consolidate a new social experience.

The history of IT, its introduction in society, and its effect on work need also to be explained in order to understand the class constituency of the users of electronic communication. I have particularly looked at theories of the information society and at sociological analyses which describe the transformation of labour in relation to the mass introduction of ICT. My hypothesis is that the expansion of electronic communication should be read in terms of the impact of IT on the structure of work. For instance, when I analysed the circulation of theories of power and resistance in Internet culture, the narratives I encountered made more sense if I thought of my research subjects as people with a reasonable access to IT *in their workplace.*

The geopolitical diffusion of CMC, for a start, seems to map the contours of the most technologised areas of the planet: massive in North America and Japan, and in definite expansion in Europe (Rheingold 1994).[3] North America and Japan are two of the world economies most dependent on the development of high-tech for international competition. Over the last thirty years, all these countries have witnessed an economic transformation whose causes, character and scope is still the subject of much debate. Kevin Robins distinguishes between four different theoretical approaches that have been used to explain the nature of this transformation in advanced societies (Robins 1992). Robins analyses the different perspectives offered by theories of the postindustrial society, neo-Schumpeterian accounts of long-cycles of

economic development caused by technological innovation, theories of the new economy of flexible specialisation, and post-Fordist explanations for increasing privatisation and the end of the welfare state. Since theories of the information society developed out of theories of the postindustrial society, I will look more closely at the latter and try to position the social location of users of CMC in this context.

The features of a 'post-industrial society' were outlined by Daniel Bell in *The Coming of Post-Industrial Society* (1973) and Alain Touraine in *The Post-Industrial Society* (1971). These authors argued that the contours of a post-industrial society were emerging all over the most technically advanced regions of the world:

> [t]he full emergence of postindustrial society, it was argued, would be associated with substantial changes in social relations: for instance the ownership of capital would no longer be the main source of social power. Instead, reflecting the importance of knowledge-based activities in the economy.., knowledge itself would become the organising principle. (Robins 1992: 4-5)

These authors conjectured that white-collar work and the service sector would become increasingly predominant over classic blue-collar work in the manufacturing industries.

This approach was heavily criticised in the following years. Its insistence that material capital would lose its ground as the source of power has been heavily disputed, but many of its elements survive in theories of the information society especially as developed in Japan (see Masuda 1985). While theorists of the postindustrial society argued that white collar work and the service sector will be increasingly central, theorists of the information society argue that the 'information sector' and 'information work' are the real centre of the economy (Webster 1995).

The issue of the transformation of work is therefore central to the debate. Robert B. Reich, secretary of labour in the Clinton administration, identifies the three classes of jobs dividing the current work force: routine production workers, in-person servers, and symbolic analysts.

> 'The first two face intense wage competition from the boundless supply of unskilled labor throughout the developing countries. Symbolic analysts, on the other hand, occupy privileged structural position in the global labor market as researchers, managers, creative problem solvers, and other high-level corporate experts. These jobs require high levels of skill and

> education, add high levels of value to production and consequently command high wages... ' (DeMartino and Cullenberg 1994: 14)

However, these analyses might be flawed by their lack of understanding of the heterogeneous nature of the new knowledge class. Frank Webster quotes two influential OECD (Organisation for Economic Co-operation and Development) reports (1981, 1986) which 'produced figures from all member countries signalling "continued growth in those occupations primarily concerned with the creation and handling of information and with its infrastructure support" (1986)' (Webster 1985: 14).

Webster criticises the use of these figures as being a proof of the shift to an homogenous information society. One of the major problems with them is that there seems to be no clear understanding of the line dividing information and non-information work, or of the variety of occupations covered by the term 'information workers'. Webster uses the example of the railway signalman and the photocopier maintenance worker: both must have a particular stock of knowledge about the technologies they work with, but only the second will be classified as an information worker just because he/she deals with a new technology.

More to the point, these figures do not tell us anything about 'the hierarchies - and associated variations in power - of these people' (16):

> For example, it could be argued that the crucial issue has been the growth of computing and telecommunication engineers, since they may exercise a decisive influence over the pace of technological innovation. A similar, perhaps even greater, rate of expansion in social workers to handle problems of an increasing population, increased family dislocation and juvenile delinquency may have little or nothing to do with an 'information society', though undoubtedly social workers would be classified with IT engineers as 'information workers'. (Webster 1995: 16)

I agree with Webster that to lump together all categories of workers in the knowledge/information industry as highly-paid and highly-skilled is not only unhelpful, but incorrect. The new knowledge class cannot be automatically identified with an economic elite in the classical sense of the word. The social subjects involved in the use of CMC can and should be located in the context of the new centrality of information work as recognised by Robins and Webster (Robins 1992; Webster 1995). However the nature of work in the information sector is far more fragmented and

hierarchical than most analyses of knowledge work acknowledge.

In this sense, I have found Stanley Aronowitz and William DiFazio's account of the heterogeneous constitution of the so-called knowledge class more helpful. In *The Jobless Future,* Aronowitz and DiFazio argue that the sociological mutation of the workplace has substantially expanded this class. The term 'knowledge worker' covers a social mini-universe accommodating extreme cultural and economic differences. In particular DiFazio and Aronowitz argue against those sociological theories that see the 'new technical intelligentsia' as a new middle class or a 'job bourgeoisie'. These analyses apply classic accounts of the location of the middle class as developed in the first half of the century by sociologists such as Thorstein Veblen and Lewis Corey (Veblen 1921; Corey 1936) to the new information/knowledge workers.[4]

Aronowitz and DiFazio argue that not all educated professionals are part of a privileged professional-managerial class. By looking at different groups of knowledge workers such as teachers, engineers, scientists and architects, they found a highly stratified hierarchy of salaries, rank, and especially creative control.

> Although the ascription "new middle class" or its variant, the professional/managerial class, as the most comprehensive generalization for intellectual labor describes a considerable fraction of those who embody specialist knowledge, the claim that virtually *all* educated professionals are members of this class may describe a powerful *tendency* of contemporary societies, but is a serious overstatement. In our view, grouping the entire technical intelligentsia under these headings misses significant aspects of the historical dynamic and complexity of divisions within intellectual labor.... For even if a large proportion of the technical intelligentsia may be properly viewed within the labor process as an arm of management's control over labor, there is at the same time considerable evidence that a majority of technical intellectuals may be experiencing relative *proletarianization* in highly bureaucratized workplaces. In these sites, management domination has extended from manual workers to both the professional and the subprofessional groups of the technical intelligentsia. (Aronowitz and DiFazio 1994: 186)

As observed by Aronowitz and Di Fazio, the experience of workers in the knowledge industry is highly stratified across hierarchical and specialised lines: from the valued scientist to the lab technician, from the tenured professor to the community college teacher, from the qualified, upper-echelon engineer to the software writer working at electronic software

assembly-lines (Aronowitz and Di Fazio 1994). Any generalisation about such a diverse social experience can take place only by excluding all those who are less likely to have access to advanced forms of techno-literacy: production workers, the unskilled and unemployed, single mothers on welfare, the old and the poor, or the masses of residents in 'underdeveloped' regions of the world.[5]

The social location of the most likely users of CMC, therefore, is likely to be in this new, large area of intellectual work. The literature on the relationship between knowledge work and CMC use is unfortunately underdeveloped. I will therefore try to outline this relationship as best as I can by drawing on the existing literature.

Firstly I have to emphasise again that I am not dealing with the totality of users of electronic communication, but only with the most outspoken and articulate. Even this limited sample is not homogenous: some of these groups are particularly visible and powerful, others are definitely more marginal. I take the groups I researched in this thesis to be part of the more technically-oriented section of the knowledge class. I will therefore refer mainly to some specific groups located in an identifiable area of information work.

This should not be taken to imply that this thesis deals with 'techies', people who are devoted to technology in a narrow-minded, pedantic way. In many ways IT has broken the boundary between artistic, intellectual, and technical work. The new market for IT demands the input of more artistically-oriented personalities, as shown by the boom in computer graphic and design. Magazines like *Wired* and *Mondo 2000* owe a substantial part of their success to their innovative and exciting layout. The whole multimedia industry is based on the collaborative work of artists and technicians, and the qualities of technical skill and artistic creativity are increasingly demanded from the same person. As Andrew Ross has noticed, technology has also invaded the realm of the most humanistic disciplines, with the widespread use of computers, photocopiers, word processors, faxes, and email (Ross 1991).

This lengthy introduction is intended to clarify the point that I am not making a case for a cyberculture of computer freaks. However I argue that the particular vision of the world expressed by these groups is definitely hegemonic in the context of contemporary cyberculture. The Extropy group, which I analyse in chapter 6, is composed of 'software engineers, neuroscientists, aerospace engineers, cryptologists [and] privacy consultants'

(Forste 1994); *Mondo 2000*'s audience, in its editor's words, are 'successful business people in the computer industry, and in industry in general, because industry in the United States is high-tech' (R.U. Sirius 1990: 12). The work experience of these people exercises a fundamental influence on the more explicitly ideological formulations of cyberculture.

The most visible and powerful of these groups is undoubtedly that collected around *Wired* magazine, which has been described lately as the most direct expression of the 'Virtual Class' (Kroker and Weinstein 1994; Barbrook and Cameron 1995). Kroker and Weinstein have coined the term to describe '[t]he social strata in contemporary pan-capitalism that have material and ideological interest in speeding up and intensifying the process of virtualization' (Kroker and Weinstein 1994: 163). The virtual class would include those sections of the communication industry who are pushing for the development of computer-mediated communications. According to Kroker and Weinstein, the virtual class is only using the egalitarian rhetoric of the early computer hobbyists to seduce more people into adopting and supporting the development of digital technologies. Their true purpose, however, is to expand their industry and turn the Internet into a pure commercial enterprise.

Richard Barbrook and Andy Cameron have developed this concept to cover not only the upper echelons of the communication industry, but also the larger population of free lancers and technical experts. In opposition to Kroker and Weinstein, who see the virtual class as an international phenomenon, Barbrook and Cameron locate it mostly in the geopolitical context of California:

> These skilled workers and entrepreneurs form the so called 'virtual class': 'the techno-intelligentsia of cognitive scientists, engineers, computer scientists, video-game developers, and all the other communication specialists..'. (Kroker and Weinstein) Unable to subject them to the discipline of the assembly-line or replace them by machines, managers have organised such intellectual workers through fixed-term contracts. Like the 'labour aristocracy' of the last century, core personnel in the media, computing and telecoms industries experience the rewards and insecurities of the marketplace. On the one hand, these hi-tech artisans not only tend to be well paid, but also have considerable autonomy over their pace of work and place of employment. (Barbrook and Cameron 1995)

Barbrook and Cameron are specifically referring to the culture of work in

Silicon Valley, the region in Northern California which is unanimously identified as the geographical centre of high-tech. Most of the groups I focus on in this thesis come from that area, but not all the users of CMC are obviously Silicon Valleyites. The centrality of Northern California to cyberculture, however, is undeniable: *Wired* and *Mondo 2000* are based there, the Extropians have their main basis in Cupertino, and the WELL, an important centre of cyberculture, operates from Northern California. It might be helpful therefore to outline some of the features of the work experience predominant in Silicon Valley.

One of the most noticeable characteristics of this particular culture is its obsessive workaholism. In his account of work in the Silicon Valley, Dennis Hayes argues that William Gibson's fiction was particularly successful in representing 'the character and politics of computer builders that eludes the non-fiction of others" (Hayes 1989: 83). In particular Gibson very accurately portrayed the 'the addictive kick for many computer workers... precisely the intuitive, creative, and emotional states they achieve at their terminals' (*ibid.*). Hayes sees the work of the computer programmer as an oasis of creativity in the job market, which explains the addiction of computer engineers to their jobs. This intense relationship between computer scientists and their work comes at a price: the abdication of any critical judgement or control beyond that based on the quality of the task completed. Most of these computer experts also show a remarkable lack of commitment to any company in particular. Companies are often simply a means to pursue the latest technology.

> Capital and modern technology apparently have seduced the computer builder with rare privilege: a genuine excitement that transcends the divide between work and leisure that has ruptured most industrialized civilisations. If Gibson's science fiction provides any clues, the computer-addictive persona is unlikely to protest his corporate- and military-sponsored projects, even when these threaten civilization. When computer-building becomes an essentially creative and emotional outlet, any politics larger than those governing access to work and tools seem distant concerns. (Hayes 1989: 85)

These descriptions actually help to contextualise much of the findings of this thesis. For example Internet culture reacts very strongly against censorship, surveillance, and the limitations of access to tools. This seems to be somehow related to the work experience of these groups, although it is

always articulated in cultural terms. This particular kind of work experience creates conditions which are then reworked creatively through the narratives these groups construct. This is particularly clear in chapter 6: the posthuman philosophy I analyse here can be explained in terms of the peculiar work culture of these users. In posthumanism, the productivity, creativity, and flexibility demanded by these workers become evolutionary qualities. They are not just demands imposed from the market: they are evolutionary traits that will lead humanity towards a future of immortality and eternal youth through technology.

There are other important features of this particular class location which are worth emphasising in this context. Hayes, for example, underlined the inherently transient nature of the high-tech industry. This feature of high-tech work strikes those involved in the most manual and unskilled aspects of the industry particularly hard.

> The employee leasing, part-time work, and layoffs reflected the fickleness of electronics capital—capital that had always been transient, in contrast to the relative permanence of capital in steel, coal, auto, rubber, glass, machine tools, and railroads'. (Hayes 1989: 29)

In the case of professionals, the transient nature of the workplace is less dramatically lived. In their case moving from contract to contract and from company to company involves a process of discovering new creative possibilities. The disadvantages of work transience, such as isolation and displacement, might be compensated for by the use of CMC—a technology which allows people to 'stay in touch' or to meet new people who are always 'there' in an electronic space.

Celia Pearce, a Silicon Valley freelancer, confirms this idea that the use of CMC is related to the transitory nature of work. High-tech consulting is precarious and stressing; CMC can help to create a community of people working in isolation.

> ...let me confess at once and without shame that I am a member of the 'virtual class' described in the article. The description of this individual - the independent contractor, free to come and go as they wish, well-paid, but, at the same time suffering from acute workaholism - fits me to a tee. All except the well-paid part. And that is a myth. It is true that many of us are well paid by the hour. However, it is also true that many of us spend between fifty and seventy per cent of our time trying to secure that hour of work. Furthermore, prospective clients often

> expect us to do work on spec or for very low rates, often with no assurance that work will not be used without our participation. (Pearce 1995)

Pearce also explains how, to become a consultant, you need to build your own community of reciprocal support. These communities are 'loosely structured, somewhat anarchistic.... Because we share the common resource of the 'digisphere', we can, in fact, function in this way, without the 'big brother' protection of a feudal master' (*ibid.*). The use of CMC is also a way to build a reliable knowledge which could not be acquired through institutional sources, like colleges and university. This use of CMC as a way to share knowledge of new technologies among peers is at the root of its history (Rheingold 1994). An important principle at the basis of these communities is 'autodidactic communalism':[6]

> Most people in new media are autodidacts. As in all fields, education is always about twenty years behind industry, so anyone with any time in the new media business is, by definition, self-taught.... But autodidacticism is also a myth and nowhere is this more true than in the computer field. In fact, we autodidacts work together. We learn by doing, and we learn by showing each other how to do things.... I can get all kind of software on-line, and I can even download manuals.... (Pearce 1995)

Linda M. Harasim has also underlined the importance of computer networks for work. She uses the term 'networkplace' to describe 'the networld primarily devoted to work-related communication. For increasing numbers of business people and professionals, the networkplace is an integral part of how work is conducted' (Harasim 1993c: 19)

> Professional such as academics, scientists, students, and researchers have adopted networking as an integral and in some cases principal work space. Knowledge workers use network to collaborate with colleagues, access specific expertise, share information about current research, and generally sift, sort, and channel information in the field. (Harasim 1993c: 20)

Wired magazine also cites a recent advertising survey suggesting that 'statistically most Web surveying in the UK is done in the hours between 12 and 2 or between 4 and 6, on company downtime' (*Wired UK*, March 1996: 17). In 1994 they also published the results of an Internet-based survey about who is using the 'info-highway'. According to the survey, respondents 'were

predominantly male (nearly 80 percent), white (again nearly 80 percent), and young (median age of 31 years). About 40 percent classified themselves as single and never-been-married. The median household income of 310 US citizens who responded was between US$40,000 and $59,000 annually. More than 22 percent of these respondents claimed an annual household income of $80,000' (in *Wired* 2:12, December 1994: 49-50).

One of the most logical conclusions is that those segments of cyberculture most involved with CMC constitute a privileged class—the 'virtual class'. This class ' has been empowered by Information Technology, unlike for example the secretaries and receptionists described by Aronowitz and DiFazio (1994). Because of the structure of intellectual work in the nineties, however, this class is more fragmented than it might appear. In the US, for example, where the use of CMC is more widespread, access to the computer networks is free for students and university staff and for most workers in the more technologically oriented sections of the information industry.

The constituency of CMC users is probably very varied. My experience of the Internet indicates that the virtual class does not monopolise the networks. For gays, lesbians, and transsexuals, for example, the incentive to log on might exceed the mere availability of the technology in the work place. The electronic networks might be a place to meet similar people and overcome the isolation that might be experienced in their cultural context. My experience of Usenet has suggested that the former groups have seized on CMC because of its capability to create a network of support which might not be found in the immediate geographical surroundings. Transvestites and transsexuals, for example, have been early endorsers of the medium as shown by the work of Rosanne Alluquere Stone, Kate Bornstein, and Helèna Velena (Stone 1991; Bornstein 1994; Thomas 1995; Velena 1995). People interested in pornography have also been pioneers in the development of CMC, because of the discretion allowed by the medium and the possibility to contact others with similar interests.

My point is that there are material constraints that determine access to CMC, but there are also a variety of reasons why people become involved in it. They might be minorities who feel they need support on a national or international scale; or they might have other interests which they feel cannot be pursued on a local scale. Therefore when I say that in this project I concentrate mainly on people whose interest in technology is professional, I want to make very clear that they are not the only users of CMC.

They are however the most vociferous voices of CMC: they use

technology to talk about technology, start magazines and form groups to disperse their specific technological vision. This restricted group is relatively homogeneous, but there are still differences of age and gender, and often also of rank. Some of them might be students, some simple software programmers, others executive managers or owners of their own corporations. They might express themselves through home-made fanzines, Internet newsgroups, or international magazines. At the moment they are mainly united by a passionate interest in technology, which probably crosses barriers of rank and salary.

As I have explained before, these groups have been studied in a phase of transition from an older technical phase of CMC to a relative mass phenomenon, widely advertised in the media at large. As such in the future I expect to find a wider range of occupations and inclinations among the activists of CMC.

Summary

I do not intend to use these theories to endorse some kind of class determinism. I have suggested a way of contextualising the positions of groups who tend to represent themselves as classless. In this sense an attempt to theorise their possible class location is meant to work as a necessary corrective.

Moreover my brief summary of theories of the knowledge class is not meant to resolve the question of the specific cultural ways in which these groups negotiate the contradictions of their class position: there is nothing obvious or deterministic, for example, in the way they have chosen evolutionism or concepts of technological mastery to frame their experience. Class, nevertheless, adds an important dimension which can help us to understand the material conditions in which these narratives have been elaborated: in this sense it is not meant to determine but to contextualise and understand.

As Caronia has argued, this social class, with all its vertical and horizontal fragmentation, has produced particularly authoritative and effective representations of technology. In this sense, this thesis is also an argument about the importance of understanding who tells our tales about the future and why. The future is an extremely serious political terrain. If this is so, then, these groups have played a meaningful role in shaping an effective discourse and a particular sensibility around it. I have used the term 'effective' to highlight the fact that these narratives are not to be confined to

an abstract level of meaning: they are shaping the kind of environment future generations of CMC users will face if not economically, at least culturally and politically. These groups are both shaping the narratives through which recent technological developments are experienced and are also privileged voices in the process of political negotiation with larger institutions.

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[1] Bukatman has answered Ross' criticism by pointing out that the city is just one of the spaces represented in cyberpunk SF. He argues that it is more important to observe that all these spaces (urban, suburban, nonurban) are connected. In his opinion, Ross also underlines too much the dystopian space of cyberpunk and ignores its utopian impulses (Bukatman 1992: 145).

[2] William Gibson was a powerful influence on the work of VR engineers. According to Philip Hayward, this is particularly significant since 'cyberspace' and 'virtual reality' 'existed as much as figments of a (sub)cultural imagination as they did as 'real' phenomena' (Hayward 1993: 182). Gibson's fiction was part of 'a group of (often overlapping) cultural discourses... [which] preceded the medium's introduction by framing, contextualising and predicting the development of cyberspace systems and their virtual experiences' (Hayward 1993: 182). Hayward's chronology of the discourse of VR locates its first appearance in the media in an article published in *Scientific American* in 1987. The article was soon followed by others in specialist computer magazines. This, in turn, led to the 'establishment of magazines such as the American *Mondo 2000* and the Australian *Index*, which combine coverage of the new computer media with rock and other 'counter-cultural' topics. By 1990 this diffusion had reached the mainstream media with publications such as the *Wall Street Journal* (US) and the *Guardian* (UK) running major features on cyberspace and virtual reality' (Hayward 1993: 181).

[3] According to *Wired* magazine, between 1992 and 1994 PC consumption in Africa decreased by seventy percent (*Wired*, 3.05: 76).

[4] Corey argued that the new professionals constitute a 'middle class', a contradictory class position between the capitalists and the working class, whose ultimate allegiance is to the status quo (Corey 1936). Alvin Gouldner defines the 'technical intelligentsia' as a new kind of middle class, characterised by the fact that, unlike older professions, is salaried, but ultimately tied up to the status quo by high income (Gouldner 1979). Others have argued that 'the professionals have fused with management to constitute a new class, the professional/managerial class... poised to contend for political and social power as a social category that is independent of capital but never a working class or even one of its allies' (Aronowitz and DiFazio 1994: 185).

[5] Of course this does not imply that, for example, developing countries can not or are not using electronic communication for their purposes. Recently, the Zapatistas in Chiapas, Mexico, have demanded access to the Internet (the Zapatista netsite is accessible through http:/www.utexas.edu/students/). In other cases the electronic networks have been used to access areas closed off to international contact—such as in the international dialogue started by the citizens of Sarajevo with the outside world through E-mail and mailing lists (the Bosnia network is reachable

through http://www.alabama.com/btf). International groups of political activists also use the Internet regularly to issue information about their countries (South American and Palestinian groups are very active on alt.activism). On the other hand, the sales of PC as resulting from statistics published on *Wired* magazine, keep showing a depressing picture: "The US remains the largest market for PCs. But the greatest growth has been in Asia, and, at least during 1992 and 1993, in Latin American and Eastern Europe. But those latter regions ("rest of the world") slowed last year because of political and economic instability" (*Wired*, 3.05: 76).

[6] Pearce also refers to 'social capitalism.' Social capitalism is based on the development of 'horizontal, collaborative relationships providing each other with various services to support each other's work' (Pearce 1995). This kind of organisation facilitates a faster development of projects and ideas.

Chapter 3
Technology in the study of cyberpunk and computer-mediated communications

Both cyberpunk and cyberculture are structurally dependent on a set of technological systems and commodities which are generally referred to as 'new technologies'. This dependence is also understood to be their fundamental strength; it is often argued that these technologies are changing the nature of time and space, blurring the borders between life and death, real and unreal, and generally altering life in ways unprecedented in human history. Therefore those groups who are 'closer' to technology are seen to be closer to the most fundamental aspect of contemporary society and to the secret of its difference from any preceding age.

In 'The New Science Fiction' cyberpunk spokesperson Bruce Sterling claimed that '[t]he modern world is defined by its technology. A literature which despises and ignores technology is doomed to be blind' (Sterling 1985). Sterling's position was fairly obvious for an author working within the limits and conventions of the science fiction genre, but for some cultural critics it also seemed to articulate a sense of the relevance of contemporary technology in forming the postmodern mind.

In the two major publications on cyberpunk SF Larry McCaffery's anthology *Storming the Reality Studio* (1991) and Scott Bukatman's *Terminal Identity* (1993), for example, cyberpunk is defined as the literature of postindustrial society, and postindustrial society is defined by its technology. Most of the debates this thesis discusses are related to technology and its relationship to society. It is obviously important, therefore, to state the definition of technology this thesis subscribes to from the beginning.

In this chapter I start from the debate around the relationship between cyberpunk, postmodernism, and technology, which I argue was based on an implicit technological determinism. I then proceed to look at the perspectives offered by the sociology of technology, recent work done in cultural studies about the relationship between technology and culture, and Donna Haraway's idea of the 'agency' of technology. By outlining the different advantages these approaches might offer to the study of CMC, I will determine the best definitions for the development of this research. In particular I argue that any analysis of cyberculture should always consider how its relationship with technology is culturally mediated and always

material. As I have outlined before, the stories these groups tell each other about technology have material effects on its historical development. This 'effectiveness' of cybercultural tales is undoubtedly related to their historical centrality. These groups are very active in relation to CMC; their political activism and their contribution to the cyberpress are essential to widespread understandings of the nature of these new technologies.

Cyberpunk, postmodernism and technology

Most analyses of cyberpunk science fiction stress its usefulness for understanding the effects of contemporary technologies on our sense of self, time, and space. In order to concentrate on the implications of these technologies, they usually avoid taking issue with a more explicit definition of technology. This kind of approach enables very effective analyses of cyberpunk as a literary genre but is sadly deficient in its understanding of technology per se.

In particular most critics have seen cyberpunk in relation to two fields: postmodernism (see Suvin 1991; McCaffery 1991; Csicsery-Ronay 1991) and the new technologies of electronic simulation and communication—from Virtual Reality to computer networks (see Heim 1993; Tomas 1993). In this specific debate postmodernism and technology have been connected to each other in a relationship of causality: postmodernism derives its unique status from its revolutionary technology which has single-handedly shattered the ontological and epistemological bases of Western civilization; cyberpunk science fiction offers a unique interpretation of its radical effects on the cultural sensibility of our times.

In McCaffery and Bukatman, this triangle of cyberpunk/postmodernism/new technologies has been consciously articulated. Although approaching it in different ways, both authors see cyberpunk as being related on the one hand to postmodernism and on the other to new electronic technologies. For McCaffery, postmodern SF in general, and cyberpunk SF in particular, are 'an art form which vividly represents the most salient features of our lives, as these lives are being transformed and redefined by technology' (McCaffery 1991: 16). For Scott Bukatman cyberpunk 'narrate[s] a new subject that can somehow directly interface with—and master—the cybernetic technologies of the Information Age' (Bukatman 1993: 2).

Both McCaffery and Bukatman widely discuss the effects of technology and the new kind of subjectivity it has engendered, but do not seem to draw

on any explicit definition. For the most part, they limit themselves to listing a series of specific technologies and/or sciences: for Bukatman video, electronic technologies, and the personal computer; for McCaffery 'sophisticated offensive and defensive and military weaponry... a new array of prosthetic devices, ... cellular phones, trash compactors, microwave ovens... [and] even more significant... the rapid proliferation of technologically mass-produced 'products' that are essentially *reproductions* or *abstractions*... advertising, information and.. the media (or culture) industry' (McCaffery 1991: 4).

These lists are also common in the writings of cyberpunk theoretician Bruce Sterling, who uses them to convey a sense of the magnitude of technological change. Sterling's lists accumulate names drawn from different categories, throwing together scientific disciplines, technological gadgets, technological systems and economic arrangements : 'the personal computer, the Sony Walkman, the portable telephone, the soft contact lens', examples of 'Eighties tech [which] sticks to the skin, respond to the touch' (Sterling 1986: xiii); 'prosthetic limbs, implanted circuitry, cosmetic surgery, genetic alteration', 'brain-computer interfaces, artificial intelligence, neurochemistry', 'drugs and rock'n roll'; 'the spray can, the photocopier, the home printer'; 'the satellite media net and the multinational corporation' (xiv); 'cybernetics, genetics, neurochemistry, ecology... satellite rock concerts, home computer networks', and again 'cybernetics, biotech, and the communication web' (Sterling 1986b: 11).

These lists emphasise the pervasiveness of technology in the everyday life of advanced capitalist societies. Their point is to convey a sense of how technology is taking over at a speed and/or a scale which exceeds our capacity to make sense of it; the sheer scope of these developments is used as evidence that our world has undergone a drastic epochal shift. Lists like these stress the discontinuity between the past and the present and give the impression that everything is new and should be thought anew. We should then think of contemporary technologies as a given and concentrate on understanding their effects, such as the cultural sensibility they have originated or the ontological transformations they have caused.

Postmodernist analyses of cyberpunk science fiction, as well as cyberpunk manifestos, rely on an 'essentialist' notion of technology, a context-free and overdetermining force shaping and moulding the postmodern subject in a social void.[1] In these accounts, and in the theories that inspire them, technologies are not powerful because they are the means by which a certain

kind of society (late capitalist society) reproduces itself, but have risen to a self-contained and self-oriented status. Technology acts for itself, without any other purpose than that dictated by its own nature:

> The development of technosciences has become a means of increasing disease, not fighting it. We can no longer call this development by the old name of progress. This development seems to be taking place by itself, by an autonomous force or 'motricity'. It doesn't respond to a demand coming from human needs. On the contrary, human entities (individual or social) seem always to be destabilized by the results of this development. (Lyotard 1989: 9)

Much of this theory could be classified as 'technological determinism'. According to Raymond Williams, technological determinism is based on the idea that 'the effects of the technologies, whether direct or indirect, foreseen or unforeseen, are as it were the rest of history. The steam engine, the automobile, television, the atomic bomb, have *made* modern man and the modern condition' (Williams 1974: 13). An important element of technological determinism is the idea that technology is autonomous, almost an independent force: '[t]he new technologies are invented as it were in an independent sphere, and then create new societies or new human conditions' (*ibid.*).

This essentialist notion of technology is pervasive throughout cyberculture, as I demonstrate in chapter 7. In particular, it is represented in a new discourse of *cybernetic evolutionism* imported from the life sciences, which claims that technology is a self-regulating system governed by evolutionary rules. Here, however, I limit myself to assessing the kind of analysis which this notion of technology often produces.

Firstly, in as much as it is very similar to many of the notions entertained by cyberpunk writers and by those subcultures influenced by cyberpunk, it often produces sophisticated depictions of the metaphors, narratives and feelings expressed by these texts and communities. It usually aims to explore, in the context of a wider debate on technology and postmodernism, some of the 'symptoms' of the postmodern condition and to make explicit the metaphors and narratives through which this perspective is articulated.

This kind of work also usually assumes that these texts and practices are the expression of an emergent 'new' sensibility: they are simply the avant-garde of a new relation to technology which will be shared by rest of the world in the future— the present of a minority is the future of the majority.

The work of the cultural critic is therefore to provide a *metamap*, what will hopefully be a productive guide to the future. Such a notion of technology accompanies and enables a sophisticated literary analysis of particular texts usually located in the disciplines of literary criticism, film studies and/or philosophy; these analyses often consider these texts as examples of a new technological experience.

Since I am more interested in the specificity of the history and the textual exchanges constituting a cultural experience of science and technology, I cannot subscribe to this definition. I am interested in how the narratives produced by these groups about the nature of technology are engaged in a constant conversation with their own cultural past and with other alternative or sympathetic accounts. The perspective analysed above does not seem interested either in the cultural history of these practices or in the embodiedness of their social subjects and I have therefore rejected it as a useful method for this thesis.

In the next pages I formulate a more useful definition of technology by assessing how some other perspectives might help to understand the history of CMC.

Theories of technology and the study of computer-mediated communications

Considering the scope and the goals of this thesis, I feel I cannot offer an exhaustive account of the sociological literature on science and technology (see McKenzie and Wajcman 1985; Pacey 1983; Forester 1985; Latour 1979 and 1987). Although this literature has helped to create the premises for an analysis of science and technology as cultural activities, it has generally not covered the issue of technological subcultures. I will, however, outline its most general assumptions and the ways in which they can be applied to the study of computer-mediated communications. By showing the perspectives offered by different approaches, I demonstrate their advantages and disadvantages for the study of cyberculture.

The bulk of the current literature on the sociology of science and technology explores the assumption that technology is not autonomous. The idea that technology must be read in relation to larger economic, social, and cultural forces does not constitute in itself a unitary position, but is very often a premise upon which the whole sociology of science and technology is founded (Williams 1974; Collingridge 1980; Barnes and Edge 1982; MacKenzie and Wajcman 1985). The history of a particular technology will

then be read in relation to the larger context which determines the direction of scientific research and technological development. If we apply this position to the history of electronic communication it is very useful for understanding the political and economic conditions behind the 'invention' of CMC. The Internet, for example, did not develop out of some intrinsic technological momentum; on the contrary it was shaped in the context of the very real needs of the Cold War and the massive financial investment in 'pure' scientific research made by the US. The first computer network was funded by the US Department of Defence in the 70s and went under the name of ARPANET (Advanced Research Projects Agency Network). The political need informing the ARPANET project was for a 'scheme of communication, command, and control network that could survive nuclear attack' (Rheingold 1994: 7).

The subsequent development of the Net was also shaped by the need of corporations like AT&T (responsible for the Usenet protocol) and the commitment of the early computer hobbyists who started the technology of the Bulletin Board System (Hauben 1993, 1994, 1994b). The evolution of the technology of computer networks can also be read in relation to the development of a global economy, and the need for faster means to exchange data in order to produce better economic forecasting (Featherstone 1990; Robins 1992). Similarly the recent wave of interest in the Internet should also be read in the context of widespread economic interests in the creation of a new information market for those sections of the middle classes disenchanted with the mass media (Aronowitz and DiFazio 1994: 18).

If we were to approach the issue from Bruno Latour and Stephen Woolgar's social constructionist perspective, the development of the Internet might be also examined in the context of a collaboration between different actors (institutional researchers, hobbyists, technicians working for private corporations), all of whom negotiated its different technical protocols (Latour and Woolgar 1979). The World Wide Web, the latest Internet protocol, would thus offer an interesting case study of an 'unclosed' technology: current conflicts between different browsing devices like Mosaic and Netscape or software languages like Java and object-oriented, are the manifestations of an early stage of technological development, when there is no agreement about the ultimate shape of its technical structure (Wolf 1994; Jobs 1996).

Another perspective which might enrich our understanding of CMC is offered by Langdon Winner and Donna Haraway, who have argued that

'artefacts have politics'; that is, that every technology carries within it a series of opinions and indications about how it should be used and by whom. The social and economic conditions of technological developments do not create neutral objects, nor do they cease to exercise their influence once the technological product reaches its maturity. Technology is not autonomous and is not neutral. The illusion of technological determinism would be the result of the presence of 'social relations of domination... into the hardware and logic of technology' (Haraway 1989: 54). Technologies are shaped so radically by specific needs that these needs become effectively invisible with time. This 'opacity' of technologies often hides the fact that, beyond the immediate purpose they appear to serve, they also generate 'ways of building order in our world':

> The things we call 'technologies' are ways of building order in our world. Many technical devices and systems important in everyday life contain possibilities for many different ways of ordering human activity. Consciously or not, deliberately or inadvertently societies choose structures for technologies that influence how people are going to work, communicate, travel or consume, and so forth over a very long time. In the processes by which structuring decisions are made, different people are differently situated and possess unequal degrees of power as well as unequal levels of awareness. (Winner 1985: 30)

This line of theory argues that the relationship between science and/or technology and society is articulated at the level of the material constitution of scientific and technological objects. In fact, it is almost impossible to distinguish technology from the different apparatuses which manage and restrict its uses; technologies are 'ideologies in their own right, intimately tied up with bureaucratic organization of power and with domination over nature' (Ross 1991: 134).

This perspective is closer to netusers' own views: Howard Rheingold, for example, acknowledges that the technology of CMC reflects the need of the military industry which sponsored it. The Department of Defence wanted a flexible technology which could not be easily bombed out of existence. On the other hand, Rheingold argues, these motivations backfired and produced a technology which is impossible to control and censor—a truly democratic medium:

> The most important technical attribute of networked BBSs is that it is extremely hard to kill—just as the RAND planners had hoped. Information can take so many alternative routes when

> one of the nodes of the network is removed that the Net is almost immortally flexible. It is this flexibility that CMC telecom pioneer John Gilmore referred to when he said, "The Net interprets censorship as damage and routes around it." (Rheingold 1994: 7)

Michael Hauben similarly argues that because of its structural characteristics, CMC is a much more democratic medium than TV and newspapers. TV and newspapers, he claims, are structurally designed so as to promote a one-to-many form of communication, which inevitably harbours standardisation and passivity. Computer networks are a many-to-many technology and therefore privilege production over consumption and variety over standardisation (Hauben 1994). The same line of argument, however, might also be used to define the Net as being structured by a Western, masculine and capitalist world view. Computer networks encourage people to spend considerable amounts of time in front of an electronic screen in isolation from their surroundings—a position that many peoples and cultures might find unpalatable. CMC also privileges a subject who can happily forget its body and physical surroundings by projecting its mind into an abstract space; this 'forgetting' the body has been pointed out to be a fundamental drive of the Western philosophical tradition (Flax 1990; Braidotti 1991).

To regard technological artefacts as possessing their own politics is to provide a useful way of recovering a sense of the specificity of the medium; such specificity might be lost if we dedicate exclusive attention to the political economy of its production. In many ways the idea that 'artefacts have politics' has been put forward to counteract the possible determinism of many sociological analyses of technology (Winner 1993). By pursuing the economic and political conditions structuring the development of technology, these theories might deny them their material specificity by dissolving it completely in mainstream sociological accounts.

It is possible to refute a determinist approach by paying greater attention to the conditions of the production of technology and to its structural features. These approaches problematise the construction and the characteristics of technology in ways which the idea of autonomous technology does not. Although important, however, both these perspectives are not sufficient in this particular context; this project, after all, is mainly about cultural narratives of technology. How does the idea that artefacts have politics help us to understand these communities' relationship to CMC?

One way in which this idea could be adapted is by saying that intentions

and needs are indeed built into the hardware and inscribed in the preferred uses of the medium, but are also transmitted as a series of narratives and myths about the nature and the history of technology itself. The term 'technology' would then be expanded to include the discursive production of tales about technology; technology, that is, would not exist without technoculture. As Haraway put it, 'the boundary between tool and myth, instrument and concept' is permeable (Haraway 1991:164).

Current users of CMC do not engage only with its technology, but also with a series of narratives about it, which they react to in accordance with their own cultural background and inclinations. Some of these tales will be about the beginning of CMC, its development, and its ideals; they might be stories about the grassroots origins of CMC, its capacity to self-regulate through the unorganised participation of its users, and its potential for the creation of new identities and new sexualities. These kinds of stories will be transmitted and multiplied through the media, books and discussions on the Internet. At the moment the Internet is as much a mythical object as a technology and it is therefore important to understand how this mythical object is constituted. Cyberpunk is one of the discursive fields which has helped to define the Internet; another one is science.

In the rest of this thesis I often draw attention to the importance of science in informing the language of some of these tales. Popular science writing features prominently in this project as a particularly influential genre in the constitution of a culture of high-tech. Science provides many of the images and ideas structuring these communities' perception of technology, thereby introducing another dimension in their understanding of the medium. The importance of science also indicates how not all the narratives circulating in cyberculture have the same status.

Most of the science of cyberculture comes in the form of popular science writing, a genre of scientific literature addressed to a well-read but essentially lay public. These texts aim mainly to convey established scientific theories to a general public; as such they don the mantle of scientific authority to introduce ideas aimed at producing cultural effects. I have therefore tended to treat scientific texts as a special kind of text. They are special texts because of their strong authoritative aspirations to produce 'truth' and are usually perceived as such by many of the groups I have analysed. Although they might be refuted and rejected by the official scientific culture, these texts are adopted and integrated in the practice of high-tech subcultures as scientifically, objectively *true*. I do not need to quote

in detail the substantial amount of feminist scholarship of science to show how the fabric of these texts, as authoritative as they might aspire to be, is mainly geared to produce cultural effects (Harding 1986, 1991; Haraway 1989; Keller 1992, 1992b). I recognise the special claims to truth made by popular science writing, but I see them anyway as fully cultural texts. In this thesis popular science texts are not read as a 'true' report on the status of science. On the contrary, they are read as cultural texts which assume the authoritative voice of science to support specific understandings of the world.

How can the relationship between these narratives and the actual constitution of technology be articulated? Donna Haraway's definition of technology as an entity possessing a degree of agency, and Andrew Ross's emphasis on its culturally negotiated nature have been particularly helpful approaches. The idea that technology has its own kind of agency is adapted from Donna Haraway's argument about science and nature, and represents a specific version of the critique of 'technological determinism'. Haraway's position on technology is better understood in relation to the general epistemological project of her work. In analyzing social and natural artefacts, Haraway had the difficult task of avoiding the dead dichotomy between what she calls a 'transcendental naturalism' and a 'radical productionism'. The first claims that objects (natural and technological) exist without the investment of the subject; the second claims that every object, regardless of its status as natural or artificial, radically constructed. Haraway calls the extremely radical version of the productionist or constructivist argument 'hyper-productionism', as expressed in the work of postmodern theorists such as Jean Baudrillard and Jean François Lyotard, who claimed 'that all the world is denatured and reproduced in images or replicated in copies' (Haraway 1992: 297). If it is impossible to accept the transcendent naturalism option, since '[it] refuses a world full of cacophonous agencies and settles for a mirror image sameness that only pretends to difference' (*ibid.*), hyperproductionism, for Haraway, is even more dangerous:

> Hyper-productionism refuses the witty agency of all the actors but One...
>
> Productionism and its corollary, humanism, come down to the story line that 'man makes everything, including himself, out of the world that can only be resource and potency to his project and active agency'. This productionism is about man the tool-maker and -user, whose highest technical production is himself; i.e., the story line of phallologocentrism.(*ibid.*)

In this way what might look like a surrender of power and agency to technology in writers like Lyotard or Baudrillard is in the end, according to Haraway, exactly its opposite: a renewed although desperate act of faith in the power of Man. Man is the creator of everything, both natural and artificial; technology might have taken over, but ultimately technology is a product of human action. As opposed to this false dichotomy, Haraway redistributes the notion of agency to a wider spectrum of human and inhuman subjects or *actors* and *actants*, whose interaction produces the natural and technical worlds. Drawing on these statements, we can reconceptualize technology as part of this active context which never completely determines, and is never completely determined by the agency of the other actors engaged in the game. Technology would not exist outside the condition of its production but is not completely determined by it: it embodies in its concrete structure the contradictions and the different investments produced by the power groups involved in its construction. In this sense technology is alive: its constitution is multiple and, in the case of the Internet, still developing.

The narratives built by the groups I analysed, for example, are formed both in a process of interaction with a particular set of technologies and in response to it: they react to and at the same time shape the possibilities of the medium. Although there is no absolute consistency in the opinions expressed by these groups and individuals, they certainly bear effects. For example, when netusers describe the Internet as a self-evolving technological organism (see chapter 7), they are reacting to technology and shaping it at the same time. Computer networks have been built with a higher degree of unregulated user input than most other media. The image of the self-regulating system satisfies certain characteristics of the medium, but it also shapes computer activism and therefore the probable development of the Internet. When netusers say that the Internet regulates itself, they are saying that they basically want to be left alone. All their political activism therefore will be geared to avoid any intervention.

By saying that the Internet is self-regulating, they are also supporting the current state of the Internet at this particular moment. The Internet is portrayed as a wonderful self-organised society, where everybody is equal and decisions are made spontaneously by the totality of its users. This representation of technology does not tell us anything about who has access to the Internet and why. Furthermore, the Internet was built by many

people and many institutions; every decision about its technical features was socially negotiated, it did not happen as a result of an intrinsic technological momentum (Hauben 1993; Hauben 1994b). I will return to this point in chapter 7.

If we understand technology as the unstable concretisation of the complex interactions of different factors, we can understand it as a set of material and cultural practices at the same time. This allows us to reintroduce the complexity of history and of social interaction in the debate around technology and culture. Technology is neither an autonomous entity nor a passive set of tools hiding something higher and/or deeper, such as late capitalism. It is a discursive/material object, fully historical and social, constructed but at the same time constructive.

In a certain way, these theories are a way to fully 'culturalise' technology, such as in the work carried out on the pages of the journal *Science as Culture*. In this sense they work both against the technological determinism described above and against some sociological arguments which see technology as completely predetermined by the conditions of its production. In the case of CMC, even the distinction between producers and consumers of technology does not seem to hold, so high is the percentage of people actually involved in writing software and therefore in 'building the place'.

This notion of technology brings it closer to that of culture. Cultural studies has repeatedly argued for the activity of culture and the impossibility of studying it as an object completely determined by economy or nature. Donna Haraway in particular has hybridised this idea of culture by applying it to scientific objects and technological artefacts. Haraway has described this process as the fundamental premise of 'the heterogeneous and very lively discourse of science studies' (and I would add technology studies) '*as* cultural studies' (Haraway 1992: 296).

This position tries to tread the difficult line between theories which argue about an autonomous technology and theories which claim that technology is completely determined by external conditions, be they society, economy, or culture. By claiming that technology is 'not as a mechanical imposition on our lives but... a fully cultural process' (Ross 1991: 3), it refuses at the same time to collapse culture with technology and vice versa.

I argue that the shape of the cybercultural groups I am concerned with has in many ways been crystallized by the technology of computer-mediated-communication; I also think that these technologies are the result of a history of production and consumption in which these groups have

played a relevant role.

The object 'Internet', in all its temporal instability, is the unforeseen result of different histories of technological innovation which include as their subjects professional scientists, business developers and amateur programmers. The accumulation of the particular histories behind the different technical protocols which constitute the 'Internet' has produced the conditions around which certain kinds of communities have been shaped (local or global, anonymous or public and so on). Technology helps Internet communities to assume a particular shape: for example, since CMC does not include at the moment a full visual representation of its users, most Internet communities will be based on the partial anonymity of their members. This partial anonymity might make these users more daring than they would be in real life; they might feel they are more able to express their feelings and emotions. In any case, the relations between the members of the group will be shaped by the fact that they cannot see each other. CMC also allows access from all over the world; the anonymity of the medium will be reinforced by the fact that the other users might be located in another nation or continent. Internet communities are then formed on the basis of the possibilities inbuilt in the technology (Stone 1991).

At the same time, the social subjects who have engaged with CMC have built specific kinds of stories and narratives which have enriched this particular medium through other kinds of connotations. For example they have described how liberating it is to be able to access any information they want without the mediation of the press or television; they have claimed that the kind of knowledge they can access through the Net is hugely superior to the information they get from the mass media. They have insisted that these possibilities are a consequence of the spontaneous, unregulated nature of the medium (Rheingold 1994; Hauben 1994). These statements have been translated, with varying degrees of accuracy, into the public sphere, and are in many ways shaping the limits, the possibilities and impossibilities of future developments. Netusers, therefore, are affecting the development of the technology.

Of course the argument about CMC sketched above is very simplified. In the context of this particular chapter I refer to it only as an example of how a theory of technology influenced by cultural studies exponents such as Haraway and Ross can help me to recover some of the complexity of the exchanges, interactions, and causalities in the treatment of CMC. These exchanges include several participants (netusers, amateur programmers,

institutional researchers, business managers) and work in both directions (technology is constituted by its users and its users are constituted by technology).

A theory of technology influenced by cultural studies also has other theoretical advantages in the context of a wider debate around the nature of 'new' technologies. It is also a way to avoid the dead stalemate of a technophobic/technophilic split, and the temptation to answer to theories that glorify technological progress with theories that focus exclusively on its negative or repressive uses (Roszack 1994; Robbins and Webster 1986). In this sense it is firmly located in some of the basic assumptions of cultural studies:

> This is the knowledge that demonstrates that there are limits to the capacity of productive forces to shape and determine consciousness. It is a knowledge that insists on the ideological or interpretive dimension of technology as a culture that can and must be used and consumed in a variety of ways that are not reducible to the intentions of any single source or producer, and whose meanings cannot simply be read off as evidence of faultless social reproduction. It is a knowledge, in short, that refuses to add to the 'hard domination' picture of disenfranchised individuals watched over by some scheming panoptical intelligence. Far from being understood solely as the concrete hardware of electronically sophisticated objects, technology must be seen as a lived, interpretive practice for people in their everyday lives. (Ross 1991: 131-132)

To see technology as a 'lived cultural experience' is in many ways one of the central impulses of this thesis. In the same spirit, I also assume that 'culture' is not a homogenous practice. If we look at technology as a lived cultural experience, then we have to bring with us the knowledge of the fragmentation of culture across non-parallel and overlapping axes of gender, race, class, and sexuality. For Haraway, 'the social relations of science and technology' are at the same time 'a historical system depending upon structured relations among people' (1991: 165).

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[1] Jean Baudrillard has exercised a considerable influence on this kind of 'technological postmodernism'. Baudrillard has moved from the Marxist notion that sees economic relations as the fundamental structure of power, to the idea that technology is now the most important factor in shaping contemporary societies: 'In Baudrillard's imploded universe, human power has itself become a simulation. Power now resides in a technology which holds humanity in its thrall. The media are invading; there will be no survivors' (Bukatman 1990: 199).

Chapter 4
A brief history of cyberpunk

In this chapter I look at cyberpunk science fiction and those groups who have associated themselves or have been associated with cyberpunk. The label 'cyberpunk' originated in the science fiction scene in the mid-eighties as a descriptive term for a group of young writers who committed themselves to rejuvenating a dying tradition of SF. Cyberpunk was exported into a series of representational contexts such as cinema, TV, and comic books. In the late eighties, it became a synonym for the burgeoning subculture of young computer hackers and for certain groups on the American West Coast gathered around the magazine *Mondo 2000*. In the early nineties the subcultural map of cyberpunk included certain specific segments of the communities constituted through computer-mediated communications (CMC) and was, at the same time, a contested legacy for computer culture as a whole.

All the groups who have been associated with cyberpunk SF are located at the subcultural or countercultural end of cyberculture. In their extremism and high visibility, however, they have occupied a central position in defining what cyberpunk and cyberculture are about. Hackers, for example, have received ample coverage in the media and in many ways the association of cyberpunk with the hacker phenomenon is the most popularly recognised. Hackers are in their own right an important influence on cyberculture; the tradition of hackerdom, as I show later, spans forty years and is responsible for much of the libertarian rhetoric which I examine in chapter 5.

Mondo 2000 and the groups associated with the more countercultural interpretation of cyberpunk have also been very influential in determining the public meaning of the terms cyberpunk and cyberculture. In many ways cyberculture as a label seems more pertinent when associated with *Mondo'* s technophilia than with some of the technological subcultures this thesis looks at.

In the following pages I will demonstrate that in the mid-eighties cyberpunk was a science fiction genre; that in the late eighties it was a term used to designate young hackers; that in early nineties it was associated with a Californian technological counterculture; and that by the mid-nineties it is a rather worn-out label for CMC at large. I have arranged these developments

in chronological order for reasons of convenience and clarity, but I would like to emphasise how things are more complex. Cyberpunk as a label is still applied to some successful science fiction written by old and new authors; it is still a label some hacker groups identify with; and it has also been a media label for CMC almost since the first works of fiction were published.[1]

A chronology of cyberpunk science fiction

The origins of the cyberpunk movement in science fiction can be located around the early to mid-eighties. The *New Wave* movement, nurtured by Michael Moorcock's magazine *New Worlds* in the late to mid-seventies, was in decline and had lost its original revolutionary impact. New Wave writers such as James Ballard, Samuel Delany, Thomas Disch, and Norman Spinrad imported into the SF genre some of the stylistic sophistication of avant-garde literature and some of the spirit of the British and American counterculture (see Greenland 1983). Cyberpunk writers aspired to become the new revolutionary movement in science fiction by establishing a new set of concerns, an interest in different technologies, and a new writing style.

I will draw on Michael Swanwick's article in the *Isaac Asimov Science Fiction Magazine* to establish the chronology of the development of cyberpunk science fiction (Swanwick 1986). Swanwick, a science fiction writer in his own right, explains the emergence of cyberpunk in terms of the void left by the decline of the seventies New Wave. In his account, the early eighties saw the emergence of two different groups with strong claims to be the new SF avant-garde: the humanists and the cyberpunks.

Humanist writers such as Connie Willis and Kim Stanley Robinson supported a more classic literary approach to the SF genre: their fiction was consciously affiliated to more traditional and respected literary standards; their plots were centered around the classic theme of human frailty and desperation; and the SF ambience was used to explore wider philosophical or religious dilemmas. Humanist SF was definitely affiliated to the more traditional and less experimental wing of mainstream literature, aspiring to the same status of respectability and literary accomplishment in a popular genre. Cyberpunk science fiction was more interested in the aesthetic of postmodernism and in the philosophy of punk: their style was dense, fast, and parodic; their favourite characters were punks, rockers, and youth subcultural groups in general.

In the context of this debate about the future of science fiction, cyberpunk was developed and articulated as a literary genre and a critical position on

the status of science and technology in contemporary society. I paraphrase here Swanwick's chronology of the cyberpunk movement till 1986:

1981 - Gardner Dozois, editor of the *Isaac Asimov Science Fiction Magazine,* publishes his annual anthology representing the best of SF published that year. In his introduction he refers to John Shirley's novel, *City Come A-Walking* (1980) and to some of Bruce Sterling's fiction as signs of the emergence of a new 'punk science fiction'.

1983 - John Kessel talks about a 'punk science fiction' to the English Society of the State University of North Carolina and he points to Bruce Sterling and William Gibson as its two most accomplished writers. John Shirley talks about the 'New Movement' to the Eastern Science Fiction Association and refers to Gibson, Sterling and Lewis Shiner. In his anthology of the best science fiction of 1982, Dozois refers to the same authors as the best of the decade.

1984 - In his annual SF anthology Dozois refers to Sterling, Gibson, Greg Bear and Pat Cadigan as 'cyberpunks'. The *Village Voice* describes Gibson's *Neuromancer* as 'techno-punk'. The authors who were being defined as 'cyberpunk' try out names like 'The Neo-Classicals' and 'Mirrorshades Writers'.

1985-Under the pseudonym of Vincent Omniaveritas Bruce Sterling publishes his first manifesto, 'The New Science Fiction', in the Puerto Rican fanzine *Warhoon* . During the North American Science Fiction Convention, a public discussion with Sterling, Shiner, Cadigan, Bear and Shirley ends up in chaos and violence.

1986 - In the *Isaac Asimov Science Fiction Magazine,* Norman Spinrad proposes a new label for the group: the 'Neuromantics'. The authors mentioned by the article answer with different degrees of enthusiasm. John Shirley rejects the term 'cyberpunk' in favour of Neuromantics; Rudy Rucker finds cyberpunk an easy and catchy label and proposes to keep it as the movement's official name; William Gibson is suspicious of any kind of label, 'cyberpunk' and 'neuromantics' included. Bruce Sterling acknowledges that the proliferation of names and labels is inevitable.

As it might appear from this brief chronology, the consolidation of the SF subgenre now known as 'cyberpunk' was not a simple process and was always a compromise at the border between external definitions and internal consensus. In spite of the controversy in the SF community, by the end of

the eighties cyberpunk was a recognizable label for the particular model of science fiction proposed by authors like Sterling, Gibson, Shiner, Rucker and Shirley. It is therefore worth analysing the reasons behind the neologism and its subsequent development.

In calling these authors 'cyberpunks', Dozois wanted to describe the reciprocal contamination of two apparently incompatible semantic fields: the world of cybernetics, a 'science of control and communication', 'the crystallisation of the Cartesian spirit into material objects and commodities' (Csicsery-Ronay Jr 1991b: 186); and punk, the nihilistic and anarchic subculture of the seventies (Hebdige 1979). The neologism aimed to describe a kind of science fiction which portrayed a high-tech urban universe through the eyes of rebellious youth groups, or more generally, from the perspective of a downcast world of hustlers and losers.

The label was therefore coined as a pretty meaningful and limited synchronic category, applying to the fiction of half a dozen young science fiction writers such as the Texans Bruce Sterling and Lewis Shiner; the Virginian and adopted Canadian William Gibson; the professor of Mathematics Rudy Rucker, and other authors like John Shirley, Lucius Shepard, and Pat Cadigan. In spite of such variety, cyberpunk is usually described on the basis of the work of two writers: William Gibson, its most accomplished literary author, and Bruce Sterling, its spokesperson, editor, and polemicist. In the last ten years Bruce Sterling has been putting together anthologies, writing prefaces, reviews and articles, and publishing manifestos besides, of course, writing his own novels and short stories.[2] The critical work of Bruce Sterling set the standards and gave definitions of what cyberpunk fiction was about, drawing genealogical trees and tracing traditions, origins and directions. As Scott Bukatman remarked, '[i]n fact, the coherence of cyberpunk as a movement is, to a large degree, attributable to Sterling's persistence and ubiquity' (Bukatman 1991: 347).

Thanks to Bruce Sterling's work he was very rapidly promoted to 'official' spokesperson of the 'movement', and cyberpunk fiction managed to raise a good deal of discussion, which was only initially limited to the SF field. The position of the group was made explicit through a series of essays, mostly written by Sterling and published in various SF magazines. Sterling started defining his position in a series of articles published under the pseudonym of Vincent Omniaveritas, the fictional *persona* he adopted in his fanzine *Cheap Truth*. In 1984 an article entitled 'The New Science Fiction' was published in the Puerto Rican SF fanzine *Warhoon* and republished at the end of 1984 in

the British SF fanzine *Interzone.* In general, as Swanwick's chronological account shows, the definition of cyberpunk in these early moments emerged from a series of magazines and fanzines internal to the science fiction community: Bruce Sterling's *Cheap Truth;* Dozois' *Isaac Asimov Science Fiction Magazine;* and the British *Interzone,* which is not mentioned by Swanwick but played an important role in the development of the movement.[3]

It was mainly after the extraordinary success of William Gibson's first novel *Neuromancer,* winner of the Nebula, the Hugo, and the Philip K. Dick awards, that the publications by cyberpunk authors multiplied. A cyberpunk programme also reached theoretical consistency in Bruce Sterling's 'Preface' to the first anthology of cyberpunk fiction, *Mirrorshades* (1986). Familiar with journalistic writing from his experience as editor of *Cheap Truth,* Sterling wrote a flamboyant preface. He argued that the fiction collected there was responsible for being the first that was able to deal with the essence of postindustrial society in any effective way. In the following pages I outline some of the programmatic statements of cyberpunk SF.

Cyberpunk science fiction as defined by its authors

Bruce Sterling played an essential role in formulating and publicising the programmatic intentions behind cyberpunk science fiction. In 'The New Science Fiction' the word cyberpunk is never used, but the ideas expressed in this text are recurrent motifs in his later writing on the subject. Sterling, already author of two novels, *Involution Ocean* (1977) and *The Artificial Kid* (1980), essentially re-states his dissatisfaction with the current science fiction output and attacks the increasing self-ghettoization of the SF field. SF in the eighties had become unable to pursue even its most characteristic and essential purpose, namely to engage actively with the challenge of a changing technological universe. Here for the first time Sterling expresses his idea that SF could and should be *the* literature of postindustrial society. Because of its history and its traditions SF is uniquely positioned to think anew the relationship between technology and culture. He also claims that the defining trait of postindustrial society is its most intimate relationship to technology, and that literature has the duty, at least in one of its genres, to think it creatively and critically (Sterling 1985).

Many of these remarks are reworked with a new edge in the 'Preface' to the *Mirrorshades* anthology, which aimed to define and expose the wealth of an existent but scattered cyberpunk output. Cyberpunk was, for Sterling, just a useful label for 'a loose generational nexus of ambitious young writers,

who... found a friendly unity in their common outlook, common themes, even in certain oddly common symbols...' (Sterling 1986: xi).

Cyberpunk was also meant to express a distinctive trait of postindustrial society; it was chosen in preference to others ('Radical Hard SF, the Outlaw Technologists, the Eighties Wave, the Neuromantics, the Mirrorshades Group') in that '[it] captures something crucial to the work of these writers, something crucial to the decade as a whole: a new kind of integration. The overlapping of worlds that were formerly separate: the realm of high tech and the modern pop underground' (*ibid.*). This combination of street culture and high tech is by no means cyberpunk's exclusive prerogative, but it is a global phenomenon 'paralleled throughout 1980s pop culture: in rock video; in the hacker underground; in the jarring street tech of hip hop and scratch music; in the synthesiser rock of London and Tokyo. This phenomenon, this dynamic has a global range; cyberpunk is its literary incarnation' (Sterling 1986: xi/xii).

In other documents produced after this early preface, Sterling clearly states that the purpose of this new literature is not just to 'reflect', 'express', or 'capture' something. Cyberpunk is meant to feed back into culture, its ideas are meant to circulate and propagate under the cover of their marginal status as genre literature: 'We can play with Big Ideas because the garish motley of our pulp origins makes us seem harmless... Very few feel obliged to take us very seriously, yet our ideas permeate the culture bubbling along invisibly, like background radiation' (*ibid.*: 9).

This allegiance between technology and the pop underground is the product of the changed nature of technology in postindustrial societies. Unlike industrial technology or the wonders of the Space Age, contemporary technology is pervasive, visceral and intimate: 'It is not the bottled genie of remote Big Science boffins... Not outside us, but next to us. Under our skin; often, inside our minds' (Sterling 1986: xiii). As examples of this new 'intimate' technology, Sterling refers to the personal computer, the Sony Walkman, the portable telephone, and the soft contact lenses. All of these items inaugurate a paranoia around body and mind invasion: 'prosthetic limbs, implanted circuitry, cosmetic surgery, genetic alienation... brain-computer interfaces, artificial intelligence, neurochemistry - techniques radically redefining the nature of humanity, the nature of the self' (*ibid.*).

These microtechnologies substitute a sense of body and mind invasion (brain-computer interfaces, artificial intelligence, neurochemistry) for an earlier sense of wonder and awe (the robot, the spaceship and the steam

engine). Their main concern is not the mastery of nature and space, but the mutation of the human body and the self. As a consequence, Sterling argues, their effects cannot be understood from the point of view of the scientist in his ivory tower. They reveal their most radical and essential aspects when viewed through the eyes of the lowest social strata of the population, those who have to accept and rework them for survival, hence cyberpunks' preference for low-life settings and characters.

In summary, then, these are the characteristics of cyberpunk SF as seen by Sterling in 1986: an allegiance of street culture and high tech; a global perspective; pervasive technologies; metaphors of body and mind invasion and low-life settings.[4]

In an interview given to Takakyuki Tatsumi, Sterling offers another perspective on his objections to classic SF. The latter is accused of portraying a technology which ultimately amounts only to a few objects added which are added to a social landscape which remains substantially unchanged. Technology, Sterling argues, does not leave the social fabric intact, it is not a neutral adding, but it pervades and disrupts society in unpredictable and uncontrollable ways. SF is the literary genre most concerned with such processes and as such it needs to be grounded in a solid technological knowledge and a rigorous scientific extrapolation. Science fiction should be about the construction of credible futures 'recognisably and painstakingly drawn from the modern condition' (Sterling 1988: 10).

Sterling's definition of what cyberpunk is about has complemented the extraordinary critical and popular success of cyberpunks' most noticeable literary products, mainly Gibson's fiction: the three novels of the 'Sprawl' ('the Boston-Atlanta Metropolitan Axis') series, *Neuromancer* (1984), *Count Zero* (1986), and *Mona Lisa Overdrive* (1988); and the short stories collected in the anthology, *Burning Chrome* (1986).

The Sprawl trilogy is the most accomplished and well known expression of cyberpunk SF. Characteristically, and in contrast with much traditional SF, Gibson chose to set his novels in the immediate future, identified as the beginning of the twenty-first century. The first novel, *Neuromancer*, is the undisputed masterpiece of cyberpunk SF. The novel starts in Chiba City, a section of Tokyo which is also a centre for illegal biotechnological implants. The protagonist is a young hacker, Case, who has been neurologically disabled as a consequence of some illegal dealings in cyberspace. Having double-crossed his criminal employer, Case has been treated with a special chemical substance that makes him unable to 'jack in', that is to connect to

cyberspace through a special interface with a computer console which would allow him full visual and sensorial immersion into the computer networks. Case is rescued from his unfortunate position by Molly, a tough, techno-enhanced woman who is employed in her turn by an Artificial Intelligence (A.I) construct, Wintermute. The A.I. construct manoeuvres Molly, Case, and a war veteran, Corto, into reuniting it with its other half, another A.I. called Neuromancer. The two A.I. constructs were created by the founder of a powerful family, Tessier-Ashpool, who clone themselves to reproduce. The plot takes the hero to the space colony Freeside, where Case hacks his way into the main computer at the Tessier-Ashpool villa and frees Neuromancer.

In the other two volumes of the trilogy, Gibson deals with the consequences of the reunion between Neuromancer and Wintermute. After their merging, cyberspace becomes a living ecosystem, inhabited by the splinters of the Neuromancer/Wintermute construct. In these novels Gibson also introduces the concept of 'simstim', a kind of Virtual Reality TV which allows the viewer to feel the emotions of the actors. The novels keep featuring hackers, rich tycoons, powerful corporations and international criminal organisations fighting for control over information and new biotechnological products.

Gibson's fiction reached immediate cult status; in many ways and for many people, cyberpunk is closely identified with *Neuromancer*. With its lyric descriptions of full VR immersions in global computer networks, hacker feats and greedy international corporations, '*Neuromancer* in the time of Reagan and DARPA is a massive intertextual presence not only in other literary productions of the 1980s, but in technical publications, conference topics, hardware designs, and scientific and technological discourses in the large' (Stone 1991: 95).

Unlike Sterling, Gibson does not tend to produce theoretical statements. In spite of being almost single-handedly responsible for the success of the label 'cyberpunk', he feels that the latter is 'a marketing strategy - and one that I've come to feel trivializes what I do'. (*ibid.*: 278). He claims to be interested in SF just because it is a form of contemporary realism. Science fiction is a liberating formula able to accommodate the increasingly distorted nature of contemporary Western societies, which can no longer be represented in terms of classical realism:

> My SF *is* realistic in that I write about what I see around me. That's why SF's role isn't central to my work. My fiction amplifies and distorts *my* impression of the world, however strange that

> world may be. One of the liberating effects of SF when I was a teenager was precisely its ability to tune me in to all sorts of strange data and make me realize that I wasn't totally isolated in perceiving the world as being monstrous and crazy. In the early 60s, SF was the only source of subversive information available to me. (Gibson 1991: 276)

Gibson is extremely reserved in his pronouncements on the nature of cyberpunk—a label he apparently feels very uncomfortable with. His reserve adds to the confusion and suspicion surrounding Sterling's ambitious and isolated claims for cyberpunk; the 'movement', therefore, comes across as a precarious and unsteady construction. Nevertheless, Sterling's ideas have been effective in provoking an interesting critical debate around the relation between literature (SF particularly), power and technology in the information age. It has also coined a useful marketing label for a distinctive corpus of fiction.

This is a broad list of the novels and anthologies which can be located within the cyberpunk hype: Gibson's trilogy (*Neuromancer, Count Zero, Mona Lisa Overdrive*) and his anthology of short stories, *Burning Chrome* (1986); the anthology *Mirrorshades;* Sterling's undervalued but interesting fiction *The Artificial Kid* (1980), *Schismatrix* (1985), *Islands in the Net* (1988), and *Crystal Express* (1989); Rudy Rucker's novels *Software* (1982) and *Wetware* (1988); John Shirley's trilogy *Eclipse* (1985), *Eclipse Penumbra* (1987), and *Total Eclipse* (1989); Lewis Shiner's *Frontera* (1984) and *Deserted Cities of the Heart* (1988); Lucius Shephard's *Life During Wartime* (1987); Mark Laidlaw *Dad's Nuke* (1984) and Pat Cadigan's *Mindplayers* (1987), *Synners* (1991) and *Fools* (1992). All of these novels deal in various ways with the status of technology in the near future, including the future of Virtual Reality, computer networks, biotechnology, electronic prostheses, artificial intelligence and genetic manipulation.

Istvan Csicsery-Ronay, Jr., a well known SF critic, has summarised the formulaic structure of these novels:

> ...how many formulaic tales can one wade through in which a self-destructive but sensitive young protagonist with an (implant/prosthesis/telechtronic talent) that makes the evil (megacorporations/police states/criminal underworlds) pursue him through (wasted urban landscapes/elite luxury enclaves/eccentric space stations) full of grotesque (haircuts/clothes/self-mutilations/rock music/sexual hobbies/designer drugs/telechtronic gadgets/nasty new weapons/exteriorized hallucinations) representing the

> (mores/fashions) of modern civilization in terminal decline, ultimately hooks up with rebellious and tough-talking (youth/artificial intelligence/rock cults) who offer the alternative, not of (community/socialism/traditional values/transcendental vision), but of supreme, life-affirming *hipness*, going with the flow which now flows in the machine, against the spectre of a world-subverting (artificial intelligence/multinational corporate erb/evil genius)? (Csicsery-Ronay, Jr 1991b: 184)

Such extensive output has been generally overlooked by a criticism fixed on Gibson's work. Recently it has stretched enough to cover only some of Sterling's novels and short stories. A more useful contemporary counterpart for Gibson's cyberpunk fiction has been found outside self-proclaimed cyberpunk authors, mainly in films and to an extent in avant-garde fiction. It should be clear how, due to the evanescence and unreliability of the cyberpunk movement, the critical debate surrounding cyberpunk has come to constitute a 'cyberpunk' object in ways at least as authoritative as cyberpunk's own theorists and practitioners.

Analyses of cyberpunk science fiction are mostly located in larger debates on postmodernism and postindustrial society (McCaffery 1991; Bukatman 1993). Cyberpunk fiction occupies a privileged space in contemporary critical speculations on the nature of technologies such as CMC and Virtual Reality (VR), and in debates around the figure of the 'cyborg' (Haraway 1991).[5]

In particular, the publication in 1988 of a special double issue of the *Mississippi Review*, edited by Larry McCaffery gave theoretical legitimacy to the movement. It also created a diachronic and synchronic context for cyberpunk in the fiction of SF writers like Samuel Delany, James Ballard, Philip K. Dick and John Brunner and avant-garde authors like William S. Burroughs and Thomas Pynchon. A cyberpunk sensibility was singled out in: comic books by James O'Barr (*Frame 137*) and Frank Miller (*Elektra Assassin*); poetry by Misha (*Prayers of Steel*) and Rob Hardin; contemporary mainstream writers like Don De Lillo (*White Noise*) and Ted Mooney (*Easy Travel to Other Planets*); and movies by Ridley Scott (*Blade Runner, Alien*) and David Cronenberg (*Scanners, The Fly, Dead Ringers*). The double-issue which was later turned into a book, *Storming the Reality Studio*, was the most accomplished appropriation by postmodern criticism of the cyberpunk theme. This marked its editor, Larry McCaffery, as the most enthusiastic advocate of the synthesis of SF and postmodernism.

Another sign of the cultural status achieved by cyberpunk in academic debates around postmodernity is Fredric Jameson's decision to open his

influential book on postmodernism, *Postmodernism or the Logic of Late Capitalism,* with a short analysis of cyberpunk and in particular of William Gibson's fiction (Jameson 1991). In 1992 Brian McHale, an authoritative writer on the subject of postmodern fiction, dedicated to a whole section of his latest book cyberpunk literature (McHale 1992). In 1993 the postmodern reading of cyberpunk fiction was at the centre of Scott Bukatman's *Terminal Identity,* a study on the relationship between technology and the postmodern subject (Bukatman 1993).

As academic criticism was catching up with cyberpunk, cyberpunk authors were, as one SF critic put it, 'swimming back toward the mainstream' (Easterbrook 1992: 378). An established author like Greg Bear, author of *Blood Music* (1985), detached himself from the label. Acknowledged central figures like William Gibson and Bruce Sterling have also moved in eccentric directions: Sterling and Gibson's publication of a co-written novel about an alternative past in Victorian England (*The Difference Engine,* 1991) surprised their fandom by deviating from the cyberpunk canon. In 1992 Bruce Sterling published a journalistic report, *The Hacker Crackdown,* a book on 'US crackdown on computer hacking in 1990'. (Sterling 1992)

According to Sterling, the label 'cyberpunk' has exhausted its value as a description for a literary and theoretical trajectory common to a group of SF writers: '[t]he number of references to cyberpunk as a literary phenomenon are now outnumbered by its use as a synonym for computer criminals' (cited in Gibson and Sterling 1992: 4). In spite of these claims, cyberpunk as a science fiction subgenre has become an established trend. New authors have reworked the tropes of the genre sometimes enjoying remarkable critical and popular success: in particular, Neal Stephenson, author of *Snowcrash* (1992) and *The Diamond Age* (1995), has been hailed as one of the best SF writers of this decade. Other authors who have been marketed as cyberpunk, or whose work is perceived to incorporate cyberpunk tropes, include Wilhelmina Baird (*Crashcourse* 1993); Melissa Scott (*Trouble and Her Friends* 1994) and Richard Paul Russo (*Carlucci's Edge* 1995). In 1995, the box-office flop of *Johnny Mnemonic,* a film scripted by Gibson from one of his early short stories, has been interpreted as the tombstone of the original cyberpunk literary movement.

> *Johnny Mnemonic,* the movie, is the day when cyberpunk died. Its failure is interesting less for aesthetic reasons - acting, screenplay, cinematography, special effects - than for what it says about the hyper-modern mind and its taste for shifting cultural

> signs. Killed by sheer cultural acceleration, by the fact that 80s cyberpunk metaphors don't really work anymore in the virtual 90s, the popular failure of *Johnny Mnemonic* testifies to the end of the charismatic phase of digital reality, and the beginning of the iron law of technological normalization. (Kroker and Kroker 1995: 1)

In spite of its fast decline and absorption by the Hollywood and multimedia culture industry, cyberpunk SF has exercised a considerable influence on virtually every youth movement associated with high-tech in the last ten years. In the next sections I will sketch out some of the associations accumulated by cyberpunk through its subcultural mutations.

I have found the summary offered in 1991 by R. U. Sirius, editor of the cyberpunk magazine *Mondo 2000* useful for this chapter. R. U. Sirius claims that cyberpunk, as a movement started in science fiction, influenced a new generation of computer hackers influenced by the punk sensibility, became a label for a certain kind of 'industrial' art, and ended up 'as a generic name for a much larger trend more or less describing anyone who relates to the cyberpunk vision' (in Rucker *et al* 1992: 64).

R. U. Sirius is also very careful to state how the development of 'cyberpunk' as a label for certain cultural practices and groups was a compromise between those who were called cyberpunks and those who called others cyberpunk: 'people started calling themselves cyberpunks, or the media started calling people cyberpunks' (*ibid.*). His history of cyberpunk identifies, therefore, two important difficulties: the variety of sites where it has been spotted, and the inescapable ambiguity of a term hovering at the border between what it is 'called' by others and what it 'calls itself'.

If it is relatively easy to track the places where cyberpunk as a label has been attributed to other people, it is much more difficult to track the location of cultural practices which would unambiguously define themselves as cyberpunk. Cyberpunk was almost immediately the object of intense public scrutiny (Sirius quotes a couple of features in the CBS *Night Watch* and the *Ron Reagan Show* in the late eighties). I argue that such an intense public exposure has made the name 'cyberpunk' a label used with various degrees of wariness, because of the structure of subcultural practices and their relationship with the media. As Sarah Thornton has argued about the British rave phenomenon, subcultures live in relationships with different media (Thornton 1994). Cyberpunk is located in one of the most intensely scrutinised areas of postmodernity, information technology, and therefore it

has undergone particular public concern and media coverage. The role of the media (including best-seller journalistic reports) is of constitutive importance in understanding the history of cyberpunk as a set of subcultural practices.

Locating cyberpunk outside science fiction means working on the overlapping border between several areas and groups: the heterogeneous group of people who identified partially or completely with cyberpunk (hackers, performance artists, technoliterates of various kinds); and the heterogeneous textual practices that engaged in the production of texts around cyberpunk (science fiction theory, postmodern criticism, mass media, niche media, underground publications, and journalistic reports). The relationship between the two groups, 'the callers' and 'the called', is not watertight; both of these heterogeneous formations interact in mutual, but unequal conversations—the opinion of a teenager in an electronic discussion group does not have the same discursive weight as an editorial in *The New York Times*.

In translation of cyberpunk fiction from an SF label into a wider cultural 'movement', it is possible, however, to identify the writings of specific individuals as being particularly influential. R. U. Sirius explicitly quotes some of the names who made the 'calling' and thus publicly conjured up specific versions of cyberpunk. Most of this early naming took place around the late eighties: John Markoff, reporter on computers and computer crime for the *New York Times*, started calling young hackers arrested for cracking government computer files 'cyberpunks'(Markoff 1988); Mark Dery, a writer for the *New York Times*, *Rolling Stone*, and *Mondo 2000* itself, published an article in the *Electronic Musician* calling 'cyberpunks' performers in the high-tech oriented radical art movement known as 'Industrial' (cited in R.U. Sirius 1992); and R.U. Sirius himself was widely responsible for giving shape and substance to another version of cyberpunk, which 'created a reaction among the hard-core cyberpunks, who feel they got there first' (*ibid.*:: 64).

In the rest of this chapter I will try to trace some of the elements feeding into cyberpunk. The purpose of this history is to give complexity and multidimensionality to a series of cultural practices which all too often have been depicted as originating in a generic 'structure of feeling' of the age. It is also meant to explain and define some of the names and labels which will be referred to occasionally in the rest of the thesis.

It is important to remember that these traditions and groups are often overlapping. I will look first at the history of the social group which was the earliest to be identified as 'cyberpunk': the hacker or cracker subculture. I

will also look in detail at the particular version of cyberpunk constructed by the Californian group of *Mondo 2000* from the mid-eighties to the early nineties; I will then give some recent examples of the uses of the term cyberpunk on Usenet.

Hackers

It is useful to remember that the particular impact of cyberpunk SF might also have something to do with the fact that it conveyed a slightly dystopian image of IT in opposition to the hyper-positive representations circulating between the late seventies and mid-eighties (Robins and Webster 1986. 1988). In the years of massive public investment in IT there was a first wave of futurist treatises that emphasised the wonderful potentials of the 'Information Age'. In 1986, Robins and Webster refer to books such as *The Micro Millennium, The Third Wave, The Wired Society, The Silicon Civilization,* and *The Communication Revolution,* all published between late 1978 and the early 1980s. In what they call 'the selling of the new technology', Robins and Webster examine the unabashed boosterism accompanying this first wave of informatisation, a wave of enthusiasm which swept left and right in ways similar to current endorsements of the Internet (Webster and Robins 1986). When cyberpunk SF came out it seemed to anticipate and even encourage a darker aspect of the use of information technology: the existence of a criminal underground of computer outlaws related to the figure of the hacker.

In the late eighties and early nineties, the relationship between cyberpunk and cyberculture was therefore articulated in the context of the hacker scare. These hackers were mostly teenagers with a very sophisticated, hands-on knowledge of the technicalities of computer systems and software writing. The early hacker cases involved computer viruses and the problem of the vulnerability of secret data banks to external intrusions. Computer viruses were initially simple programs endowed with self-replicatory instructions that could be made invisible to users and transferred from one computer to another. The typology of computer viruses varied from simple programs which caused the computer to display certain phrases or statements, to dangerous varieties that could paralyse entire computer systems simply by cluttering their memories with redundant instructions.

The problem of hackers breaking into databanks was a consequence of the increased networking of computers through the telephone lines. The security of these databanks relied on a system of passwords which hackers

tended to crack in various ways—from stealing passwords by looking over the shoulders of naive users to isolating faults in the security systems. Hacking databanks was a time-consuming activity that also required a great deal of passion—a quality particularly abundant in young teenagers with personal computers.

These young hackers earned the name 'cyberpunk' from the police and the media coverage of the first cases of computer crime and fraud. They represented a threat to international politics and the security of the State (as in the case of Pengo, the German hacker who traded electronically stolen secrets with the KGB). They also threatened the flow of information which kept together an increasingly computerised society (as did the electronic 'worm' which paralysed millions of computers in November 1988 and the AT&T crash of January 1990).

These famous episodes produced intense public coverage on the phenomenon of young whiz-kids with the technical know-how to paralyse a country. The AT&T crash was also the immediate motivation behind at least one major police operation in the early months of 1990, the so-called 'Operation Sundevil' run by the American Secret Service.[6] The Internet worm and the first cases of hackers breaking into computer systems were the subject of John Markoff's articles in the *New York Times* and his book (with Katie Hafner) *Cyberpunk: Outlaws and Hackers on the Computer Frontier.* (1991). 'Operation Sundevil' was explored in Bruce Sterling's first non fictional book *The Hacker Crackdown: Law and Disorder on the Electronic Frontier* (1992).

Bruce Sterling felt particularly compelled to state his position on the matter when, as part of 'Operation Sundevil' on March 1, 1990, the Secret Service came to his home town and confiscated the computers of a science fiction gaming publisher, Steve Jackson Games, Inc. Although the raid was motivated by other reasons (an intricate case concerning the electronic theft of some documents belonging to the local phone company), it came to be known as the 'Cyberpunk Bust'. Steve Jackson, in fact, was about to publish a gaming-book called *GURPS Cyberpunk.* The book was curated by a young hacker called 'Mentor', a member of one of the most famous teen-age hacker groups—the self-defined elite of the Legion of Doom (see Slatalla and Quittner 1994). In Sterling's words, Mentor

> ...like most of his friends in the Legion of Doom, was quite the cyberpunk devotee. Mentor reasoned that the time had come for

> a *real* cyberpunk gaming book—one that the princes of computer-mischief in the Legion of Doom could play without laughing themselves sick. This book, *GURPS Cyberpunk,* would reek of culturally on-line authenticity. (Sterling 1992: 147)[7]

The federal law-enforcement agents gave their own interpretation to the book. When they 'discovered the electronic manuscript of *Cyberpunk* on the computers they had seized from Mr. Jackson's offices, they expressed grave shock and alarm. They declared that *Cyberpunk* was 'a manual for computer crime'' (Sterling 1993).[8]

In his quest to understand 'Operation Sundevil', Sterling realised how the term he had conjured and spread had developed another life in the growing literature on computer crime. Cyberpunk fiction, and particularly Gibson's novels, were positioned at the centre of a criminal computer culture and accused of glamorising the figure of the outlaw hacker. Sterling refers in particular to a book published in 1990 by Buck BloomBecker, *Spectacular Computer Crime.*

According to BloomBecker, *Neuromancer* represents 'an attitude that should be watched' and a key text to understand the motivations of a new generation of young hackers. BloomBecker calls this breed of computer criminals, who 'demonstrate a new level of meanness', cyberpunks (cited in Sterling 1993). Sterling is aware of the fact that 'cyberpunk' has become a police label. For the police, the presence of cyberpunk science fiction in the libraries of young men interested in computers was a real sign of the presence of criminals as opposed to simple computer-crazy teenagers:

> *Neuromancer* has won quite a following in the world of computer crime investigation. A prominent law enforcement official once told me that police unfailingly conclude the worst when they find a teenager with a computer and a copy of *Neuromancer.* When I declared that I too was a 'cyberpunk' writer, she asked me if I would print the recipe for a pipe-bomb in my works. I was astonished by this question, which struck me as bizarre rhetorical excess at the time. That was before I had actually examined bulletin-boards in the computer underground, which I found to be chock-a-block with recipes for pipe-bombs, and worse. (Sterling 1993)

In the process of researching the book, Sterling found that this labelling was not totally inappropriate. In his words 'Cyberpunk SF (along with SF in general) has, in fact, permeated the computer underground' (*ibid.*). Young underground hackers used names from Gibson's novels to define

themselves and their worlds, with aliases such as 'Neuromancer', 'Wintermute' and 'Count Zero'. One of the most famous hacker groups, the Legion of Doom, used to congregate on a bulletin-board called 'Black Ice'—Gibson's name for the lethal electronic defences guarding the security of secret databanks.

Sterling acknowledged the presence of cyberpunk literature in the hacker underground, but refused responsibility for encouraging or originating the latter. Repeating a pattern already present in his preface to *Mirrorshades*, he preferred to talk about an affinity between cyberpunk fiction and a generation brought up with an intense familiarity with information technology.

> The cyberpunk SF writers were a small group of mostly college-educated white middle-class litterateurs, scattered through the United States and Canada. Only one, Rudy Rucker, a professor of computer science in Silicon Valley, could rank with even the humblest computer hacker....
>
> The cyberpunks had a strong following among the global generation that had grown up in a world of computers, multinational networks, and cable television. Their outlook was considered somehow morbid, cynical, and dark, but then again, so was the outlook of their generational peers. As that generation matured and increased in strength and influence, so did the cyberpunk. (Sterling 1992: 146)

These 'cyberpunk' hackers, who for a long time constituted the most public and debated aspect of cyberpunk in the mass media, had a history of their own. As I explain in the following pages, they emerged out of the experience of a new technology (CMC) in the context of a cultural history inherited partly from previous hacker generations and partly from another cultural practice called 'phone phreaking' (phreaking). Much of the political rhetoric of cyberculture does indeed come from phreakers and hackers.

Hackers was a name originally adopted in the fifties by a group of young computer scientists at MIT (Massachusetts Institute of Technology) in Boston. The story of these young men was chronicled by Henry Levy in his book *Hackers*, published in 1984. Constrained by the material scarcity of computers at the time, the early hacker subculture was strictly local. MIT possessed some of the big, clumsy mainframe computers which preceded the Personal Computer (PC) revolution. These primitive computers occupied entire floors of important scientific institutions and their use was formally restricted to the scientists and their authorised personnel. Most of the scientists, however,

were not trained to operate them, regarded them with scepticism, and used them only for particular operations which required monotonous and repetitive calculations. These big mainframes also attracted a particular young crowd of technicians and students fascinated by the possibilities of the machines and interested in learning the complex software languages.

These young white men formed a tightly knit group: they were all obsessed with the potentialities of these computers and they had a common enemy—the bureaucracy that surrounded the use of the mainframes. Levy describes these early hackers as being physically unkempt, mostly bachelors, into junk food and with sleep patterns that followed the availability of the mainframes.[9] Their obsession with technology and their disdain for the body are echoed in the contempt shown by Gibson's heroes for the flesh, or 'meat'.

The particular circumstances in which these hackers had to operate (scarcity of resources, intense bureaucratic control) produced what came to be known as the 'Hacker Ethic', summarized by Levy in this way:

> Access to computers —and anything which might teach you about the way the world works—should be unlimited and total. Always yield to the Hands-On Imperative!...
> All information should be free....
> Mistrust Authority—Promote Decentralization.
> Hackers should be judged by their hacking, not bogus criteria such as degrees, age, race, or position....
> You can create art and beauty on a computer....
> Computers can change your life for the better. (Levy 1984: 27-33)

According to Levy this first generation of hackers was followed by another two: the seventies hacker group, who produced the PC revolution (centred around amateurs' clubs such as The Homebrew Computer Club in Berkeley, California); and the eighties game wizards and software engineers, who proceeded to create the Silicon Valley phenomenon. Levy stopped short of describing a fourth generation of young computer hackers, the 'cyberpunks', whose chronicler would be journalist John Markoff.

The composition of this last generation, and the technological environment which formed them, shaped their experience and cultural allegiances in ways which differed and overlapped with the concerns of older generations. The fifties and sixties hackers were involved with the early big mainframes which were based on time sharing and subject to heavy

bureaucratic control; the seventies hackers wanted to create a new accessible technology and were inspired by the countercultural investment in decentralization. The eighties group cashed in on the PC revolution by becoming the protagonists of the computer game boom; and the fourth generation was the generation of early CMC (computer-mediated communications), and was obsessed with the technicalities of 'systems', specifically the telephone system.

The specific applications of CMC which helped to produce this new hacker scene were the early BBSs, or Bulletin Board Systems. In classical accounts of the history of the Internet, the 'network of all networks' was born not only out of the institutional network connecting military and academic centres, (the famous ARPANET), but also out of the increased connectivity of small and local computer networks, usually centered around a single computer privately owned and managed (Rheingold 1994). The BBSs were the result of the increased availability of personal computers and the diffusion of small machines, called modems (modulator/demodulator), which used phone lines to transmit electronically-encoded messages. A single computer was set up in a house with an incoming phone line and any user with a modem and a computer could dial up and leave messages in an area of the main computer for others to read. Simple programs (distributed as 'shareware' or 'freeware', in the tradition of the early hacker ethic) made it possible to 'chat' in real time.

This dependency of the early culture of CMC on the telephone lines was what probably produced a certain convergence between the hacker subculture and the phreak subculture. The magazine *Phrack* exemplifies in its name, a combination of 'phone', 'freak', and 'hack', the coming together of these two traditions. The history of phreaking was even older than hacking; phreakers were particularly interested in exploiting the faults of the phone system not just in order to make free phone calls but also for the sake of exploring its considerable complexities. Phreakers most enjoyed the confrontation with what was perceived as the monolithic, bureaucratic and monopolistic Bell Company. Both hackers and phreakers embraced the cult of decentralisation and the hate for bureaucracy which has become a staple of cyberculture.

Phreaking enjoyed particularly high subcultural status in the sixties, after Abbie Hoffman and Al Bell started the yippie movement and its official organ: the *Youth International Party Line*. This anarchist paper encouraged and publicised all kind of tactics to rip off the system and the phone

company was one of its favourite targets. When Abbie Hoffman left YIPL, his friend and co-editor Al Bell changed the magazine into *TAP* (Technological Assistance Program or Technological American Party), eliminated much of the politics, and concentrated heavily on technical matters, especially on phreaking (Scelsi 1990).

When the phone system became more and more computerised, computers started to be hooked together to organise all kinds of economic and political activities, and a new generation of young hackers started to communicate through computers connected via the phone system, the situation had the potential of becoming an international security problem. These young hackers had inherited an ethic which promoted free access to information from their predecessors. From the phreakers subculture they inherited a passion for the technical complexity of the phone system. Cyberpunk fiction intervened in this context by providing a mystic of hackerdom as embodied in the figure of the 'console cowboy', and by conveying a nihilistic punk sensibility that marked this generation off from the idealism of previous hackers.

Groups such as Legion of Doom, Mothers of Deception and the Warelords, and young hackers named 'Phiber Optik' or 'Acid Phreak', built a kind of 'digital underground' ruled very much by maverick adolescent fantasies (Sterling 1992; Slatalla and Quittner 1994). For the older hackers, some of these youngsters were not even 'hackers', but criminal 'crackers' who would not just explore the system but vandalise it, stealing credit card numbers, committing digital theft by manipulating bank accounts, and sometimes paralysing entire systems.[10]

It was in this particular moment that the mythology of the hacker cyberpunk was created. John Markoff, in particular, contributed to an identification of the label 'cyberpunk' and the term 'hacker'. In 1988, three years before the publication of the book, he was already creating the mood for this identification by publishing articles such as, 'Cyberpunks Seek Thrills in Computerized Mischief' (Markoff 1988). The reviews of his book published on the back cover show how the mainstream media bought into the collapse, implied by the title, between late eighties hackers and cyberpunk.[11]

Markoff effectively defined the fourth generation hackers, the group that in a few years saw its image changed from the smart, but innocent, whizz kid of *War Games* to the ominous criminals described in the book. In spite of the sensationalist title, however, Hafner and Markoff portray a new

generation of hackers whose ideological and historical roots are differentiated and complex. In the three main portraits in the book, the authors depict three very different, although coexistent, strains of hackers: Kevin Mitnik, the California hacker, represents the continuity between phreaking and hacking; Pengo, the West German hacker, represents a the continuity with the video game phenomenon; Robert Morris, son of a respectable computer scientist, represents the tradition of early hackers at MIT.

The book explicitly links cyberpunk science fiction only to the figure of Pengo, the German teen-age hacker who became famous for selling secret computer documents to the KGB. Pengo is described as a fan of cyberpunk fiction. In particular he identifies with the figure of Case in *Neuromancer* and adopts the latter's ethical indifference to the issue of computer hacking.

> Pengo believed that he was upholding a commitment to hacking as a thing in itself. Part of this idea had come from reading *Neuromancer*, an intense and chilling science fiction novel populated with high-tech lowlifes. Written in 1984 by William Gibson, the book came to define what later was called cyberpunk.... *Neuromancer* became Pengo's personal computer primer. After reading it, Pengo decided that if he hadn't already established himself with a nickname, he would have chosen Case. In Pengo's reality, working for the Russians held its own justification. It was something Case would have done. (Hafner and Markoff 1991: 195)

Although calling their book *Cyberpunk* suggested that an articulated subculture developed around the label 'cyberpunk' really existed, Markoff and Hafner did implicitly admit in the introduction to the book that this was more their attribution than the hackers'. Cyberpunk represents a particular attitude to technology, and in particular to computers and computer networks. It stands for the 'obsession' with technology, the criminal pathology of young men whose intellectual and erotic resources have been channelled into the inanimate.

> We set out too investigate a computer underground that is the real-life version of cyberpunk, science fiction which links high technology with outlaw culture....
>
> The inspiration for this book came when we began to see a change in the way computers were being used. We found harbingers of cyberpunk, young people for whom computers and computer networks are an obsession, and who have carried their obsession beyond what computer professionals consider ethical

and lawmakers consider acceptable. (Hafner and Markoff 1991: 9)

Cyberpunk was, then, a particularly popular literary genre among the young hacker population, and many young hackers called themselves 'cyberpunk'. The conflation of cyberpunk fiction, a cyberpunk subculture, and young computer hackers in the late eighties, however, would be a gross generalisation—although one widely advertised and common in the mass media. Cyberpunk fiction was popular with groups who exceeded the restricted realm of computer hackers, and the latter could rely on some rich traditions that were not present in cyberpunk fiction. The ideas of the digital underground, in their turn, were diffused in a wider network of differently positioned computer literates.

Mondo 2000

At the turn of the decade, cyberpunk was adopted and reinterpreted by a different group of people with another cultural history. In the winter of 1987, the same group that had produced since 1984 the popular magazine *High Frontiers,* in Berkeley, California, started a new magazine called *Reality Hackers. Reality Hackers* belonged to the same countercultural style of its older twin, but it also had its own peculiarity in terms of its interest in 'visionary science and technology'. The first issue included items on lucid dreaming, megabrain update and computer networking. Among the goals stated by the magazine were 'using high technology for a life beyond limits... infusing new energy into postmodern culture.... blurring the distinction between high technology and magic' (Sirius 1988: 3). The editors intended to pursue these goals by such tools as '[h]ypertext, cyberpunking, videographics and computer play..'. (Sirius and Mu 1988: 4). In Autumn 1989, *Reality Hackers* (*RH*) upgraded its graphics and the quality of the layout, and changed its name to *Mondo 2000. Mondo* had an essential role in shaping a new version of cyberpunk. Even the term cyberculture was coined as a label for *Mondo'* s brand of technophilia (Dery 1993; Sobchack 1993).

The editors R. U. Sirius (aka Ken Goffman) and Queen Mu (aka Alison Kennedy) carried much of their previous focus into the new magazine (the first issue was numbered #7, to keep continuity with *RH* and its cover featured the previous magazine). *Mondo 2000* effectively built a version of cyberpunk that appealed to wider sections of the population than just young hackers and science fiction fans. The combination of science fiction, New Age, 60s' counterculture, spectacular science, eighties technoculture, and

postmodernism gave *Mondo* its unique cut, mobilising a cross-section of social subjects who could recognize themselves across a spectrum of cultural and artistic practices. Specifically, as R.U. Sirius admitted in a later interview, *Mondo* was aimed at much more socially crucial segments of the population than the restricted subculture of teenage hackers: 'A large portion of our audience is successful business people in the computer industry, and in industry in general, because industry in the United States is high-tech' (Sirius 1990b: 12).

Mondo was not just a magazine, but a real cultural centre for people interested in the countercultural interpretation of new technologies. Douglas Rushkoff describes the '*Mondo 2000* mansion' in Berkeley as a commune, where people who were inspired by *Mondo*'s vision could physically meet each other. The 'Mondo House' attracted not only Californians, but also Japanese and British people who were interested in what *Mondo* was trying to accomplish.

> The Mondo House, as it's admiringly called by those who do not live there, is the hilltop castle/kibbutz/home-for-living-memes where the magazine is written, edited, and, for the most part, lived. Dispensing with the formality of an objectified reality, the magazine accepts for publication whichever memes make the most sense at the time. The man who decides what makes sense and what doesn't is R.U. Sirius, aka Ken Goffman, the editor in chief and humanoid mascot. (Rushkoff 1994: 291)

Mondo regularly published articles by, and interviews with cyberpunk writers like John Shirley, Bruce Sterling, Rudy Rucker and William Gibson. Cyberpunk writers were incorporated at the centre of the cultural project fostered by the magazine: mobilising and materialising the social subjects who could understand the revolutionary nature of contemporary technology. *Mondo'* s stylistic trademark is a hyperbolic, cynical style, which parodies both postmodern critical theory and sixties countercultural rhetoric. *Mondo'* s graphic layout, designed by Bart Nagel, was essential to the message itself; its glamorisation of science and technology is another parallel with cyberpunk hipness (Sirius 1996).

Unlike hacker's subcultures, *Mondo'* s version of cyberpunk is explicitly articulated in relationship with the sixties counterculture which defines its historical lineage in terms of continuities and breaks. The legacy of the sixties is literally reproduced in the chromosomes of their children, the new generation in charge of the future: 'their mutated nucleotides have given us

a whole new generation of sharpies, mutants and superbrights and in them we must put our faith and power' (Sirius and Mu 1989: 3). On the other hand, '[a]ll the old war horses are dead. Eco-fundamentalism is out, conspiracy theory is démodé, drugs are obsolete' (*ibid.*) and the countercultural obsession of a return to nature is simply 'boring'. As an antidote to the burn-out of the old countercultural values, *Mondo* proposes a new awareness of the power of technology to change the world and of the opportunities this new technology offers to humanity as a species.

> This magazine is about what to do until the *millennium* comes. We are talking about Total Possibilities. Radical assaults on the limits of biology, gravity and time. The end of Artificial Scarcity. The dawn of a new humanism. High-jacking technology for personal empowerment, fun and games. Flexing those synapses. Stoking those neuropeptides. Making Bliss States our normal waking consciousness. *Becoming* the Bionic Angel. (*ibid.*)

Mondo' s fundamental relationship with the idealism of the counterculture on the one hand, and the nihilism of cyberpunk on the other is at the core of some of its remarkable contradictions. While the former passage, the first editorial, beams with the glow of sixties utopianism, the second emphatically reminds its readers of the necessary cynicism to face the '21st Century legalistic, megacorporate, one-world, peace-on-earth' New Order (Sirius and Mu 1990: 3). According to Vivian Sobchack, the play of sixties utopianism with cyberpunk cynicism is made possible by the use of an ironic postmodern rhetoric, which allows them to 'resolve the utopianism of the first [editorial] with the cynicism of the second by making cynicism itself utopian' (Sobchack 1993: 573).

Cyberpunk and sixties counterculture were literally made to speak to each other in the first issue, which included a 'conversation' between William Gibson and Timothy Leary, republished in Timothy Leary's *Chaos & Cyberculture* (Leary 1994). Leary is undoubtedly a crucial influence in *Mondo'* s attempt to build a new countercultural sensibility around digital technologies. Since the mid-eighties he had focused much of his production on the structural similarity between the human brain and the computer: 'If the brain is like a computer, then the trick is to know how to format your brain—to set up operating systems to run your brain' (Leary 1994: 35). Personal computers were interpreted by Leary as a seed of the counterculture, inspired by principles of decentralization and individual evolution. This continuity between the sixties counterculture and

cyberculture is represented by the protagonists of the PC revolution and by those who are preparing the ground for the full actualisation of Gibson's cyberspace, Virtual Reality: 'The seven million Americans who experienced the awesome potentialities of the brain via LSD certainly paved the way for the computer society. It is no accident that the term 'LSD' was used twice in *Time* magazine's cover story about Steve Jobs [founder of Apple], for it was Jobs and... Steven Wozniack who hooked up the personal brain with the personal computer and thus made possible a new culture' (Leary 1994: 47).

Leary characteristically read the cyberpunk phenomenon with his familiar conflation of generational change and evolutionary mutation. In particular he located cyberpunks as the first generation in history born and adapted to an information society ruled by cybernetic technology. Their peculiar historical location gave the cyberpunks their edge; they were the generation who could regain control from the cybernetic system. They also were the evolutionary bridge between the old kind of human beings and a new breed who would live in a creative world of customised virtual reality. In Leary's definition, '[cyberpunk is] a stopgap, transitional meaning-grenade thrown over the language barricades to describe the resourceful, skilful individual who accesses and steers knowledge-communication technology towards his/her own private goals, for personal pleasure, profit, principle, or growth' (Leary 1994: 67).

Leary's claims for cyberpunks are compatible with the hackers' vision of themselves as pioneers in the exploration of a new technological dimension, and maverick libertarians who use technology to penetrate the deep secrets of the information society. Leary's call for a 'free agent', a smart new subject able to navigate a sea of information and use technology to liberate him/herself also had a wider appeal in a society based on intangible work.

These principles are also at the basis of R. U. Sirius's idea of the 'reality hacker' or what he calls the 'cyberpunk personality type'. In *Mondo*' s rhetoric, cyberpunk represents the subject of the magazine in a double sense: it is both the kind of subject they hope to attract as a reader, and it is also the subject they want to create. The reality hacker, or cyberpunk, is a 'productive' myth. Its propagation is meant to create or amplify the 'sophisticated, high-complexity, fast-lane/real-time, intelligent, active, and creative' personality, the social subject able to catch up with a technological development vastly beyond the reach of the 'dulled, prosaic, practically-minded, middle-of-the-road public' (in Rucker, R.U. Sirius and Queen Mu 1992: 195). *Mondo*'s cyberpunk is the creative social subject who can regain

control lost to the system in the industrial revolution. This subject is the harbinger of the end of mass culture and mass indoctrination represented by television. This new subject descends from the sixties counterculture but is also a substantially different species: he/she has incorporated science and technology as his/her new environment and rejected nature as the referent and ground of value.

The construction of science and technology as fields of exciting and revolutionary possibilities is also another of *Mondo's* trademarks. *Mondo* fully endorsed Virtual Reality and was quick to trace its connections with the sixties counterculture in the work of VR engineers such as Brenda Laurel and Jason Lanier. It also endorsed the work of scientists such as Marvin Minsky and Hans Moravec, who support the idea of technologically enhanced human evolution. Another group of scientists regularly featured in *Mondo* are the nanotechnologists of Stanford University, who work on the possibility of building molecular machines.

In 1992 R. U. Sirius and Queen Mu together with cyberpunk Rudy Rucker edited *Mondo's Guide to the New Edge,* which extensively covered all the fields of the 'New Edge'. The 'New Edge' is literally the unmapped territory built by a technology evolving at a speed which exceeds most subjects' ability to make sense of it. The hypertextual map of the New Edge includes such items as: artificial life, brain implants, chaos, nanotechnology, multimedia, virtual reality, psychedelic drugs, personal computers, deconstruction, evolution, industrial and postindustrial music and art, and, of course, cyberpunk, cyberpunk science fiction, hackers and crackers.

Mondo' s project aimed to combine the spirit of the Californian sixties counterculture with a cyberpunk sensibility and was directed at a larger group than the teenage hackers collected around the pirate BBSs. *Mondo* precariously managed to convey a cultural sensibility which had a certain appeal for social subjects operating in various versions of the new high tech workplace.[12] In 1993 R.U. Sirius split from *Mondo 2000.* The magazine is now published extremely irregularly and has lost much of its original popularity. R. U. Sirius, however, keeps publishing in *Artforum International, Wired* and other cybercultural magazines (Sirius 1996).

Cyberpunk and the Internet

The relationship between cyberpunk and cyberculture has also changed following the explosion of the Internet phenomenon. The Internet has generated a great deal of media coverage and has been officially named as

the protagonist of the year by *Time* magazine in 1995. It has also produced a number of 'niche' media, like the magazines catering to the growing interest in electronic communication such as the American *Wired* and the British *.net*. Both mass media and niche media have incorporated cyberpunk fiction in their coverage of electronic communication: Philip Elmer-DeWitt opened his editorial to the special 'cyberspace' issue of *Time* magazine with a reference to William Gibson (Elmer-DeWitt 1995); *Wired* regularly publishes articles by Rudy Rucker and Bruce Sterling and has dedicated at least two covers to cyberpunk (one to Neal Stephenson in October 1994; and another to Keanu Reeves, who plays the protagonist of *Johnny Mnemonic*, in June 1995).

In particular the media's use of Gibson's neologism, 'cyberspace' to describe CMC has not pleased the most experienced users of electronic communication. On Usenet, the media's use of the terms 'cyberpunk' and 'cyberspace' has provoked mixed reactions. On alt.net.media.coverage, in answer to *Time* magazine's 'cyberspace' issue in the spring of 1995, older segments of the community of net-users criticised the use of cyberpunk in the media by suggesting that it is a trivialising label. In a dialogue with the editor they vociferously argued for a much older and more independent history of electronic communication.

> Neuromancer didn't come out until 1984, and while some of his early work in that universe/subgenre was published as short stories in the early 80s, it was well after Arpanet was well established, and after Usenet had started to take off. And, frankly, I can't think of a single idea that Gibson has had in the computer field that influenced it, with a possible exception of building up some excitement about what's now being called virtual reality. (alt.net.media.coverage March 1995)

> Let's put it this way, Philip: when I announced plans to do a t-shirt with the word "cyberspace" inside one of those red circles with a bar across it (analogous to a no smoking sign) and the phrase "It's the Internet, stupid" underneath, I got over 100 email messages in a single day saying "sign me up! I *hate* people who use that word." Cyber-this, cyber-that, cyber-babble. (alt.net.media.coverage March 1995)

Posters on alt. cyberpunk have also come to despise the sensationalised ways in which the mass media have appropriated and distorted both cyberpunk fiction and a cyberpunk subculture.

> According to the media, cp's are lowlifes, capitalizing on dystopia. according to cp's, the media are the lowlifes, capitalizing

> on hyperbole, misinformation, and the dark side of human nature that votes with a quarter for a rag full of gossip. (alt.cyberpunk March 1995)

It is impossible, however, even for the regular posters on alt.cyberpunk not to recognize the popularity of the term and, consequently, its increasing distance from an 'authentic' and 'exclusive' subcultural experience. An example of a use of the word that would certainly anger or irritate some of these communities is the following ad, published in the classified section of London *Time Out* magazine in December 1995. I quote it as an example of the semiotic drifting of the term which has occurred in the last couple of years:

> diabasis
> BECOME A CYBERPUNK IN 1996
> A resourceful, skilful individual who accesses and steers knowledge for your personal pleasure, profit, and growth.

A telephone inquiry about the nature of the course advertised by diabasis under this heading revealed that it was a human resource workshop, meant to help people to cope positively with 1996 by taking control of their life.

As a result of this common use of the name, its meaning has become fraught with ambiguity. J.C. Herz, a twenty-two-year old writer and author of the autobiographical book *Surfing on the Internet*, expresses the ambivalence felt by young technoliterates and net-users: on the one hand, 'Gibson's name is invoked in genuflection and spritzes of holywater on the Net, where he is revered as a patron/saint and/or minor deity' (Herz 1994: 315) and cyberpunk is still for a lot of individuals 'a way to talk about the Big Picture' (Herz 1994: 222). On the other hand, cyberpunk also stands for the misapprehension of the phenomenon of electronic communication as a whole:

> I once consulted a corporate vice president about the Internet. From his voluminous leather swivel chair, he dialled up America Online and was reading his e-mail when a phone call interrupted our meeting. Reaching over his executive desk pad and copy of *Wired* magazine, he picked up the receiver, grinned, and told the company president, 'Hey, you'll never guess what I'm doing right now. I'm *surfing* on the *Internet'*. He looked at me. 'This is really *cyberpunk*, isn't it?' (Herz 1994; 221)

The commercialisation and popularisation of the term is coupled with the

new capabilities of CMC, which can bring individuals from different areas of the world into contact with each other. Anybody from any Internet connected area can log onto Usenet and join the discussion on alt.cyberpunk. This international virtual space allows different views on cyberpunk as a cultural sensibility to confront each other. At the same time it allows differently-located subjects to discuss contemporary developments in the media treatment of the word. In its own peculiar way, an international, but America-centred, cyberpunk subculture survives on the Net as a historical, evolving, collective entity. Although its relationship both with mass media and Internet culture is fraught with tensions and ambiguities, I think that the relationship between cyberpunk and cyberculture is not to be underestimated. Even where cyberpunk did not influence cyberculture, their shared roots in popular science and early technological subcultures make cyberpunk a useful entry point into cyberculture as a whole.

Alt.cyberpunk and all the other cyberpunk sites on the Internet are the electronic spaces where this relationship is made explicit. I have sampled some extracts from the discussions on alt.cyberpunk to show how some of the definitions of cyberpunk are adopted and discussed by people who choose to post on a discussion group explicitly named as such. These statements were made in 1994 and they represent the development of the word cyberpunk in a subcultural context.

On alt.cyberpunk, enquiries about what makes a cyberpunk are welcomed with various degrees of amusement and seriousness:

> Could somebody please tell me how to become a member of
> Cyberpunk.

Cyberpunk isn't a group. It's more of a philosophy/social trend. All you have to do to join is to read some of the books (They post a reading list every so often), love playing with computers and new techology, and enjoy being subversive. (alt.cyberpunk November 1994)

I see not much has changed. Most of the posters here are kiddies who've read Gibson and decided that the whole 'cyberpunk' movement is a way for nerdy computer types to come across as being some sort of K00L outlaws who play by their own rules. (alt.cyberpunk January 1994)

In these spaces cyberpunk emerges as a contested area of meaning, whose multilayered historical complexity still survives in the different emphases different individuals decide to put on the term. The co-existence of

these traditions, and their contribution to the crystallisation of new narratives about science and technology is an important part of this thesis. In the rest of this chapter I will just provide some examples of this complexity, stressing in particular the inter-textual presence in these scattered arguments of the cultural history outlined above. These quotes belong to three different individuals (or at least to three different e-mail addresses):

> 'CyberPunk is nothing directly to do with Internet. I suspect you are applying the 'Info wants to be free' principal (maybe in a slightly incorrect fashion) and connecting it to the CyberPunk idea. BZZZZZ!! Wrong answer, try again. CyberPunk isn't about info, the Punk bit is about freedom of thought and action, not of speech. CyberPunk is about machine and man, it's about the next evolutionary step being the merge of machine and man. (alt.cyberpunk April 1995)

> Cyberpunk has a wide variety of people and opinions involved with it. Not every opinion is correct, not everyone is a full Cyberpunk. To try to limit who or what can enter into this game is exactly what Cyberpunk is NOT about. Cyberpunk is about breaking lose from authority, not establishing its own. Cyberpunk is about open mindedness and welcoming diversity ('Welcome to My Mind'). Cyberpunk is for everyone. (alt.cyberpunk December 1994)

> A hacker is not necisarilly a cyberpunk and a cyberpunk is not necisarilly a hacker.
>
> Again there are simularities, in fact the two groups have such an overlay (so many are both) that maybe it could largely be said to be true, but where a hacker can be just any ten-year-old trying to push his limits onto foreign networks, the cyberpunk actually hacks for idealogical reasons. His motto is 'Information wants to be free'. So the ten-year-old is not in fact a cyberpunk but just a kid fucking around with stuff he doesn't know. Also some cyberpunks don't care for hacking but try to brake down society in other ways. But general for cyberpunks is that it is a fight against the system. (alt.cyberpunk December 1994)

These statements repeat and rework the hacker's ethic, the phreak's hostility to the system, and *Mondo'* s emphasis on evolutionary mutation, and are also engaging in a dialogue with media coverage of electronic communication. Similarly the following poem, 'A modern teenage Cyberpunk', deals with the problem of drawing one's identity out of the narratives and the stereotypes elaborated by the hated mass media:

> I am the very model of a modern teenage Cyberpunk
> I rent my own apartment and it's full of electronic junk

I own a VAX, a 486, I've even got a PDP
I've finished Myst and Doom but I am stumped by Wing Commander III
(..).
I'm totally an anarchist, the government I'd like to wreck,
Though if they were to get blown up, who'd give to me my welfare cheque?
In short if you need answers that concern your electronic junk,
I am the very model of a modern teenage Cyberpunks
(..).
My life outside the Internet is very very sad you see
I cannot get my spots to fade, my social life's a tragedy,
But still if you need answers that concern your electronic junk,
I am the very model of a modern teenage Cyberpunk.

Circulated on alt.cyberpunk in the summer of 1995, this poem resonates with the subcultural necessity of keeping the media invasion at bay through irony, while at the same time rejoicing in a tradition and a mood which other participants can share.

Summary

Cyberpunk is both a worn-out label to describe a vision of the future and an ethos still dear to the digital underground. 'Built-in smirk notwithstanding', as J. C. Herz put it, it is still an important field of identification, a way through which communities formed in virtual spaces, usually, but not exclusively, embracing the generational space marketed as 'generation X', discuss the world created by information technology. Discussions operate through a developed and rich cultural history (hackers, phreakers, cyberpunk fiction). They also interact with a culture of science and technology very much in progress: scientific developments interesting to a cyberpunk sensibility (from nanotechnology to brain implants) are regularly discussed. Media coverage of CMC is discussed and/or criticized as it happens.

Cyberpunk cannot be separated from contemporary computer culture at large. Even when cyberpunk cannot be considered as an 'influence' (such as in the case of older professionals and computer activists), it participates in the same cultural milieu. Cyberpunk authors drew on a cultural sensibility of technology rooted, among other things, in the history of the American technological subcultures. Many groups at the vanguard of the exploration of Information and Communication Technologies have been inspired by cyberpunk and have added their own ideas and their own cultural legacy to

its meaning.

In this thesis I do not concentrate exclusively on cyberpunk-inspired subcultures, although much of this project is devoted to them. This chapter is meant to show the historical relations between cyberpunk and cyberculture. I have focused on cyberpunk subcultures only in as much as they have provided a useful entry into cyberculture as a whole. In recent years, different segments of a more scattered computer culture have been brought together by their involvement in the development of the Internet. In this chapter I have traced a first map of the constituency of some of these groups, their cultural allegiances, and their ideological projects. In the rest of this thesis I look at the consistencies between the cyberpunk groups outlined in this chapter and members of computer culture in general about the nature and the possibilities of CMC.

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[1] For reasons of space and consistency, I have not discussed the impact of cyberpunk SF on music and the performing arts. Among the artists quoted in relation to cyberpunk, we find some important exponents of the 'industrial movement' in performance art, such as the Mutoid Waste in the UK, and Mark Pauline and the Survival Research Laboratory in the US (Pauline 1993). Another performance artist very popular with cyberpunks is Stelarc, who has actively incorporated elements from scientists such as Marvin Minsky and Hans Moravec (Stelarc 1989). In music, Billy Idol earned the contempt of alt.cyberpunk when he issued *Cyberpunk,* a record which was perceived as purely a commercial operation. Although cyberpunk writers prefer sixties rock in their writing (Gibson's often refers to the Velvet Underground in *Neuromancer;* Pat Cadigan quotes Jimi Hendrix in *Synners*), cyberpunk as a larger cultural formation is associated with hard core techno or heavy industrial music (McCaffery 1991c). In November 1994 on alt.cyberpunk, there was a certain amount of controversy around the band Psychosonic, who have apparently identified themselves as a 'cyberpunk' band.

[2] Sterling's role as the 'guardian' of cyberpunk purity could be particularly authoritarian. Samuel Delany quotes an episode in 1987 when 'a young editor proposed putting together a cyberpunk casebook of this material on and around cyberpunk. Bruce Sterling quashed with some ugly threats—practically of excommunication—to any one of the cyberpunk group who cooperated or let his or her work appear in it' (in Dery 1993b: 757).

[3] 'The New Science Fiction' was accepted by the editors of the British SF fanzine *Interzone,* who shared a certain feeling of where science fiction should be heading in the eighties. In the summer of 1984, an editorial by David Pringle and Colin Greenland complained about the conditions of SF and argued for the necessity of renewing it so that it could face the challenges of the age: 'What we are looking for is a fiction that is radical and hard as the implications of the new technology itself. It will be *radical* SF because it will be critical and investigative... At the same time it will be *hard* SF, using hard-edged language and imagery of technology for imaginative

reinterpretations of reality rather than departures into fantasy' (Pringle and Greenland 1984: 3). In the same editorial the editors announced the opening of a competition which aimed to find and support 'that new science fiction for the electronic age'. Bruce Sterling responded with enthusiasm in a letter published in the next number of the magazine. He also had his piece, 'The New Science Fiction', published in the magazine in the winter of 1984/5 under the pseudonym 'Vincent Omniaveritas' (Omniaveritas 1984). The support offered to cyberpunk by *Interzone* confirms its claims to be the new science fiction of the eighties; the connection with the New Wave, and particularly with the fiction of Ballard, reinforces the cyberpunks' claims that they were starting a revolution in the science fiction genre. *Interzone* supported cyberpunk writers by publishing their short stories and backing up their theoretical programme—the creation of the new, 'hard radical SF'. In the spring of 1984 *Interzone* published Bruce Sterling's 'Life in the Mechanoids/Shapers Era. 20 Evocations', and in the autumn of the same year the editors admitted an exception to their policy of publishing only new material by accepting William Gibson's short story 'Fragments of a Hologram Rose', which appeared originally in 1977 (No. 9 Autumn 1984).

[4] This basic outlook was later reviewed by Sterling in a variety of other documents: in the 'Preface' to *Burning Chrome* he claims that cyberpunk's favourite technologies are also cybernetics, biotech, and the new communications sciences of global networking. Its privileged points of view are also incarnated in different kinds of subjectivity; no more 'passionless techies and rock-ribbed Competent Men of hard SF' but ' a pirate's crew of losers, hustlers, spin-offs, castoffs, and lunatics', shortly the future seen 'from the belly up, as it is lived, not merely as dry speculation'(Sterling 1988: 11).

[5] According to the well-known SF critic Peter Fitting, cyberpunk is a genre much more popular with readers who do not usually read science fiction: 'Gibson's popularity within SF is nowhere as great as his prestige outside. Although *Neuromancer* won all three 'best novel' prizes in 1984 (the Hugo, the Nebula and, the Philip K. Dick awards), those were his last major prizes. In the annual *Locus* poll, Gibson's second novel, *Count Zero,* was ranked the third best novel of 1986 by the readers, the same ranking it attained in the Hugo voting. In 1988 *Locus* polled its readers for the top SF authors of the 1980s - Gibson placed fifth - and for the top SF authors of all time: he did not make the top 50. In 1989 *Mona Lisa Overdrive* placed second in the *Locus* poll' (Fitting 1991: 312).

[6] The US Secret Service is involved in two main activities: it represents the force in charge of protecting the President and it is the federal law enforcement agency with jurisdiction over counterfeiting and forgery. As money has become more electronic, the Secret Service has moved from fighting the counterfeiting of paper currency and the forging of cheques to the protection of funds transferred by wire. As a result it has acquired the authority to investigate 'access device fraud', a large category that includes computer fraud. The Secret Service has been involved in all the main police operations against computer hacking in the US (Sterling 1992).

[7] Sherry Turkle sees a close proximity between writing science fiction books, computer programming and fantasy gaming: 'In the early 1970s,

fantasy gaming grew from cult to culture in the worlds around computer programmers. They found an affinity between an aesthetic of building a large complex program, with its treelike structure, its subprograms and sub-subprograms, and working one's way through a highly structured, constructed world of mazes and magic and secret, hidden rooms' (Turkle 1985: 80). The common feature with science fiction is that all are 'rule-governed worlds'. In science fiction, for example, the author can invent everything 'but once the rules of the system have been defined they must be adhered to scrupulously' (*ibid.*: 81).

[8] It is remarkable how computer crime was first associated with employees taking advantage of their access to their employers' databanks. In 1982 Leslie Ball, an assistant professor at Babson College, Wellesley, Mass., identified computer criminals as people who tend to be 'relatively honest and in a position of trust... Their positions range from data entry clerk to company president. While direct access to a computer terminal is helpful, they need only a job allowing them to generate data entered into the computer. And, perhaps ironically, most computer criminals who have been caught have no formal computer training; only a modest amount of knowledge seems necessary. They commit frauds in the areas they best understand: payroll clerks steal from payrolls, not from accounts receivable' (Ball 1982: 536).

[9] Interestingly enough, the loose, autonomous work-hours of these early hackers have become a trademark of the software industry in the Silicon Valley (Cringeley 1992).

[10] Andrew Ross quotes Hugo Cornwall, British author of the bestselling *Hacker's Handbook,* who 'presents a Little England view of the hacker as a harmless free-air enthusiast who "visits advanced computers as a polite country rambler might walk across picturesque fields"' and stigmatises the new teenage hackers as reckless hooligans (cited in Ross 1991: 82).

[11] The following quote, published on the back cover of *Cyberpunk,* comes from *Newsweek:* '... Hafner and Markoff, like the dedicated, intense cyberpunks they illuminate, appear to have stopped at nothing to hack their way into the cyberpunk subculture' (Hafner and Markoff 1991).

[12] It is worth remembering that *Mondo* was only one of the most successful examples of what came to be known as the 'cybercultural' press. Other magazines interested in the same issues were *Future Sex,* run by Lisa Palac, and *bOING bOING,* edited by Gareth Branwyn (by now, e.g. 1996, a collaborator of *Wired*)

Chapter 5
Technology and resistance in Internet Culture

In this chapter I will concentrate on the political nature of cyberpunk: what is the politics of technology expressed in cyberpunk fiction and how does it resonate with cyberculture at large? How are power, resistance, and political agency conceptualised in cybercultural discourse?

In formulating these questions I have been particularly influenced by the experience of the Italian cyberpunk movement. In Italy cyberpunk SF has tended to be read as a commentary on the new political strategies needed by the left in the Information Age. Raffaele Scelsi, in his introduction to the anthology *Cyberpunk*, gives a strong reading of its perceived political potential:

> In short, cyberpunk is basically read as a political phenomenon, as techno-urban literature, reflecting the transformations produced by modernity in the new social subjects.... The political tension of this anthology is towards the reappropriation of communication by social movements through the formation of alternative computer networks which could finally affect the excessive power of the multinationals in this field. (Scelsi 1990: 9) [my translation]

I will try to determine the extent to which Scelsi's reading of cyberpunk is applicable to the English-speaking, mainly American, electronic scene—a strong reference point for European cyberpunks. I argue that cyberpunk SF expressed a split attitude to power and technology that is still widespread in communities coalesced around the use of computer networks. As in cyberpunk fiction, these high-tech subcultures represent their relationship with technology in terms of ecstasy and paranoia: the empowerment experienced through the interface with the machine and the fear of censorship and surveillance. I argue that not just cyberpunk groups, but a substantial segment of Internet culture at large seems to share this image of the political scenario of cyberspace. These two positions, one that emphasises the pleasures and the possibilities of technology and the other its dangers, are parts of a single structure of feeling. Far from expressing a polarization of discourses between an 'insider' and an 'outsider' position, this dynamic opposition between paranoia and ecstasy is at the heart of most cybercultural expressions.

I will look at a diverse range of sources: two Internet newsgroups,

alt.cyberpunk and alt.net.media.coverage; niche magazines such as *Mondo 2000, Adbusters,* and *Wired;* the mass media's coverage of CMC; and various pamphlets and articles concerned with the politics of cyberspace. Most of this literature reveals recurrent paranoid concerns ranging from fears of narrow-minded legislation to nightmarish scenarios of total panopticism.

Both in cyberpunk SF and in cyberculture at large, this paranoia is balanced by a more optimistic rhetoric which emphasises the pleasures of technology and celebrates electronic communication as the medium of a truly decentralised democracy. In the paranoid register, the Internet decentralises surveillance: government and corporations can use the computer networks to gain very detailed information about citizens and consumers. In the optimistic register the Internet decentralises democracy: CMC facilitates a true democratic participation where everybody has access to sensitive information and can express his/her opinion as never before in the traditional mass media.

This tension is interwoven in a larger narrative about the development of the Net, its possibilities, its friends and enemies. Political agency is rediscovered through access to technology and advanced forms of technoliteracy (which I call technomastery to emphasise the element of advanced skill). Netusers' technical knowledge of the possibilities of the medium safeguards the Net from the totalitarian drives of national governments and greedy corporations. Only when free, in fact, will the Net be able to express its true potential as the medium of the future. The model of communication typical of CMC is many-to-many and it reflects the needs and the character of a more liberal society. Television and more traditional mass media are based on the few-to-many model, which is typical of the more regimented and standardised industrial society. The triumph of the Net will be the end of the traditional mass media who have betrayed their vocation and happily turned to manipulating and misinforming the general public.

I start by showing how the dystopia/utopia opposition has been reformulated in recent debates around CMC as an opposition between technophobia and technophilia. I analyse the contours of this paranoid/ecstatic split inside cyberculture and look at the ways in which this split is resolved by a stress on technomastery. I will then look at the defensive and productive tactics enabled by this mastery and conclude by assessing the possibilities and the limits of the kind of politics allowed by a discourse of resistance which puts such an exclusive emphasis on

technoliteracy.

Technophobia and technophilia

One of the possible ways to talk about narratives of resistance in cyberculture is to locate them in the old debate between technological utopianism and dystopianism in Western literature. The industrial revolution made extremely and dramatically visible the power of technology to alter the shape of social relations. This visibility caused concern and revulsion for some, hope and enthusiasm for others: both attitudes found expression in an increased output of utopian/dystopian literature. Both utopians and dystopians often share a determinist perspective on technology, which is charged with the power to affect human relations either for the best or for the worst. Writers often quoted as part of a utopian or dystopian tradition include Thomas More, Charles Fourier, Edward Bellamy, H.G. Wells, George Orwell, Aldous Huxley, Philip K. Dick, Joanna Russ, and others.[1]

In the early 80s, when the first wave of public interest in computers started, the debates about the implications of IT were similarly formulated as a choice between utopia and dystopia. As Robins and Webster put it 'Big Brother or Power to The People, education or entertainment, centralisation or decentralisation.... choices present themselves everywhere when it comes to IT' (Robins and Webster 1989: 25).

Such long-standing traditions are echoed in contemporary debates about electronic communication technologies under the new labels of 'technophobia' and 'technophilia'. Philip Elmer-DeWitt, in his opening feature in *Time* magazine's special issue on 'cyberspace' ('Welcome to Cyberspace') claims that 'much of what has been written about it [cyberspace]-in the press and on the networks-' is split between 'one extreme and the other, from hype and romanticism to fear and loathing' (Elmer-DeWitt 1995: 11). Hakim Bey, a cult figure for the more radical end of cyberculture, sees the same split between 'two seemingly contradictory attitudes toward Hi-Tech and its apotheosis, the Net'. He identifies two groups:

> (1) what we might call the *Fifth Estate* / Neo-Palaeolithic Post-Situ Ultra-Green position, which construes itself as a luddite argument against mediation and against the Net; and (2) the Cyberpunk utopianists, futuro-libertarians, Reality-Hackers and their allies who see the Net as a step forward in evolution, and who assume that any possible ill effects of mediation can be

> overcome – at least, once we've liberated the means of production. (Bey 1991: 110-111)[2]

This attitude, which Bey and DeWitt represent as a general split between an inside and an outside, is reproduced in its turn inside computer culture. The only difference is that for the passionate technophile the nightmarish scenario can be averted by making the right choice: this choice is not about accepting or rejecting a technology, but about working on its 'good' uses, rather than its bad ones. In an anthology published by the M.IT. press, for example Linda Harasim expresses the same ambiguity regarding the two apparently opposite future scenarios allowed by electronic communication:

> Computer networking today is largely the result of cooperation among self-reliant individuals and nodes. This notion of networking has connotations of increased self-organization and a conscious alternative to top-down organization.
>
> ...Yet, while networking can augment our communication potential, others worry that users of global networks will be caught in a Big Brother web of social control, in which all traffic and communication can be monitored and in which networks become nets to catch and confine prey. (Harasim 1993c: 32)

The location of cyberpunk literature in this context has been highly debated, with detractors denouncing alternatively its connivance with 'dystopic' portraits of the future and/or its unproblematic celebration of the technological interface.[3] In cyberpunk fiction, the ecstatic perspective gave their most lyrical moments to novels like *Neuromancer* and *Synners*. In *Neuromancer* the protagonist Case is thrown into desperation by the loss of what he cared most for in his life: the experience of jacking in, of leaving the body to wander in cyberspace (Gibson 1984). In *Synners*, Visual Mark, a rock musician, finds true happiness when his body dies and he becomes another entity loose in the computer networks (Cadigan 1991).

At the same time both heroes have to fight against greedy multinational corporations, international mafias, and powerful tycoons. In spite of the cynicism of cyberpunk hackers—they always care about their own financial interest— corporations are consistently cast in the role of omnipresent, powerful villains. In *Neuromancer* 'corporations are vaster—and faster—than empires. Above laws, they make laws and hire bandits when necessary' (Rosenthal 1991: 85). Fredric Jameson saw this paranoid element as constitutive of cyberpunk SF—a feature which linked it to the Cold War spy

novel. The typical cyberpunk plot, as seen by Jameson, is a 'high-tech paranoia' genre

> ...in which the circuits and networks of some putative global computer hook-up are narratively mobilized by labyrinthine conspiracies of autonomous but deadly interlocking and competing information agencies in a complexity often beyond the capacity of the normal reading mind....
>
> Such narratives, which first tried to find expression through the generic structure of the spy novel, have only recently crystallized in a new type of science fiction, called *cyberpunk*, which is fully as much an expression of transnational corporate realities as it is of global paranoia itself. (Jameson 1991: 37-38)

Jameson's argument about the paranoid web trapping cyberpunk heroes could be abstracted from the limited realm of cyberpunk literature and tested against cyberculture as a whole. During the time I researched these groups, these paranoid concerns were formulated mainly against the government. Although computer culture as a whole tends towards libertarianism,[4] the particular anti-government virulence of 1993/1994 is undoubtedly due to the first signs of strong political interest in CMC. The events that started in the summer of 1993 and culminated in an anti-censorship crusade in late 1994, constitute the immediate historical background framing this chapter.

The State of Internet Politics in 1993/1994

According to Howard Rheingold, a strong public interest in the possibilities of computer networks emerged in the summer of 1993, when the first mergers between major companies interested in CMC were announced: the first of these mergers (which did not materialise) was between two US companies: Bell Atlantic and TCI—respectively a major telephone and cable company. The ostensible purpose was to achieve some kind of diversified platform from which to proceed to colonise the new digital market promised by electronic communication—including applications such as interactive television and digital shopping. In March 1994, Bill Gates from Microsoft announced a new partnership with Craig McCaw, whose main former interest was in cellular communication. The Gates-McCaw company, Teledisc, wanted to use a network of 840 low-orbit satellites to transfer information to and from the earthbound Net. One week later Gates also announced a new partnership with a similar Japanese

company (Rheingold 1994).

The public interest aroused by these mergers was further enhanced by Bill Clinton and Al Gore at the end of 1993, when they began to promote their plan for a 'National Information Infrastructure' (NII).[5] In a speech to the National Press Club in December 1993, Gore talked about five 'guiding principles' that should frame the government's policy towards CMC. Rheingold sees in these principles a compromise between the lobbies representing the major corporations and the computer activists. The latter were represented by the Electronic Frontier Foundation, ' a membership organization that was founded in July of 1990 to ensure that the principles embodied in the Constitution and the Bill of Rights are protected as new communications technologies emerge' (Barlow 1990).

The guiding principles established that the NII was going to be built by private industry and that the government should limit itself to regulating the competition: the NII was going to be built by as many companies as possible with strict anti-monopoly rules. This compromise pleased the EFF, but was jeopardised by two parallel proposals;[6] the instalment of an encryption device, the Clipper Chip, in every computer, and the 'Digital Telephony Bill'. According to Barlow, Brock Meeks, and Rheingold, both proposals were the result of the influence of the FBI and both completely ruined the reputation of the Clinton administration in its dealings with computer activists (Rheingold 1994; Barlow and Meeks 1995). They also sparked the kind of paranoid thinking which was widespread on the Internet at the time of my fieldwork.[7]

The Clipper Chip 'is an encryption technology built into a microchip that can be manufactured in telephones and other communication devices.... The fly in the ointment is that the federal government holds the keys to a backdoor to everybody's Clipper Chip, which it can use to decode private conversations whenever it needs to defend national security' (Rheingold 1994: 306). This would happen without the same kind of regulations that apply to telephone tapping. The Digital Telephony Bill was similarly based around the need for government's access to private conversations. As Rheingold put it:

> The FBI was at it again, trying to force the telephone companies to install FBI-operable central snooping power in the new digital communication networks. Remember the Panopticon? Keep in mind that fewer than one thousand legal wiretaps are granted every year for investigation of serious

> crimes, out of the millions of crimes and billions of conversations. Instead of obtaining a court order and going to the telephone company to install a tap, the FBI would like the telephone company to, in effect, give them the power to tap any conversation they deem necessary. Everything is happening at once. The Net is liberating; the Net is a trap. (Rheingold 1994: 307)

In the context of these widespread fears about decentralised surveillance and global panopticism, the old debate about the utopian/dystopian possibilities of digital technology appeared again. '1984' and 'Computopia' emerged as the two possible futures of electronic communication and society at large. The choice between the two was totally dependent on the ways in which of the Internet community responded to these first attempts at regulation.

Cyberculture was quick to react to the threat of surveillance: in the winter 1994 issue, *Mondo 2000* published two articles about global panopticism, one signed by Charles Ostman ('Total Surveillance. Your Life on a Chip') , the other by Clark Matthews ('Nitch Chips, Slave Bracelets and You or Lemme Off This Boardgame'). Matthew's article elucidates the immediate political background to the paranoid imagination. The article is a long attack on the Clipper Chip and the Digital Telephony Bill, concluding with an emphatic comparison between the FBI and the Nazi Gestapo:

> Almost from the day President Clinton assumed office, it became obvious. The secret guardians of national security and public order were fully prepared *to pervert the new generation of information technologies* into a monstrously sophisticated digitotalitaran police state.
>
> The Total Surveillance State taking shape under his leadership appears to have three broad components:
>
> - Automatic spying of all public and private communications networks.
> - Automatic "profiling" of all citizens by computer: gathering all available details—health, consumer habits, political activities, etc.
> - Digital identity and social control mechanisms, in particular, Smart Carts featuring ultra-dense integrated circuitry and trackable Clipper-chip encryption. (Matthews 1994: 23) [emphasis added]

In the other article, Ostman, allegedly a former research engineer at Lawrence Livermore Labs, starts with a similar nightmarish scenario. Digital surveillance is exercised at every scale and level of human existence:

> Imagine a world in which every aspect of your life, past and present, is encrypted on a personal ID card and stored on a nationwide data base. Where virtually all communications media—soon to be 100% digital—are automatically monitored by computerized phone taps and satellites from control centers thousands of miles away. Where self-training neural nets and artificial intelligence data search systems scan for undesirable lifestyles and target you for automatic monitoring. (Ostman 1994: 16)

In the course of the article, Ostman refers to the existence of a 'supersecret' National Reconnaissance Organization, whose new huge complex is being completed in Chantilly, Virginia. The tone, deliberately science fiction, is pure Orwellian cyberpunk. Ostman enumerates the new technologies of panopticism: universal encryption chips, intelligent cameras, biometrics,[8] satellite surveillance, robot spies, and monstrous A.I. intelligences on parallel computers able to sift through and organize oceans of data.

In the summer of the same year, *Adbusters*, a magazine specifically oriented against marketing and advertising, was more worried about the danger of a panoptic universe manoeuvred by corporate power. Once again the issue concerns privacy rights.

> In the post cold war era, corporate power is growing beyond a military, industrial complex that produces weapons of mass destruction. It is evolving into a media-industrial complex that induces mass consumption. The 'saturation bombing' tactics of mass marketing are becoming obsolete. Modern corporate firepower is evolving to extract precise intelligence data via consumer surveillance, and then respond with surgically targeted commercial 'smart bombs'. Call it individualized advertising. (Crawford 1994: 22)[9]

These worries are not just characteristic of countercultural or subcultural movements, but are part of a generalized concern within mainstream computer culture for problems of privacy. If corporate scooping of employees' E-Mail is a legal and begrudgingly accepted practice in the US, *Wired* definitely sided with the libertarians of the Electronic Frontier Foundation at the time of the Clipper Chip controversy. On the front page of the April 1994 issue, *Wired* denounced the coming of 'Jackboots on the Infobahn' (*Wired* 2.04, April 1994).

> ...we could shortly find ourselves under a government that would have the automated ability to log the time, origin, and recipient of every call we made, could track our physical whereabouts continuously, could keep better account of our financial transactions than we do, and all without a court-ordered warrant. Talk about crime prevention! (Barlow and Meeks 1994: 47)[10]

The paranoid streak in cybercultural writing overlaps with, but differs from analyses of the dangers of technology coming from the ranks of concerned left criticism. In an article aimed at debunking the technological boosterism equally embraced by left and right in the UK, Kevin Robins and Frank Webster insist on remembering how 'the new technologies... have already been constituted to express dominant social relations and values [the military industry in the US.]. When we explore how these technologies have been (and are being) constituted, we find not a culture of Athenian democracy but rather a culture of social control and political domination' (Robins and Webster 1988: 29). Robins and Webster do not only denounce the proliferation of 'new reservoir of information' but also their centralization 'in the hands of those who own and control technology' (*ibid.*: 36).

Webster and Robins suggest throughout their work that the solution to this culture of control and domination lies in opening collective negotiations about the development and the introduction of new technologies. Technology is not shunned per se, it is not seen as being intrinsically dehumanising or oppressive; but it can be oppressive when it is shaped according to the needs of powerful minorities.

Electronic subcultures respond to paranoia from a different kind of political culture. For these groups, technology is the source of both fear and pleasure, paranoia and ecstasy. This constitutive split is not solved by asking for more accountable mechanisms of decision-making when it comes to the introduction of new technologies. These groups see themselves as the *makers of* technology. Since they are making it, they fear intervention and regulation; if left alone, netusers would be free to develop their technical protocols and their own communities in an ideal, self-regulated environment. If an incompetent and authoritarian government tries to intervene and regulate it, however, the wonderful potentials of CMC will be turned against itself.

This line is foundational to the development of the Net. There is a very

common 'origin story' about the Internet and how it was developed by the government, with the famous ARPANET project, but reappropriated and mutated by the people.[11] In spite of its origins in military research, the story goes, the Net was built and developed by its users:

> The first computer networks are a spinoff of American military research. The first computer network, ARPANET, was created in the 1970s so that Department of Defence-sponsored researchers could operate different computers at a distance... ARPANET grew out of an older RAND [the think tank in Santa Monica that did a lot of work with top-secret thermonuclear war scenario] scheme for a communication, command, and control network that could survive nuclear attack by having no central control.
>
> ...The hobbyists who interconnect personal computers via telephone lines to make computer bulletin-board systems, known as BBs, have home-grown their part of the Net, a true grassroots use of technology. (Rheingold 1994: 7)

> The Net has only developed because of the hard work and voluntary dedication of many people. It has grown because the Net is in the control and power of the people at a bottom-level, and because these people developed it. People's posts and contribution to the Net have been the developing forces. (Hauben 1994)

In *The Virtual Community,* Howard Rheingold emphasises this point: governments and corporations do not know anything about electronic communication. They lost touch a long time ago and now it belongs to those passionate amateurs who developed its material foundations and its peculiar culture. The danger caused by the intervention of the US government in CMC is therefore that of *perverting* a good technology and turning it into a bad one. As Matthews put it, these 'industrial' institutions are ready 'to pervert the new generation of information technologies'.

In a similar vein John Perry Barlow sees the Clipper Chip proposal as the 'last ditch attempt by the United States, the last great power from the old Industrial Era, to establish imperial control over cyberspace' (Barlow 1994: 40). In an 'afterword' added to *The Virtual Community* in 1994, Howard Rheingold also sounds alarmed about the sudden outburst of interest which he perceives as downright cybernetic neo-colonialism: in 1994, '[t]he heretofore underground on-line culture was reported, hyped, spoofed, incisively analyzed, and grossly misinterpreted by the networks and national news magazines, intellectual and technical publications, *Doonesbury* gags and cartoons in *The New Yorker,* jokes on sitcoms—the modern American media

food chain' (Rheingold 1994: 301). Reporting on the Clipper Chip case and the corporate battle for the control of CMC, he has to admit that '[j]ust as CMC decentralizes control of communication and publication, it decentralizes surveillance as well. Before we argue about the best way to build utopia, it might be time for citizens to unite against the encroachment of tyranny in the guise of technology' (*ibid.* :: 308).

On what basis does cyberculture intend to avoid this perversion of a truly democratic medium? In the next pages I analyse the ways in which cyberculture as a whole has reacted to these images of the virtual panopticon. Netusers' strong investment in technology does not allow them to give up CMC without a fight. I argue that the paranoid trend I have explored in the last pages is counteracted by a positive language which claims that technological mastery is the key to political and cultural agency. Mastery not only allows netusers to defend themselves against censorship and surveillance, but also to answer back. They can defend themselves from the State and engage with politics through the production of alternative knowledge and the circulation of better information than that produced by the corrupted mass media.

Technological mastery in the political rhetoric of the Internet

Resistance to the 'perversion' of technology is based on an in-depth knowledge of the medium. But what is this knowledge based on? The rhetoric of technological mastery is usually inflected in the language of the 'masterful' or 'exceptional' individual, whose natural environment is the 'small group' of like-minded persons. The subject of cyberculture, as I show in chapter 6, is fast, adaptive, driven by pioneering instincts of discovery and moves in small packs. From Timothy Leary and Steven Levy to Howard Rheingold and the cyberpunk writers (most noticeably Bruce Sterling), the narratives of agency in cyberculture consistently contradict claims about the 'terminal identity' of the postmodern interfaced subject.

This is not to imply that technology is not perceived as altering the boundaries of the self. Cyberculture accepts and rejoices in the alteration of consciousness induced by prolonged exposure to CMC. As a poster on alt.cyberpunk put it,

> This medium is different ... It's as if there is no location anymore, and location, "here" is how we usually define and think of our "self' so now that our main anchor is non-existent, our view of "self' and of human being has to be changed.

(alt.cyberpunk February 1995)

At the same time the integrity of the self is re-established by a constant emphasis on the individual as the staple against which politics is measured.

There are contradictions and tensions involved in holding together a discourse of dissolution and of radical empowerment and masterful individuality. These contradictions run across a whole series of influential texts, such as Timothy Leary's *Chaos and Cyberculture* (1994); Stephen Levy's *Hackers* (1985); Alvin Toffler's *The Third Wave;* (1980); Katie Hafner and John Markoff's *Cyberpunks* (1991) and Sterling's own *The Hacker Crackdown* (1991).

Across all of these very different books, we find a discourse of mastery through technology which relies exclusively on the category of the individual: they are all stories of individual empowerment through the acquisition of technological mastery. They also never give any kind of assessment of the social conditions that allow the individual to aspire to and achieve technological mastery. The individual will is set against the bureaucratic leftovers of the Industrial Age, and is nourished by a small group of people with the same interests and personality traits. In *Island in the Nets,* one of the last cyberpunk novels written by Bruce Sterling, the author states that '[c]reativity comes from small groups. Small groups gave us the electric light, the automobile, the personal computer. Bureaucracies gave us the nuclear power plant, traffic jams, and network television' (Sterling 1988: 47).

This discourse of mastery provides the space for a mystical language of resistance which I define as 'ecstatic' in opposition to the paranoid concerns explored in the last section. Examples of the uneasy dialogue between the two elements are easily found in the electronic exchanges on Usenet:

> The New World Order is the digital reality, the new flesh, and not global mercantilism. My feeling is that cyberspace is the state's kryptonite. It is denatured and undone by it. Considering its power and its vested interest in the net, the state's action in cyberspace is clumsy and ineffective. This is not their field of competence. The advantage is ours. -- (alt.cyberpunk January 1995)

Who gets to control our sensual input the net, and therefore who gets to insinuate themselves into our 'self'. The people who get control of the net, will become a part of the people who use it, because they will control the flow of sensual information thru the net. Thank god that the net, is not a single entity, solid, it is

> not an object or a controllable resource. (alt.cyberpunk, January 1995)

Such maximisation of mastery is what allows Gibson's archetypal console cowboys to get the upper hand in a universe filled with hostile and threatening powers. In a version popular with multimedia artists, creative uses of technology can also redeem it from the attempts at appropriation made by totalitarian institutions such as governments, mass media and corporate capital.[12]

Technological mastery of the medium facilitates both defensive and productive strategies. Some examples of technomastery as self-defence are: the use of 'E-mail bombs' to counteract early attempts to advertise commercial products on Usenet, whereby the e-mail of the corporate advertisers is targeted with thousands of messages and thereby clogged for days; kill-file applications which allow the user to erase off his/her screen messages coming from unwanted parties; the application of hacking to unscrupulous corporations and the use of anonymous (anon) sites to avoid censorship.[13] Even the Clipper Chip is dangerous only for those who do not know about encryption: a skilled encrypter can build an unbreakable code, which nobody else would be able to decipher.[14]

The forms of political activism left open in this particular landscape are therefore inextricably connected to techno-literacy, and this is not limited to merely defensive gimmicks such as those shown above. Self-defence is the first step and is useful only because it helps the Net to follow its own nature and its own drives. The 'natural' outcome is the development of a new, truly democratic medium which will liberate society from the grip of mass media and therefore herald the birth of a new civilisation.

In a particular 'thread' on the politics of cyberpunk on alt.cyberpunk, one of the participants asked the question:

> what sort of resistance is possible within the stance of cyberpunk? (alt.cyberpunk November 1994)

The discussion which followed was long, and, not unusually for Usenet, unfinished and extremely discontinuous. The political entity against which claims of resistance were being made was mainly 'the government'. These are some fairly typical comments made by the younger segment of the group:

> My personal views are to ignore govt, but not forgive it as Hakim Bey would say. So, to me, and what I see as CP in the fact that it appears in the literature, as well as the entire scene, is that direct activism, such as protests and other political games in efforts to control/better govt are doomed. Hence to me an idea that Cp is anti-govt is ok, in the aspect that it is APOLITICAL. Politics have no appeal to me, and most people seem to associate any youth movement with activism and other forms of reforming politics, which is something I despise actually. So Clayton, I think you misread my statement in that quote construing it to mean that Cp is anti-govt, in a political sense when really I was only responding to your statement about organized protest. CP to me is anti-govt just like a child is, we don't care for it, and we don't care for politics. (alt.cyberpunk November 1994)

Questioned again by participants, this poster clarifies his position in this way:

> Well resistance implies opposition, but I see it more like moving sideways. For me it is using tech to help myself, and those around me. Whether it is making art form it, or helping people learn to use it. It takes away the dependence people have upon normal media, and the monopolies that control it. Which in turn eventually corrodes the hold the media has on people, and after that, it's only small step until they become really free. So I DO ignore the bad thing, I don't waste anytime fighting a battle that only strengthens it like the tar-baby it is. I still think the entire key to REAl freedom is in the individual mind, and I work to free that, and it is not in opposition to anything really, they have to do all the work, I just try to supply tools in some cases, or open some avenues in others. (alt.cyberpunk November 1994)

For 'Khul of Infect' writing in the UK fanzine *Zine*, 'people who are part of the [computer] scene like to think of themselves as the cowboys of the future, fighting for the freedom of speech and information, and waging computer war on secretive governments and organizations. One major appeals is our freedom. We can say what we want, when we want, and how we want: there is no censorship' (Kuhl of Infect 1994: 8). Kuhl maintains that there is a common cause shared by the computer scene (freedom of information and expression) and the underground network of 'leaflets and fanzines', which are alternative spaces to 'express themselves [or] outlets for people's opinion' (*ibid.*).

This anti-mainstream media attitude is shared by the whole of computer culture beyond the limits of cyberpunk-inspired movements. Michael

Hauben, from the newsletter *Amateur Computerist,* argues that '[t]he Net helps to make information available more accurate because of the many-to-many or broadcast & read and write capability. That new capability (which is not normally very prevalent in our society) allows an actual participant or observer to report something. This capability gives the power of journalism or the reporter to individuals. This new medium allows the source to report. This is true because the medium allows everyone on-line to make a contribution while the old media control who reports and what they say' (Hauben 1994).

This rejection of 'old media' can be direct and aggressive. One example was the long flame war between the editor of the *Time*'s special issue on 'Cyberspace' and an angry crowd of professionals on alt.net.media.coverage. Interestingly enough a lot of the discussion centered around the misrepresentation of on-line culture through the use of stereotypes such as those crystallised around the figure of William Gibson:

> If you are covering the news media's coverage of the Net, then it's certainly accurate to start with Gibson as one of the first people to egregiously misrepresent what's happening on-line. If, on the other hand, you are covering on-line culture, Gibson has virtually nothing to do with it at all. The media conceptualization of Internet-as-Cyberspace is about as accurate as the NBC White Paper shows on 'Motorcycle Gangs: A Growing Threat' which ran in the 1950's and early 1960's -- overdramatized and exceedingly inaccurate. (alt.net.media.coverage April 1995)

This kind of statement indicates a serious concern in older segments of computer culture about the common use of cyberpunk to stereotype electronic communication. It also expresses a legitimate desire to vindicate an alternative, older culture for CMC than that spawned by cyberpunk. On the other hand, posters on alt.net.media.coverage and the mainstream of computer culture as represented by *Wired,* share the contempt for the mass media flaunted by posters on alt.cyberpunk. There are also consistent continuities between these different Internet communities in the fact that they all advocate a technological DIY ethics as an answer to the excessive power of mass media.

As another participant put it, 'Why would anyone want to READ Time mag on-line? It is so very lame compared with the posts of most net writers. For news, better just to cut straight to the chase and read the clari groups. For information, argument, prose, ect., why read the sanitized crap that the

mass media produce? The Net has rendered media as we know them completely superfluous' (alt.net.media.coverage March 1995). Another member of alt.cyberpunk comments on the media coverage of the Kevin Mitnick's case (the famous hacker described by Jane Hafner and John Markoff in their best-seller on hackers in the '80s, *Cyberpunks.*):

> it is the media that doesn't understand technology, and demonizing it is trendy this year, not to mention painting 'virtually harmless' people like Mitnick as serious criminals. according to the media, cp's are lowlifes, capitalizing on dystopia. according to cp's, the media are the lowlifes, capitalizing on hyperbole, misinformation, and the dark side of human nature that votes with a quarter for a rag full of gossip. (alt.cyberpunk March 1995)

The same idea of resistance as access to and production of alternative information has also been endorsed in *Wired.* Journalist Jon Katz recently wrote a particularly passionate eulogy to Thomas Paine, whom he describes as possibly one of the Godfathers of the Internet. Thomas Paine and the early print movements of the eighteenth century are unearthed in order to characterise on-line culture as a true public sphere. The consumer of knowledge can become also the producer, and a new ethic of knowledge production could be born to counteract the monopoly of multinational information complexes:

> Like the specters introduced by the Ghost of Christmas Future, today's media are what the Net should never become - but will surely evolve into if it fails to develop, articulate, fight fiercely for, and maintain a value-system other than expanded memory, whiz-bang toys and money. The digital age is young, ascending, and diverse, already nearly as arrogant, and, in parts, as greedy as the mass media it is supplanting. The new generation faces enormous danger from government, from corporations that control the traditional media, from commercialization and from its own chaotic growth. (Katz 1995: 156)

Much of the identity of the CMC culture, then, comes from its opposition to the mass-production of information, or the vilified broadcast model of the 'few-to-many'. The places where cyberpunk-inspired movements participate in the general rhetoric of computer culture, is in this conceptualization of agency as *the production of knowledge in opposition to mainstream media.*

>CP, a movement without a direction?

> What direction could it have? the only dirrection I could think of would be towards individual freedom thru the use of technology to breakt he mono[oly of information held by the media nd the control structure. (alt.cyberpunk. November 1994)

Such a politics mainly calls for the construction of alternative networks of information processing and distribution. *Mondo 2000*, for example, regularly provides information about how to start your own TV or radio station, create your own WEB page, or set up your own BBS. In his account of international activism centered around the use of computer networks, Howard Frederick similarly underlines the possibilities of a decentralized use of technology for alternative politics. Significantly, Fredrick's account is set up against a rather dismal description of the significant inequalities produced by international capitalism:

> To counter these twin trends [national and international unequal access to knowledge] that threaten to engulf civil society with commercialization and control, there has arisen a worldwide metanetwork of highly decentralized technologies—computers, fax machines, amateur radio, packet data satellites, VCRs, video cameras, and the like. They are decentralized in the sense that they democratize information flow, break down hierarchies of power, and make communication from top and bottom just as easy as from horizon to horizon. For the first time in history, the forces of peace and environmental preservation have acquitted the communication tools and intelligence-gathering technologies previously the province of the military, government and transnational corporations. (Fredrick 1993: 288)[15]

We can therefore identify the politics expressed by these communities as a complex spatial game, involving several participants: technology itself (the uncensorable anarchy of the Net); competent netusers, with a full grasp on the possibilities of the medium; mainstream media, usually evil and misinformed; big government, ready to censor and intervene whenever possible; and big money, that is multinational corporations ready to colonise the Net with their monopolistic capitalism as opposed to a more natural anarcho-capitalism. The stage is set for the information war, but one that looks 'horribly skewed in favor of a select group of issues' (Critical Art Ensemble 1994: 90).[16]

The limits of cybercultural politics

Cybercultural representatives have claimed that we live in an information

society and that the control of information is central to any kind of serious social change. Compared to the apocalyptic rhetoric of a postmodern philosopher like Jean Baudrillard, they offer a more positive model of politics based on the active reappropriation of information and communication. As such there are important aspects to be valued in cybercultural rhetoric, but also very important flaws to point out. In the first place, how is information going to change the world? How can such a stress on technoliteracy tackle the structural conditions which regulate access to technology and technological knowledge?

As Theodor Roszack has commented, information and free access to information are presented as an alternative in itself, suggesting that 'the body politic is starving for lack of information and that only the computer can make good that shortage' (Roszack1994: 162). Roszack argues that the problem is not lack of information, but 'data glut' the proliferation of useless information: 'what computer enthusiasts overlook is the fact that data glut is not some unforeseen, accidental fluctuation of supply, like a bumper crop of wheat. It is a strategy of social control, deliberately and often expertly wielded. It is one of the main ways in which modern governments and interest groups obfuscate issues to their own advantage: they dazzle and distract with more raw data than the citizenry can handle' (Roszack 1994: 164).

The Critical Art Ensemble, a group of techno-theorists active in New York City, looks at hacker groups and argues that the fetishization of information is a real handicap for existing forms of what they label 'electronic civil disobedience'.

> Their intentions are vague. Some seem to know that their actions are political in nature. As Dr. Crash has said: 'Whether you know it or not, if you are a hacker you are a revolutionary'. The question is, a revolutionary for what cause? After poring through issues of *Phrack* and surfing the Internet, one can find no cause mentioned other than the first step: free access to information. How this information would be applied is never discussed. (CAE 1994: 85)

The CAE group believes that this 'vagueness' is a result of the age constituency of hacker groups: '[t]he problem of letting children act as the avant-garde is that they have not yet developed a critical sensibility that would allow them to proceed beyond their first political encounter' (*ibid.* : 85).

The age explanation however, does not seem to hold when applied both to explicitly cyberpunk-inspired posters, or to the general mainstream of computer culture. I have found the explanation of the increasing popularity of CMC provided by Aronowitz and DiFazio more convincing. In their opinion, CMC satisfies the needs of knowledge workers for better information than that provided by the mass media. CMC is a way for a relatively small number of people to build for themselves better idiosyncratic information. In their opinion, though, this might take a rather different turn than that desired by the Internet dwellers. Instead of bridging the information gap it might widen it to unforeseen dimensions:

> The new electronic communication technologies have become the stock-in-trade of a relatively few people because newspapers, magazines and television have simply refused to acknowledge that we live in a complex world. Instead they have tended to *simplify* news, even for the middle class. Thus, an "unintended" consequence of the dissemination of informatics to personal use is a growing information gap already implied by the personal computer. A relatively small number of people - no more than ten millions in the United States - will, before the turn of the century, be fully wired to world sources of information and new knowledge: libraries, electronic newspapers and journals, conferences and forums on specialized topics, and colleagues, irrespective of country or region around the globe. Despite the much-heralded electronic highway, which will be largely devoted to entertainment products, the great mass of the world's population, already restricted in its knowledge and power by the hierarchical division of print media into tabloids and newspapers of record, will henceforth be doubly disadvantaged. (Aronowitz and Di Fazio 1994: 18)

Even if we put aside for a minute the issue of the actual use of information for political action, the Net might contribute to the polarisation of knowledge and technoliteracy which netizens seem eager to demolish. In spite of their best intentions, netusers' celebration of the importance of technological skills for full citizenship is enacted in a virtual void. Nothing but the *will* seems to distinguish the empowered subject from the disempowered, a notion I will explore further in the next chapter. The humanist language in which these claims are articulated works to naturalise cultural, social, and economic differences in relation to technoliteracy. This is particularly evident in discussions about access to technology which are often inflected in a language which is both technologically deterministic and vaguely voluntaristic. As the 'cypherpunk' writer Sandy Sandfort put it on

the pages of *Wired:*

> It's not a question of money. It's a question of desire... Then you have it, Net-access on a shoestring. It's obvious that the real barriers to getting online are not financial: we would argue that they are not even intellectual. The real problem is that most people do not yet know they want to be wired. That barrier can be overcome only by good marketing that turns the Net into something everyone has to have. We won't get it from the government. (Sandfort and Frissel 1995: 141)

Even taking for granted that such a 'desire' would be a good thing for everybody (which is never questioned among net-literates), one could argue that the production of 'desire' for electronic communication is shaped through the material and cultural constrains that constitute the fragmented stage of global capitalism. There is nothing in the rhetoric of these groups which seems to point to a genuine consideration for the structural inequalities that set limits to the distribution of technological knowledge.

If nothing concrete, like a government-ban or high prices, prevents an individual from accessing technology, then there seems to be no other argument that can justify his/her technological illiteracy. In 1987 Boris Frankel pointedly labelled the endorsers of this kind of rhetoric 'Atari Democrats':

> 'Atari Democrat' is a label applied to those politicians and theorists who combine technocratic solutions with the rhetoric of small-is-beautiful. They are generally strong admirers and promoters of high-tech such as Senator Gary Hart in the USA, David Owen in the UK, Simon Nora and Alain Minc in France. Their supporters are often 'Yuppies', tertiary-educated professionals or the owners of small businesses.... Rejecting the aggressive campaigns of the Moral Majority or the confrontationism of Thatcherism and Reaganism, the 'Atari Democrats' present the 'human face' of new technology, and stress the need for educated citizen initiatives, tolerance, consensus and personal awareness—while they leave largely unchallenged most of the existing practices of the corporate sector. (Frankel 1987: 7)

This tension is evident, for example, in *Wired'* s 'uncomfortable' endorsement of Republican Speaker Newt Gingrich. As the subtitle to Esther Dyson's interview recites: 'His buddy is futurist Alvin Toffler. He talks the talk about being a revolutionary. And he walks the walk by ramming through the most radical political agenda since the New Deal—to slash

centralized decision-making and devolve power out of Washington. So why does he still leaves us feeling uncomfortable?' (Dyson 1995: 106). The leading Internet magazine considers Gingrich's policy towards cyberspace more enlightened than the Democrats, and gleefully neglects taking up a position on his other less enlightened proposals, such as increasing cuts in education, health and welfare.

I think that although *Wired* in particular might actually be disingenuous, most netusers genuinely do not see the existence of structural problems in the distribution of technological knowledge: if you want it and you try, you can get it. In opposition to this view, a whole scholarly tradition of criticism has pointed out how the access to scientific and technological knowledge is inherently structured. Sociological literature on the 'shaping' of technology has underlined how the actors involved in the creation of technological artefacts are unequally positioned (Latour and Woolgar 1979; Collingridge 1980; MacKenzie and Wajcman 1985). The introduction of new technologies into the workplace, for example, very often implies lay-offs and a general deskilling of workers (Robins and Webster 1987). 'Access' is not just buying a computer, but it involves a series of decisions about the shape of the technology and its advantages, which should be collectively negotiated (Robins and Webster 1986; Umpleby 1977; Miles and Gershuny 1987). An informed participation in these decisions requires a degree of technological literacy, which, in its turn, is highly regulated: Brian V. Street has underlined the continuity between issues of 'literacy' and 'computer literacy' and the ideological nature of both (Street 1987).

Feminists have taken particular issue with the idea that technological knowledge is simply accessible to everybody in the same way. Feminist critics like Cynthia Cockburn, Joan Rothschild, and Chris Kramarae have produced significant studies on the gendered nature of technological production (Cockburn 1992; Rothschild 1983; Kramarae 1988). Dale Spender and Sherry Turkle have also emphasised how computers and technological knowledge in general have been constructed as male, leading to a situation where for example women enrolled in computer courses are actively ostracised (Turkle 1988; Spender 1995). Technologies are very often also 'raced', that is connotated with the marks of a particular race: Samuel Delany has remarked on the constitutive 'whiteness' of computer technology as compared to the 'black boxes' of beepers, Walkmen, Diskman and ghetto blasters (in Dery 1993b: 749). There is also a substantial amount of criticism about the effects of the 'informatisation' of society on developing countries

that do not have the resources to compete in a knowledge-intensive international economy (Miles and Gershuny 1987; Bessant 1987; Bellman, Tindimubona, and Arias 1993). The sheer amount of literature on issues of access, participation, and technological literacy shows how limited the idea that technoliteracy is available equally to everybody is.

Furthermore, the assumption that the modalities of access to information technology will be the same for the already on-line, and the future wired populations is already being dismantled by corporate plans. These plans see the market of CMC as split between a parallel I-Way (commercially directed interactive television) and a more elitist I-net, which would be similar to the Internet as it is today (see Greenwald 1995). In the global distribution of information, and in fulfilment of the most dystopic conjectures for the future of CMC, this could easily be translated as such: I-Net for the knowledge-workers, I-way for the Western masses, and good old evil TV for the working poor and the unemployed.

It would be unfair to state that minority concerns are invisible in computer culture as a whole (there are places on the Net which do allow the expression and the debate of issues related to questions of ethnicity, race and sexuality). However, these concerns are rarely articulated at the core of computer culture as expressed in cyberpunk-inspired movements and mainstream magazines such as *Wired*. It is particularly indicative of the social constituency of the cyberpunk legacy, that there is no space to debate the way in which high-tech surveillance technology isolates and controls immigration flows and urban inner-city, by definition ethnic, populations (Davis 1990). If, as Haraway put it, 'partial perspective promises objective vision' (Haraway 1991: 190) then the unacknowledged partiality of these perspectives makes them disturbingly limited. The optical limitations of the 'suburban belt' at the core of cybernetic activism are painfully obvious in their clamorous silence on the main social uses of surveillance technologies. Cyberculture often speaks the same language as corporate culture, notably in its empty emphasis on 'information' and 'decentralisation', the 'naturalisation' of social systems, and the reductionism applied to categories of 'access' and 'mastery' of technology.

As I show in the next chapter, cyberculture neutralises its own political capacity to intervene productively in these debates through its adoption of a teleological rhetoric of evolution: those who are deprived of access to technology are only 'late', the natural evolution of technology will reach them in due time bringing with it all the wonderful effects predicted by its

current users.

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[1] Howard Segal, for example, has produced a study of technological utopianism in the United States between 1880 and 1930 (See Segal 1985) Technological utopianism argued that technology would liberate humanity from the obligation to work. As a result prosperous and balanced societies could be developed.

[2] This opposition is also consciously exploited by *Wired* magazine. *Wired* generally does not give much space to cultural or political oppositions to technology. When it does give them space, however, it usually represents them as the expression of a backward and irrational technophobia. See for example Kevin Kelly's interview to the neo-Luddites, a rather naive group of anti-technologists headed by Kirkpatrick Sale (Kelly 1995).

[3] Literary critics have often emphasised the presence of dystopian and utopian elements in cyberpunk science fiction. They generally see the dystopia/utopia divide as a structural component. The dystopian aspect is confined to the representation of the city, the utopian language is used to describe the technological interface. Julian Stallabrass argues that 'Gibson is utopian about the experiential aspect of the technology (its slickness, speed, definition and the experience of immersion and freedom from the body) if not about its overall effects; his dystopia is made necessary as a field for the heroic actions of the cyberpunk cowboys who ameliorate it' (Stallabrass 1995: 24). Pam Rosenthal also argues that cyberpunk represents a dystopian future with the exception of the utopian language reserved for the experience of jacking in: 'What is beautiful and thrilling in this society is not visible to the naked eye; you have to "jack in" to it, plug your synapses in via electrodes or perhaps a microchip implanted behind your ear. This gives you access to "cyberspace," the matrix—the paths of communications, the geometric structures of data, the huge electronic neurosystem of the world' (Rosenthal 1991: 85). Philip Hayward claims that cyberpunk is essentially dystopian, but that 'many readers—and significantly many computer aficionados—have interpreted the domain of cyberspace as an imminent technological utopia. Much to [Gibson's] surprise, the dystopian elements of his best-known novels have been largely ignored' (Hayward 1993: 185). Gibson has answered these criticisms by claiming that his novels are realistic rather than dystopian: '"The world I am depicting is dystopian if you are a very comfortable middle-class citizen. You'll think, "Man, that looks pretty bad." But if you are crouching in a basement in Sarajevo being shelled by ethnic separatists, you'd look at *Neuromancer* like it was a dream vacation.... I mean, get real. There's stuff happening to people, lots of people, right now, all over the planet, that's incredibly worse and so much more depressing than anything I've ever written about' (Gibson 1993b: 22).

[4] Ted Nelson quotes a 'recent poll in New York City [which] indicated that *over half of the registered Libertarians were computer people*. This probably holds elsewhere as well' (Nelson 1987: 109). A survey published in *Wired* magazine defines the political allegiances of netusers as '36 percent Democrat, 32 percent Independent, and 23 percent Republican' (in *Wired* 2.12: 50). Most of the Usenet users I researched repeatedly claimed that they were libertarians.

[5] On September 15, 1993 the US government issued the 'National Information Infrastructure Agenda for Action (NII Agenda for Action)'. The Agenda argued that the NSFNet (National Science Foundation Net), the

main communication network that supports much of the Internet flow, needed to be replaced. According to the newsletter *Amateur Computerist* the Agenda was clearly set to privatise the Net and throw away 25 years of successful non-profit development: 'Will the US government succeed in its efforts to dismantle the public research and education and science net that has been developed over the past 25 years and replace it with a private commercial net?' (Hauben and Hauben 1994). The Agenda was preceded by another document issued by the Inspector General overseeing the NSFNet. This document purported to describe a workshop held March 1-3, 1990 at Harvard University, Cambridge. The *Amateur Computerist* claims to have found in that report the first traces of the 'privatising' philosophy of the Clinton/Gore 'Agenda': 'The Report claimed that despite the restrictions on commercial usage of the NSFNet, commercial usage was increasing 15-20% a month. The problem Wolff [the Inspector General] explained was that such commercial use of the NSF backbone might be offering unfair competition from the U.S. government to private providers of network services.' (Hauben and Hauben 1994b) According to Ronda and Michael Hauben, the argument is deeply reactionary: 'it would effectively eliminate all government services since each might be then attacked as competing with their commercial counterparts, e.g., no social security as that might compete with commercial insurance, no public schools as they compete with private schools, no post office as that competes with commercial mail or package delivery, etc. Such an argument eliminates the historic obligation of the U.S. government to provide for the health and welfare of the people' (Hauben and Hauben 1994b).

[6] Michael and Ronda Hauben claim that the 'National Information Infrastructure Agenda for Action, (NII Agenda for Action) report issued by the U.S. Department of Commerce on September 15, 1993 mentions neither the AUP [Acceptable User Policy] nor the NSFNet. Instead it claims that private companies have already been developing the network that will become the National Information Infrastructure. Thus this report includes no history or background of the last 25 years of network development, revising the historical development of the current U.S.' (Hauben and Hauben 1994b)

[7] The Digital Telephony Bill was followed by the Communication Decency Act (also known as the Exon Bill, after the Democratic Senator James Exon). The Act is meant to control the flow of pornography on the Net by holding the service provider responsible for the material published online (see Meeks 1995). In 1990, this rule was also applied during Operation Sundevil, when the system operator was held responsible for the fact that a user submitted a document owned by the local telephone company (Sterling 1992).

[8] The process of gathering biological information and converting it into data that can be uploaded into automated systems for purposes of identification.

[9] The dangers of corporate capitalism, on the other hand, seem to elicit a less Orwellian rhetoric. As I will show in more detail in chapter 6 and 7, cyberculture as a whole does not seem to resent corporation as it resents the government. Apart from Microsoft, whose virtual monopoly on the software market is recognised as a threat, the whole attitude is rather benign. This is particularly evident in the case of *Wired* magazine, which

often identifies its readers as company executives. For example in a recent article about marketing strategies 'pointcasting' as opposed both to 'broadcasting' and 'narrowcasting' is exposed as one of the new tactics of advertising, *but* from the assumed point of view of the company man ('Pointcasting: Even more precise than narrowcasting. What you get when you can talk one-on-one with your clients' in *Wired* 2:12: 49). In *Spew*, a short story published in *Wired*, (October 1994), Neal Stephenson describes a virtual consumer panopticon; market-research talent scouts are unleashed to the discovery of every new, no matter how far underground, youth culture ('Are you on the trail of the next unexploited market niche-or just on a nookie hunt?'). The reader is expected to identify with the market-researcher, who is presented as another highly pressured slave of the marketing industry. This offers a rather stark contrast to much of the existing academic literature on the dangers of surveillance which emphasises more the importance of databases in the running of corporations (Lyon 1994).

[10] This libertarian crusade against the invasion of privacy had already been mobilized at the time of the Operation Sundevil—the 1990 hacker crackdown organised by the FBI and the Secret Services. This operation caused the destruction of a small software company, Jackson Inc., who was working on a 'cyberpunk' role game. The Samuel Jackson case was one of the main episodes behind the birth of the EFF (see Barlow 1990 and Sterling 1992).

[11] Louis Rossetto, editor and publisher of *Wired*, disagrees with this idea that the government financially helped to build the infrastructure of electronic communication: 'Far from building the Digital Revolution, the US Defense Department sucked up 6 to 7 percent of US GNP for 40 years and utilised up to 40 percent of all the engineering talent, channelling these resources not into technological growth, but into tanks, bombs, and military adventurism. In point of fact, it was the cutback in American defense spending following the Vietnam War and the subsequent firing of thousands of California engineers which resulted in the creation of Silicon Valley and the personal computer revolution' (Rossetto 1996).

[12] Jeffrey Ditch for example claims that '[t]echnology will make it possible to remodel our bodies and supercharge our minds, but art will have to help provide the inspiration for what our bodies should look like and what our minds should be doing' (Deitch 1994: 26).

[13] Foreign re-mailers are hired so that, for example, obscene material is transmitted from one node in Arkansas to one in Finland and remailed to the whole Internet under the protection of the more liberal Finnish legislation. In February 1995, however, an anon site based in Finland was forced to give up the address of a user to the Church of Scientology. The user had apparently distributed some documents owned by the church: 'The ease with which the church obtained the real name of an anonymous user shocked many on the Net. According to Helsingius [the Finnish owner of the anon site], hundreds of users have since asked him to remove their names from the anon.penet.fi database' (in *Wired* 3.05: 46).

[14] Tim May and the 'cypherpunks' believe that only fool-proof encryption devices can prevent the coming of the electronic panopticon. The

cypherpunks actively campaign for private and safe encryption (see Kelly 1994; Barlow 1994).

[15] Fredrick is looking at the possible uses of CMC by Non Governmental Organisations (NGO). The Association for Progressive Communications (APC) was set up in 1984 and it includes progressive networks such as PeaceNet (serving the needs of the movements for peace, human rights, and social justice); EcoNet (sponsored by Apple Computer to advance the cause of planetary environmental protection and sustainability) and GreenNet (the English environmentalist network) (cited in Fredrick 1993). 'In 1992 the Association for Progressive Communications, through its Brazilian partner network Alternex, played a major role in providing communications services for environmentalists, non governmental organizations, and citizen activists before, during, and after the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro' (*ibid.*: 293). Bellman, Tindibumona and Arias jr. also refer to the experiences of BESTNET (Binational English and Spanish Telecommunications Network) in Latin America, U.S. and in the UK; and UNINET, EASANET, and AFRINET in Africa (Bellman, Tindibumona and Arias Jr., 1993)

[16] According to the Critical Art Ensemble group, the decentralised nature of power in information societies requires a new form of civil disobedience. The street is no longer a central space for contemporary capitalism; the computer networks are the real crucial area for alternative politics in the nineties. Electronic guerrilla strategies are therefore needed to conquer this politically strategic terrain. These strategies, however, are undermined at the moment by the schism between techno-rebels (teen-age hackers) with the techno-know-how and political activists, with the social know-how (Critical Art Ensemble 1994)

Chapter 6
Technology, evolution and the body in posthumanism

In this chapter I look at representations of the technologically evolved body in some high-tech subcultures. By focusing on some of the more 'extreme' representations of the technologically altered body in cyberculture, I will read the techno-body as the ideal figuration of the masterful subject envisaged in chapter 5. In particular I look at groups who see the techno-body as an evolutionary step towards a new species. Their description of the characteristics demanded from such an evolutionary subject reveals another dimension of the emphasis on technomastery emphasised in chapter 5.

As usual, cyberpunk SF has provided me with a good framework to work with. Much of the literary criticism about it, in fact, pointed to the centrality of its representation of the technological body. John Fekete, for example, argued that cyberpunk touched a major nerve in representing our culture 'as being on the threshold of a major mutation of the liberal mind/body system of categories' (Fekete 1992: 396).[1] The mutation of the mind/body system is represented as a by-product of the evolution of technology.

This relationship between the human body and technology has also been read as typically postmodern. By representing subjectivities symbiotic with technology cyberpunk SF deconstructs the integrity of the humanist self. In her contribution to *Storming the Reality Studio,* Veronica Hollinger has produced the most effective argument for the anti-humanism of cyberpunk SF:

> ...cyberpunk can be situated among a growing (although still relatively small) number of SF projects which can be identified as "anti-humanist." In its various deconstructions of the subject—carried out in terms of a cybernetic breakdown of the classic nature/culture opposition—cyberpunk can be read as one symptom of the postmodern condition of genre SF. While SF frequently problematizes the oppositions between the natural and the artificial, the human and the machine, it generally sustains them in such a way that the human remains securely ensconced in its privileged place at the center of things. Cyberpunk, however, is about the breakdown of these oppositions. (Hollinger 1991: 204-205)

This anti-humanist interpretation of cyberpunk is substantiated by Bruce Sterling's hostility toward humanist SF (Sterling 1987b).[2] Unlike traditional

science fiction which foregrounds human action against a background constituted by technology, Hollinger argues that cyberpunk SF insists on the disruption of boundaries, especially those between the body and the machine. Among the writers who have also supported the postmodern argument about cyberpunk and the body are Brian McHale, who argued that cyberpunk represents a 'centrifugal self' (McHale 1992);[3] Charles J. Stivale, who has similarly claimed that cyberpunk produces new subjectivities of the kind imagined by Giles Deleuze and Felix Guattari (Stivale 1991); and Larry McCaffery, who insists that cyberpunk is about the breakdown of concepts such as organic/inorganic, artifice/nature, human/inhuman: '[t]he breakdown of these concepts and distinctions, as well as the rise of new metaphors and categories of perception, is obsessively explored' by postmodern science fiction, in general, and cyberpunk in particular (McCaffery 1991: 7).

Although these postmodern readings of cyberpunk do not refer explicitly to Donna Haraway's 'Cyborg Manifesto', they share her rejection of humanism by way of a different relationship with technology. Cyborg is a key term in contemporary discussions about the relationship between the body and the machine and Haraway's text is a landmark for the whole debate. I will therefore briefly outline Haraway's interpretation of the cyborg so as to locate this chapter in relation to her use of the term.

Although 'cyborg' has become a popular term to describe any 'cybernetic organism' composed of mechanical and biological components, its roots, as with many of the technological developments analysed in this thesis, date back to the Cold War. 'Cyborg' was the name given to (the body of) the future astronaut, a military body modified technologically to survive in outer space conditions.[4] The cyborg was naturally picked up by science fiction writers as early as the sixties, replacing the robot as the embodiment of advanced technology. Hollywood SF productions such as *Terminator I* and *II, Blade Runner, Robocop,* and the low-budget *Cyborg* series popularised the figure of the cybernetic organism. Many of these films were accused of portraying the cyborg as a phallic body; technology is used to defend the body and enhance its masculinist features (Springer 1991).

It was in this context that Haraway used the 'cyborg' as a metaphorical figure for a new kind of politics of identity and a new relation to technology. Aware of the 'military roots of the cyborg family tree' Haraway, who never wrote about cyberpunk, tried to claim the cyborg back from its military origins and turn it into a hopeful figure for a different relationship with

technology. Her cyborg resists the militarist imagination of the impregnable body by insisting on the pleasure of connection and contamination, rather than on hierarchy and wholeness.

> The cyborg is resolutely committed to partiality, irony, intimacy, and perversity. It is oppositional, utopian, and completely without innocence... Nature and culture are reworked; the one can no longer be the resource for appropriation or incorporation by the other. The relationships for forming wholes from parts, including those of polarity and hierarchical domination, are at issue in the cyborg world. Unlike the hopes of Frankenstein's monster, the cyborg does not expect its father to save it through a restoration of the garden; that is, through the fabrication of an heterosexual mate, through its completion in a finished whole, a city and cosmos.... Cyborgs are not reverent; they do not remember the cosmos. They are wary of holism, but needy for connection- they seem to have a natural feel for united front politics, but without the vanguard party. The main trouble with cyborgs, of course, is that they are the illegitimate offspring of militarism and patriarchal capitalism, not to mention state socialism. But illegitimate offspring are often exceedingly unfaithful to their origins. Their fathers, after all, are inessentials. (Haraway 1991: 151)

It is important therefore to distinguish between Haraway's cyborg and cyborgs in general: although Haraway's intention is to reappropriate it to a radical imagination, other kinds of cyborgs keep circulating in popular culture regardless of her commitment. Her use of the cyborg is completely antithetical to the posthumanist cyborg analysed in this chapter and therefore I am not going to use it substantially in this context.

Haraway's cyborg, however, is relevant to the debate around cyberpunk science fiction. Hollinger's claims for cyberpunk as an 'anti-humanist' literature, for example, are similar to those envisaged by Haraway. Like Haraway, Hollinger sees the effects of technology on the human body as a breaking down of the bounded, whole self. Technology is therefore another weapon in the struggle against the subject of humanism. Bruce Sterling seems to acknowledge and reinforce this impression. He rejected most SF of his time as it endorsed a 'standard humanist liberalism 'because of its interest in exploring the various scenarios of humanity's potential interface with the products of its own technology (Sterling 1987b) This kind of science fiction assumed a universalising model of humanity which was not affected by technology.[5]

The academic debate around the anti-humanist or transcendent nature of

the relationship between technology and the body in cyberpunk SF is far from being settled and it will not be pursued farther in this chapter. Rather I will take a different route here by looking at the development of the cyborg theme in some specific segments of cyberculture, specifically in two high-tech subcultures which take the techno-body very seriously: the magazine *Mondo 2000,* the voice of the techno-psychedelic scene; and the Extropians, an organised group of professional scientists and technicians who believe in 'outward evolution'.

These groups have interpreted the technobody in an evolutionary framework that they define as 'posthumanism'. Posthumans and cyborgs are related but not identical: the cyborg is a figure generally used to describe a scenario through which the human body's intimacy with machines has grown to the point where technology is part of the body; posthumans are about a larger evolutionary narrative which frames the development of the cyborg in the history of the evolution of life on Earth. After the bacteria, the dinosaurs, and Homo sapiens, it is argued, comes the posthuman. I use the term 'posthumanism' to describe all accounts that claim that technology, and not nature, is contributing to the evolution of the human species beyond the organic. By looking at posthumanism I will try to understand how these accounts outline the ideal subject of high-tech, and on what authoritative sources they rely on to justify their claims.

Although I do not claim that these groups exhaust all possible interpretations of the cyborg theme, I have isolated them because they offer the most articulate accounts. Of the two groups, only that collected around *Mondo* has acknowledged a direct debt to cyberpunk SF. Although the Extropians do not have any explicit affiliation to cyberpunk, there is a consistent similarity with *Mondo,* both in their treatment of the subject and in the scientific figures who authorise the posthuman philosophy. I attribute this similarity to the exposure of all these groups—cyberpunks, *Mondo,* and the Extropians—to the same kind of scientific material: genetic evolutionism, AI (Artificial Intelligence) studies, and molecular manufacturing, which I will also explore in this chapter.

In opposition to postmodern arguments about the deconstructed self, I argue that in these subcultures the theme of the human/machine interface represents an *intensification* of humanism. Posthumanism is also underlined by an evolutionary utopianism elaborated in a loose field of scientific disciplines: scientists such as Hans Moravec, Marvin Minsky, Eric Drexler, and indirectly but powerfully Richard Dawkins, have provided a new

language of utopian evolutionism which these subcultures have eagerly appropriated and recirculated. Since posthumans are not so much about the future as about the present, I hope to show that the evolutionary rationale behind these narratives makes sense in terms of the discourse of mastery I have discussed in chapter 5. Posthumanism is not only a utopian dream for the future of humanity, it is also the figuration of the ideal subject of the Information Age.

To evolve into posthumans is both a necessity and a worthy pursuit: if we do not evolve to keep up with technology we cannot survive, but if we evolve there are extraordinary rewards such as transcendence, immortality, and omniscience. Evolution, although inevitable, is not automatic: it is the result of voluntary exertion and needs to be pursued actively. Those who aspire to become posthumans must take an active interest in learning and developing new technologies. While in the paranoid register, mastery works as a strategy of resistance, in posthumanism mastery is connotated as a survival strategy in an evolutionary context. Posthumanism, both in its scientific and popular representations, is about the need to evolve in order to survive and succeed in an economically competitive environment.

The emergence of posthumanism in cyberculture

Although I will not address the broader history of posthumanism, ideas which could be related to it have a long history in Western civilisation. David Tomas' descriptions of 'functional' (technologically-enhanced) and postclassical (disembodied) cyborgs' in cyberpunk SF, for example, sound suspiciously similar to Mazlish's theory that humans have always been caught between '[y]earning either to take on some of the superior attributes of other animals or to rise above their own animal nature by becoming angelic' (Mazlish 1993: 14).[6] If we decide not to be too strict about relating 'posthumanism' to contemporary digital technology, rudimentary versions of posthumanity have circulated at least since the high-tech modernist avant-garde represented by the Italian Futurists or the German Dada. Dangerous interpretations of Frederic Nietzsche have also taken his lyric description of the 'superman' (*Übermensch*) as a call for a superior form of (post)humanity. In the fifties another cult SF author, Arthur C. Clarke, coined the term 'transhumanism' referring to a state 'in which a kind of transcendental mysticism precludes the necessity of envisioning a future based on changing technologies, social conditions, and social relations' (Hollinger 1991: 209).

A rhetoric of simulation, media-originated epochal shifts, and enhanced evolutionism by artificial means are also available in the writings of Jean Baudrillard, Marshall McLuhan and Timothy Leary (McLuhan 1964; Baudrillard 1983; 1988; Leary 1994). As early as 1977, Langdon Winner complained about a philosophical trend which applauded the technological obsolescence of man. Winner's summary, which does not include concrete examples, uncannily summarises contemporary posthuman arguments:

> ...there are other thinkers who hold that the evolution of technology is the most glorious of blessings, even though it spells the obsolescence of the human race. The movement is leading to a higher stage of development in the history of the world and in the history of consciousness. Support for this hypothesis is found in what its proponents believe to be the convergence of men and machines. Machines, computers in particular, are becoming more and more human and are, according to some estimates, on the verge of a consciousness and intelligence of their own. Human beings, on the other hand, are becoming more and more like the cyborgs—cybernated organisms—of science fiction. They now require an increasing number of technical support systems to keep them running efficiently: cardiac pacemakers, artificial kidneys, computer-aided systems of enquiry, and so on. Eventually there will be a kind of total man-machine symbiosis in which the organic parts of the human being will be grafted directly to highly sophisticated, miniaturised technological organs, which will assist in all physical and intellectual function. (Winner 1977: 58-59)

A particular kind of evolutionary rhetoric was also blooming in the sixties among the adherents to the psychedelic movement: Fraser Clark in the UK and Timothy Leary in the US described the psychedelic experience in evolutionary terms and saw in a laboratory drug, LSD, the door to other dimensions and possibilities of existence. Both psychedelic gurus participated in the revival of evolutionism in the high-tech subcultures: in London Fraser Clark renamed his famous fanzine *Encyclopaedia Psychedelica* as *Evolution*. Timothy Leary applied his psychedelic theory to cyberpunk which he saw as the new evolutionary mutation of the human race (Rushoff 1994; Leary 1994).

'Posthumanism' as a particular cyborg philosophy was proposed by Bruce Sterling in his novel *Schismatrix* (1985). Rudy Rucker also appropriated the label in *Wetware* and *Software*, two short novels based on roboticist Hans Moravec's proposal for a postbiological age (Moravec 1988). In the technological press, the first echoes of the 'posthuman' theme can be traced

to the postulation of a postbiological age by *Omni* magazine in 1989 ('Interview to Hans Moravec'); and the publication of a forum titled 'Is the body obsolete?' (in *Whole Earth Review* 1989). This featured pieces by roboticist Hans Moravec ('The Coming Divorce in Human Nature'); Bruce Sterling ('Is the Body Obsolete?') and performance artist Stelarc ('Redesigning the Body - Redefining What Is Human') (Moravec 1989; Sterling 1989b; Stelarc 1989). In 1988 Max More and Tom Morrow founded the *Extropy* journal and advocated a new 'posthumanist' philosophy. In 1989 *Reality Hackers* became *Mondo 2000* , the Californian magazine which made the connections between cyberpunk posthumanism and the psychedelic evolutionism of the West Coast rave scene explicit.

There was an intensification of discussions around the techno-body across the American countercultural and subcultural press at the end of the eighties. Cyberpunk authors were usually among the invited guest speakers, but the range of writers involved in the discussion stretched beyond the cyberpunk group: regular guests in posthuman fora included scientists such as Marvin Minsky and Hans Moravec; performance artists such as Stelarc and Mark Pauline; cyberpunks Rudy Rucker, William Gibson, and Bruce Sterling; cybercultural exponents such as R. U. Sirius and Timothy Leary; and occasionally different writers enlisted to uphold the beauty and necessity of the physical body.[7]

Regardless of all the possible cultural practices that are undoubtedly exploring technological mutations, all of the writers involved in these early dialogues seem to share at least two arguments.

Firstly they locate the moment of transition between the organic, natural past and the technologised, hybrid future in the last ten years. In particular the miniaturisation of technology which has produced items such as the pace-maker, the contact lens, and the Walkman is regarded as the first wave of the radical technologisation of the species. Computer networks are also altering human consciousness by connecting the individual brain to the 'global matrix of the minds' (Quartermann 1993).

Secondly there are two different ways in which this technological contamination takes place: by acting directly *on the body,* as exemplified by widespread use of cosmetic surgery, artificial hearts, nootropic drugs, and in vitro fertilisation; or by modifying the individual consciousness, for example, through interaction with computer networks. In posthumanism the total 'transmigration' of the human mind into the machine is considered to be an inevitable outcome of technologically-enhanced evolution.

Both positions are shared by most cyberpunk science fiction, which insists on the state of *transition* characterising the contemporary body: our age is located at the border between the present and the future, between an old world of natural and contained bodies and a new world of technologically-enhanced individuals. In the preface to *Mirrorshades*, Sterling claimed that the technological invasion of the human subject has already started to radically redefine the nature of humanity as a species. Familiar techno-gadgets such as contact lenses, Walkmans and portable telephones are infiltrating our daily experience of the world in subtle, but dramatic ways:

> Certain central themes spring up repeatedly in cyberpunk. The theme of body invasion: prosthetic limbs, implanted circuitry, cosmetic surgery, genetic alteration, The even more powerful theme of mind invasion: brain-computer interfaces, artificial intelligence, neurochemistry, techniques radically redefining the nature of humanity, the nature of the self. (Sterling 1986: xiii)

Industrial and postindustrial technologies define two different relationships to the body: unlike industrial technology which relied on a sense of material magnitude, 'Eighties tech sticks to the skin, responds to the touch: the personal computer, the Sony Walkman, the portable telephone, the soft contact lenses' (Sterling 1986: xiii). In the industrial age the body was attacked and overwhelmed from the outside by massive technology; in the postindustrial era the body is surreptitiously invaded by invisible technology. The miniaturisation of technology creates a stronger and subtler intimacy between the body and the machine.

A theme we will observe in posthumanism, the distinction between a partly technological body and a post-biological body, is also present in cyberpunk SF. In his analysis of Gibson's *Neuromancer,* David Tomas distinguishes between 'functional' and 'postclassical' cyborgs: in the first example the body is modified through '*functional* alterations to the human body's organic architecture. It includes biochip implants, prosthetic additions mediated by myoelectric coupling and redesigned upgraded senses' (Tomas 1989: 114); in the second we have an 'independently governed cyborg body' living completely outside the biological limits of the flesh (*ibid.*: 122). In posthumanist and cyberpunk SF scenarios, the natural body is increasingly colonised and invaded by invisible technologies and the natural outcome of this colonisation is inevitably the abandonment of the body altogether. The human personality will then be transferred into the machine, especially

computer networks, and achieve supernatural mobility and omniscience.

By positioning the human body as an entity moving towards complete technologisation, cyberpunk science fiction offered abundant material for posthumanism. Gibson, in particular, extrapolated from existing research in new disciplines such as nanotechnology, biotech and computer studies to create an amazingly varied morphology of the concept of the 'human/technology' interface. In his most acclaimed novel, *Neuromancer,* almost every character is 'wired', that is somehow connected with a machine. Case, the archetypal computer hacker, lives in a sort of symbiosis with his computer console, which is a gateway to the disembodied pleasures of cyberspace. Molly, the female ninja, has been surgically altered for physical optimality: her eyes, for example, are covered by artificial, sewn-in dark glasses incorporating all the functions of a sophisticated camcorder and her nervous system has been modified to enhance her strength and reflexes. McCoy Pauley ('Dixie Flatline') is a software construct replicating the consciousness of a human being. In *Count Zero,* Virek, a multi-millionaire magnate, lives in a Virtual Reality world while his body grows increasingly cancerous in a huge tank. In the short story 'Johnny Mnemonic', even a dolphin, Wily, has been altered to be able to read computer data. More generally, all of Gibson's characters are either aesthetically or structurally altered, or live in an advanced symbiosis with an artificial universe (the so-called cyberspace).

In Bruce Sterling's first novel *The Artificial Kid* (1980), a thirty-year old man manipulates his body through hormones and rejuvenation techniques in order to live perpetually as a twelve-year-old. In another novel *Schismatrix* (1985), humanity has split into two species: the Shapers, who prefer to alter their bodies through genetic engineering; and the Mechanists who prefer mechanical prostheses. The 'posthuman' or 'Shaper/Mechanist' theme is also the object of a series of short stories collected in Sterling's anthology *Crystal Express* (1989). In his two novels *Software* (1982) and *Wetware* (1988), Rudy Rucker takes up scientist Hans Moravec's idea of 'transmigration', a process of chemical translation which literally transfers the content of the human brain from a physical body into a live robot. In *Fools* (1992) and *Mindplayers* (1987) Pat Cadigan imagines the possibility of mind to mind contact and a new kind of 'psychotherapy': in her fictional worlds, characters have detachable eyeballs and they can enter each other's psyche by connecting a wire through the empty orbits straight to the brain. In another novel, *Synners* (1991), she describes the transformation of rock musician Visual

Mark into a digital consciousness loose in the computer network.

My argument is that these two cyberpunk themes—the transitional nature of the present, and the division between functional and postclassical cyborgs—are repeated in posthumanism. In addition, however, they are embedded in the language of a new *humanist utopia of science;* and translated in narratives of technological evolutionism as *individual economic survival* in a naturalised capitalist economy. On the one hand posthumanism counts on science to achieve immortality and omniscience; on the other it points to the needs of a competitive global economy to suggests that evolution is also the means to achieve economic supremacy in a competitive technological environment.

Posthuman manifestos: *Mondo 2000* and the Extropians

As I have argued before, all posthumans are somehow cyborgs, but not all cyborgs are posthumans. Posthumanism uses the cyborg as an element in a larger evolutionary narrative of progress and expansion towards superior forms of life. Cyberpunk science fiction elaborated on the theme of the cyborg body and did display elements of evolutionary thinking. Posthumanism emphasises the evolutionary element in the cyborg theme and inflects it in a heightened utopian language. Posthumanism is therefore not only the evolutionary interpretation of the cyborg theme, but its *utopian evolutionary interpretation.*

Before explaining posthumanism further, I would like to give some background to these two groups: the people orbiting around the magazine *Mondo 2000,* and the Extropians. *Mondo 2000,* as I have explained in chapter 4, was one of the first magazines to incorporate cyberpunk as a self-defining label. Developed in 1989 out of *Reality Hackers,* it caters to a subcultural sensibility at the crossing between the new psychedelic culture of the Californian rave scene and a more explicitly technologically oriented vision. Timothy Leary and William Gibson, in conversation on the first issue, are the twin souls of *Mondo'* s New Edge—the unmapped territory at the vanguard of the future.

The Extropian group is more an explicit incarnation of the Silicon Valley corporate technological class, less 'hip' and more 'geek', with fewer connections with the high-tech multimedia artists and the rave scene and more with the bulk of the scientific and technological professions. The official organ of the Extropians, the journal *Extropy,* was founded in 1988 by British

expatriate Max More (aka Max O' Connor) and American Tom Morrow.[8] The Extropians have also established the Extropy Institute 'a non-profit California corporation... a bimonthly institute newsletter, the *Exponent*, as well as an electronic mailing list' (Regis 1994: 149). An Extropian 'nerd house' called Nextropia was also founded in the same year in Cupertino and operated by 'Mistress Romana' (aka Romana Machado), an employee of the Newton division of the Apple Company. The Extropians also run a considerable numbers of sites on the World Wide Web.

As their FAQ (Frequently Asked Questions) file tells us, 'Extropians have made career choices based on their extropian ideas; many are software engineers, neuroscientists, aerospace engineers, cryptologists, privacy consultants, designers of institutions, mathematicians, philosophers, and medical doctors researching life-extension techniques. Some extropians are very active in libertarian politics, and in legal challenges to the abuse of government power'.[9] (Forste 1984). Extropians are a small group, comprised of around 300/350 actual members, although the actual journal is quoted to have print-runs above 3000 (Regis 1994).

Mondo and the Extropians seem to come from very different areas of the Californian technological belt: respectively the techno-rave scene and the world of professional scientists and technological consultants orbiting around the technological corporate parks. Berkeley and San Francisco for *Mondo;* Cupertino and Stanford for the Extropians. The first group seems to develop out of the sixties counterculture and is explicitly related to the rave and neo-psychedelic scene. The second is closer the technoscientific industry whose philosophy it claims to embody. Extropians are fervid admirers of the positivist, scientific tradition dating back to Francis Bacon and the Enlightenment. Both groups, on the other hand, share very similar views about the evolutionary destiny of humankind.

The following feature appeared in *Mondo 2000 A User's Guide to the New Edge,* and is part of a section on 'Evolutionary Mutation' written by chief editor R.U. Sirius. The guide is an anthology of the best articles published in the first four years of the magazine. Posthumanism is defined in terms made familiar by cyberpunk science fiction: we recognise its emphasis on the transitional nature of the present; the beginning of evolutionary mutation in common technological gadgets and medical devices; the visionary gaze projected into a future when mutation will be complete and the transition to a post-biological age will be accomplished:

> Ultimately, the New Edge is an attempt to evolve a new species of human being through a marriage of humans and technology. We are ALREADY cyborgs. My mother, for instance, leads a relatively normal life thanks to a pace-maker. As a species, we are moving toward replaceable parts. Beyond that, genetic engineering and nanotechnology... offer us the possibility of literally being able to change our bodies into new and different forms... Hans Moravec, director of the Mobile Robot Lab at Carnegie-Mellon University in Pittsburgh, has investigated three possibilities, and he believes that a form of postbiological humanity can be achieved within the next fifty years.
>
> Think about it. The entire trust of modern technology has been to move us away from solid objects and into information space (or cyberspace). Man the farmer and man the industrial worker are quickly being replaced by man the knowledge worker. ... We are less and less creatures of flesh, bone, and blood pushing boulders uphill; we are more and more creatures of mind-zapping bits and bytes moving around at the speed of light. (Sirius 1992: 100)

The Extropians have very similar views on the subject: the transitional nature of the present is further specified by the label transhumanism, but this time a further level of voluntarism is added. Transhumans are those who are consciously preparing for the final evolutionary mutation. They work on their consciousness and explore the posthuman possibilities available in the new technologies. There is also a conscious rejection of the cult of nature and supernatural forces which we will encounter again in cyberpunks' rejection of fantasy:

> A3. TRANSHUMAN: We are transhuman to the extent that we seek to become posthuman and take action to prepare for a posthuman future.
>
> This involves learning about and making use of new technologies that can increase our capacities and life expectancy, questioning common assumptions, and transforming ourselves ready for the future, rising above outmoded human beliefs and behaviours.
>
> TRANSHUMANISM: Philosophies of life (such as the Extropian philosophy) that seek the continuation and acceleration of the evolution of intelligent life beyond its currently human form and limits by means of science and technology, guided by life-promoting principles and values, while avoiding religion and dogma. (Forste 1994)

In this sense, the label 'transhuman' is akin to *Mondo'* s 'reality hackers' or Leary's 'cyberpunks': all of these labels represent an ideal figuration of the

qualities embodied by the subject of cyberculture. *Mondo* defines as 'reality hackers' the 'sophisticated, high-complexity, fast-lane/real-time, intelligent, active, and creative' personalities, the social subjects able to catch up with a technological development vastly beyond the reach of the 'dulled, prosaic, practically-minded, middle-of-the-road public' (in Rucker, R.U. Sirius and Queen Mu 1992: 195). Leary calls 'cyberpunk' 'the pilot who thinks clearly and creatively, using electronic appliances and brain know-how... the newest, updated, top-of-the-line model of the 21st century: *Homo sapiens sapiens cyberneticus'* (Leary 1994: 64).

Posthumanism is the ultimate goal of the transhuman effort promoted by the Extropians and *Mondo* : it is the ultimate realisation of the millenarian dreams of the Western imagination. It marks a total and uncompromising rejection of mortality and of dependence on anything other than the pure, self-contained self. Donna Haraway has referred to this drive to ward self-contained immortality as the masculinist dream of excremental second-birthing (Haraway 1991: 189):

> POSTHUMAN: Posthumans will be persons of unprecedented physical, intellectual, and psychological ability, self-programming and self-defining, potentially immortal, unlimited individuals. Posthumans have overcome the biological, neurological, and psychological constraints evolved into humans. Extropians belief [sic] that the best strategy for attaining posthumanity to be [sic] a combination of technology and determination, rather than looking for it through psychic contacts, or extraterrestrial or divine gift.
>
> Posthumans may be partly or mostly biological in form, but will likely be partly or wholly postbiological -- our personalities having been transferred "into" more durable, modifiable, and faster, and more powerful bodies and thinking hardware. Some of the technologies that we currently expect to play a role in allowing us to become posthuman include genetic engineering, neural-computer integration, molecular nanotechnology, and cognitive science. [MM](cited in Forste 1994)[10]

Both groups acknowledge that the beginning of the posthuman/techno-evolved body has already started. R.U. Sirius quotes his 'mother with the pace-maker'; in their FAQ the Extropians claim that they are working through contemporary technologies such as 'neurochemical enhancers, computers and electronic networks'. Both seem also to acknowledge the possibility of at least two kinds of technologically evolved posthumanity: a technologically-enhanced body and a post-organic body. The first would be

a variation on the existing human body (it will still be, as the Extropians put it, 'partly biological'). *Mondo* can see the beginning of the first kind of posthuman body in the presence of technological implants such as pace-makers and contact lenses. Ultimately, though, the goal of technologically enhanced evolution is the transcendence of the body altogether in a post-biological identity.

If we compare these two versions of posthumanism to cyberpunk science fiction, we will notice that in this particular case *Mondo* and the Extropians seem to have selected posthumanism's most utopian moment: a faith in the pleasures of the mutated body, in the pleasures of the interface, and in the mystic moment of bodily transcendence. Such dreams entirely reject the element of contamination emphasised by deconstructionist and postmodern interpretations of cyberpunk. In its widest possible sense, they replicate '[t]he historical project of humanism, and its associated life and human science,... the search and the fulfilment of the self' (Haraway 1991: 78). They postulate a complete rejection of the natural body in ways that would easily alienate, for example, feminist writers like Carol Merchant who have traced the consistent identification of woman with nature, and their common subordination to the will of man (Merchant 1980). A criticism of the posthuman body which would offer as an alternative a holistic natural body, however, is probably strategically and politically unhelpful. As Haraway put it, there are not many advantages in the nostalgia for a pure, whole nature: such appeals usually reinforce a binary logic which does nothing to help to recover a much-needed sense of political agency in relation to technology.

> ... most American socialists and feminists see deepened dualisms of mind and body, animal and machine, idealism and materialism in the social practices, symbolic formulations, and physical artefacts associated with 'high-technology' and scientific culture. From *One Dimensional Man* (Marcuse 1964) to *The Death of Nature* (Merchant 1980), the analytic resources developed by progressives have insisted on the necessary domination of technics and recalled us to an imagined organic body to integrate our resistance... But a slightly perverse shift of perspective might better enable us to contest for meanings, as well as for other forms of power and pleasure in technologically mediated societies. (Haraway 1991: 154)

This 'slightly perverse shift' moves us away from organicist, holistic objections, which inevitably set up an uncontested nature against a colonising, dehumanising technology. This opposition usually closes any

political options which are not a rejection of technology altogether. Here I will take a different route: although I acknowledge that there are deeply troubling connotations in a philosophical project which aspires to do away with the body altogether, I am more interested in investigating the reasons why this project should have such an appeal for high-tech subcultures at this particular historical moment. The replaying of millenarian masculinist fantasies is always highly specific: by understanding the specificities of the resignification we might achieve more useful readings.

One of these specific resignifications is probably located in the relationship between posthumanism and scientific and technological production. In particular I am interested in understanding what kind of scientific knowledge has been made available for these groups to integrate their quest for utopia. I am also keen to understand whether these posthuman accounts can be also read in relation to the ideas of mastery I have explored in chapter 5. I have therefore come to formulate some arguments, which I elaborate in the following pages:

Posthumanism witnesses the comeback of science as utopia after the public loss of trust in science and technology during the nuclear and chemical seventies. It is one of the terrains where subcultural desires for empowerment through technology meet with science's quest for a return to its ideal position as deliverer of boundless prosperity.

Posthumanism shows that the technological contamination of the body does not necessarily endorse the poststructuralist fragmented self. The human body is made obsolete, but the faith in the humanist project of science is reinforced. As a result posthumanism emerges as one of the terrains where the old ideology of the individual subject is reinforced even at the not-so-paradoxical cost of the loss of the human body. This seems to confirm feminist criticisms of scientific humanism which claimed that the construction of Man is usually accomplished at the cost of the erasure/exploitation of the subjugated body (Haraway 1989).

The political allegiances of posthumanism are to free market capitalism. The free market is the only environment which encourages change and therefore evolution. Posthumanism draws much of its rhetoric from the economic language of competition and individual performance. In a certain sense it is possible to read posthumanism as a fantasy of the totally ergonomic worker enacted by the worker herself/himself. By taking it up and radicalising it, he/she fulfils the myth the intellectual worker as the creative, independent, empowered subject of the Information Age. In this

sense, these narratives provide us with a more complete understanding of the limitations of the discourse of mastery explored in chapter 5.

The scientific case for posthumanism

Posthumanist narratives appear in a moment of uncertainty concerning the status of science and technology in the Western world—what Andrew Ross has called an age of 'technocratic crisis':

> This crisis appears at a time when the official legitimacy accorded to technology-worship has guaranteed it the status of a new civil religion in North America, perhaps the only possible millenialist home that remains for the official versions of the emptied-out American dream. Yet it is also a time when faith in modern science's founding sacraments—its claims to unimpeachable objectivity, axiomatic certitude , and autonomy from the prejudices of power—is rapidly disintegrating under the pressure not only of demythologizing critics and activists within the priesthood, but also from thoroughgoing historical critiques of scientism waged by feminists and ecologists with one foot in the door, and from public disaffection with science's starring role in the grisly drama of global degradation. (Ross 1992: 533)

In this context, posthumanism can be interpreted in two ways (which might be both partially and simultaneously true): as a reaction against the rejection of science in the 60s and 70s counterculture; and as another version of the millenarian dream of technological deliverance from scarcity. As is usual with cultural phenomena, this is further complicated by the simultaneous presence of other legacies whose own historical roots are variously positioned in relation to science itself: the psychedelic movement and the rave scene for *Mondo 2000;* the philosophical tradition of the Enlightenment for the Extropians.

The deep need to reappropriate science and technology after the dire years of the nuclear threat are also expressed in cyberpunk science fiction, which started by announcing its rejection of post-nuclear science fiction *and* hippie naturalism. In this sense, cyberpunk science fiction heralded, at the level of popular culture, a return to science and technology as spaces of possibility. This return follows twenty years of countercultural criticism of mainstream technology —a criticism which had even infiltrated the citadel of science in popular culture, science fiction. In his introduction to Gibson's *Burning Chrome,* Sterling mentions 'the ominous proliferation of

postapocalypse stories' as one of the signs of the decay of science fiction (Sterling 1988: 10): indeed '[t]his is another distinguishing mark of the emergent school of Eighties SF: its boredom with the Apocalypse' (*ibid.*: 12).

Beyond post-nuclear SF, Sterling was particularly vociferous about the technological illiteracy and the general rejection of science and technology in the sixties and seventies.

> A lot of New Wave writers had what most cyberpunks would regard as quite a wimpy, and sort of a wet approach to technology. Whereas cyberpunks pride themselves on their technological literacy and their ability to fit right in with the cutting edges of new technological developments. What they want to do is to grab that technology and use it themselves before someone uses it on them. Whereas the New Wave thing is tied in with the whole Sixties rejection. A utopian, politically radical, anti-technological attitude. "Let's get rid of Babylon and go out on the commune and raise goats." - - sort of approach, which most cyberpunks reject with contempt as total wet hippie nonsense. (Sterling 1987: 28)

This position is shared by the contemporary high-tech subcultures and has originated a whole series of political strategies centered around the concept of technological mastery. In this sense it has opened up a problematic but productive field of possibilities around a more decentered and democratic use of high-tech. The political space envisaged by cyberpunk science fiction and cyberpunk-inspired subcultures is split between dystopian anxieties about the new 'surveillance society' and ecstatic hopes about the anarchist possibilities of technology itself.

Posthumanism is an expression of what I have called the 'ecstatic' side of cyberculture and it draws on the most utopian scenarios envisaged by science and technology in the last twenty years: the mystic landscapes revealed by quantum and chaos theory (Gleick 1987); the liberationist language of the Personal Computer revolution (Nelson 1974); and the visionary quest of nanotechnology and artificial intelligence (A.I) research.

Nanotechnology and A.I. research have been particularly inspirational for posthumanist rhetoric. Their centrality can be proved by the virtual ubiquity of scientists such as Marvin Minsky, one of the fathers of Artificial Intelligence research at MIT; Hans Moravec, the Stanford Graduate and roboticist from Carnegie-Mellon university; and the Stanford University nanotechnology group headed by Eric Drexler. They are undoubtedly the most quoted scientists in these accounts and, in my opinion, the vanguard of

a new *scientific utopian colonisation of the future.*

Minsky, Moravec and Drexler are claimed by the Extropians as kindred spirits and inspirational figures: 'artificial intelligence theorist Marvin Minsky [and] nanotechnologist Eric Drexler... have been found lurking on extropians@extropy.org' (Regis 1994: 149)

> Drexler, indeed, is something of a patron saint among Extropians, the reason being that his books, *Engines of Creation* and *Nanosystems,* some members feel, chart the path to the Extropian future. Tiny robots working with molecules, the theory goes, will bring us extreme longevity (Drexler does not speak of "immortality"), health, wealth, and indefinite youth.
>
> No surprise then, that at the Extropian banquet and Extropy Awards Ceremony, at Extro 1, Drexler emerged as star of the show. That was after Hans Moravec (father of the downloading idea) gave the keynote speech... (*ibid.*)

Similarly, Hans Moravec and Eric Drexler are two key figures in the *Evolutionary Mutation* section of *Mondo's Guide to the New Edge:*

> As a species we are moving toward replaceable parts. Beyond that genetic engineering and nanotechnology offers us the possibility of literally being able to change our bodies in new and different forms. As we increase our understanding of matter as information patterns, it may become possible to download the information patterns and consciousness of a human being into solid state. It may also become possible to make copies of that information pattern, just as we now make copies of information stored on computer disks. Hans Moravec, director of the Mobile Robot Lab at Carnegie-Mellon University in Pittsburgh, has investigated these possibilities, and he believes that a form of postbiological humanity can be achieved within the next fifty years. (Sirius 1992: 100)

Hans Moravec was also a central influence at the beginning of the debate around the obsolete body, with his interview released to *Omni* magazine and a chapter from his book published in *The Whole Earth Review* (Moravec 1989; 1989b). I will therefore start by looking at his controversial work and its roots in recent genetic reformulations of evolutionism.

Moravec's book *Mind Children* follows in the footsteps of AI pioneer Marvin Minsky and is firmly located in the epistemological and technological outlook of cybernetics, founding discipline of AI research. Cybernetics is obviously a central element in the posthuman discourse: without some of the philosophical underpinnings of cybernetics there could be no practice or

theory of cyborgs or posthumans.

Cybernetics started from a definition of the human steeped in the rationalist philosophical tradition of the West. In the seventeenth century René Descartes, one of the fathers of the Western scientific method, so defined the two criteria for discriminating between humans and machines: the machine has '(1) no feedback mechanism... and (2) no generalising reason' (Mazlish 1993: 24). In the forties such a limited definition of humanity was easily set aside by the accomplishments of cybernetics, which created machines who could give positive feed-back and simulate a generalising reason.[11]

Cybernetics is certainly the basis of modern robotics and AI research, (Moravec's own discipline), but is not the whole story. In the fifty years since its early formulations, cybernetics has been rewritten, hybridised with other disciplines, and generally updated and adapted. Moravec's work illustrates the interesting confluence, which we will encounter again in the next chapter, of cybernetics, genetics, and evolutionism—the real novelty represented by posthuman accounts. In particular Moravec takes as his starting point recent genetic reformulations of evolutionary theory such as that popularised by Richard Dawkins, the Oxford zoologist and author of best-sellers such as *The Selfish Gene* (1976); *The Extended Phenotype* (1982) *The Blind Watchmaker* (1986) and the recent *River Out of Eden* (1995) Dawkins' digitalisation of evolutionism is another of the scientific foundations of posthumanism.

In 1976, in the preface to *The Selfish Gene*, Dawkins declared that his book was directed at three imaginary readers: the layman, the expert, and the student. With this statement he intentionally located his book in the genre of popular science writing and defined it as an attempt to offer to the general public an informed account of recent developments in evolutionary theory. In this first book, as in all the others, Dawkins' main sparring partner is creationism - the religious objection to evolutionism - rather than alternative accounts of evolution. The result is that the reader feels like he/she is pretty much offered an undisputed report on the current state of evolutionary theory—unless he/she is of a firm religious persuasion. The book enjoyed extraordinary success in reformulating evolutionism in updated, genetic terms. As a proof of his continued influence on the lay public, twenty years later it earned him the cover of *Wired* magazine, where he was celebrated as the man who 'redefined the fundamental doctrines of 'natural selection' in ways that transform the vocabulary of evolutionary biology into the new realms of digital media' (Schrage 1995: 23).

Dawkins suggests that evolutionary theory should be reformulated in the light of the discovery of the genetic structure underlying the organism. Classic evolutionary theory deals essentially with the concept of the *species* or the *organism*. Dawkins suggests that the survival and propagation of the species or the single organism does not really matter: 'It is a smaller kind of unit which I call the active, germ-line replicator. The most important kind of replicator is the 'gene' or small genetic fragment' (Dawkins 1982: 4). Genes rule evolution with their 'selfish' desire to survive by replicating themselves across several organisms: as Dawkins put it in 1976 '[t]hey are in you and me; they created us, body and mind; and their preservation is the ultimate rationale for our existence... we are their survival machines' (Dawkins 1976: 20).

As a machine, the function of the organism is provisional and always directed by the real 'mind' behind it, the selfish, manipulative, replicating gene. In its turn, the gene is just a set of encoded information and, just like a piece of software, it dictates the shape and the characteristics of the organism (phenotype) whose final function is to help the gene to replicate and propagate. In *The Blind Watchmaker* and *River Out of Eden*, this parallel between life and information is made even more explicit:

> What is truly revolutionary about molecular biology in the post-Watson-Crick era is that it has become digital.
>
> After Watson and Crick, we know that genes themselves, within their minute internal structure, are long strings of pure digital information. *What is more, they are truly digital, in the full and strong sense of computers and compact disks....* The machine code of the genes is uncanny computerlike. Apart from differences in jargon, the pages of a molecular-biology journal might be interchanged with those of a computer-engineering journal. Among many other consequences, this digital revolution at the very core of life has deal the final killing blow to vitalism—the belief that living material is deeply distinct from nonliving material. (Dawkins 1995: 17) [emphasis added]

In the final chapter of *The Selfish Gene*, Dawkins also lays the foundations of a theory which he will develop in his later work—a reconceptualisation of culture in biological terms. This has become a staple of Internet culture. Dawkins accomplished this feat through an apparently humble acknowledgement of the irreducibility of humans to simple genetic theory: humans possess culture, and culture is what enables us to resist the dictates of our selfish genes. In a remarkable move, Dawkins accepts this argument

and turns it against itself: it is true that culture differentiates human beings from any other form of life, and it is indeed true that selfish genes do not exercise the same power on human beings as they exercise over other species. On the other hand Dawkins had already defined life in its larger sense as being dependent not so much on the existence of the biological gene, as on the existence of a unit called the 'replicator'. The tendency and the capability to replicate are what distinguishes life from non-life, *regardless of the presence of the biological gene.*

In this sense, culture possesses its own smallest replicatory units in the form of ideas which propagate and develop in time: culture, therefore, obeys the same evolutionary rules as DNA-based life. Instead of the gene we have ideas or 'memes', completely non-genetic kinds of replicators 'which flourish only in the environment provided by complex, communicating brains' (Dawkins 1982: 109).

> Examples of memes are tunes, ideas, catch-phrases, clothes, fashions, ways of making pots or building arches. Just as genes propagate themselves in the gene pool by leaping from body to body via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain... (Dawkins 1976: 192)

As cybernetics breaks down boundaries between humans and machines, Dawkins' genetic evolutionism breaks down boundaries between culture and nature, in a colonising move that subsumes them both within the framework of evolutionary theory. The famous blurring described by postmodern readings of cyberpunk is clearly interpreted by science as a one-directional movement: whether humans are defined by their biology or their culture, it does not matter. Science has the final word on both.[12]

The concept of culture as 'another genetics' was passed on to posthumanism by Hans Moravec, who built his case for the necessity of evolution on the incompatibility between memes and genes: if culture is a new form of life, then it can be identified as a parallel genetics 'passed from one generation's brain to the next through example and language' (Moravec 1989: 12). The two 'genetics', the organic and the cultural, are in definite contrast. Since the movement of humanity in the last couple of thousand years has been towards culture (aka technology), our transmigration into technology is the natural outcome of evolutionary history:

> What is best for the continued survival of one is often not best

> for the other. The most dramatic conflict may be the issue of individual death. Our DNA genes usually survive our death, grouped in different ways in our off-spring and our relatives. In a subtle way it is no doubt in their evolutionary interest to regularly experiment like this with fresh shuffles of the evolutionary deck. But the process is devastating for our cultural genes. Many hard-earned skills and memories will simply die with us. (*ibid.*)

If culture has superseded biology, then culture must find a way to survive the obsolescence of the human body. In 1954 cybernetician Norbert Wiener anticipated Moravec's conclusion (although he would probably not approve of Moravec's radical solution). Wiener claimed that '[t]he pace at which changes during these years have taken place is unexampled in earlier history, as is the very nature of these changes... We have modified our environment so radically that we must now modify ourselves in order to exist in this new environment' (Wiener 1954: 46).

The idea that we have culturally modified our environment to the point where we have to mutate to survive was also popularised in the seventies by another inspirational figure for cyberpunk authors: Alvin Toffler. In *Future Shock,* (1970) Toffler argued that the rate of technological change and all the social changes that come with it has resulted in a definite shock for our 'old' bodies. After all we still carry around the genetic make-up of Man the Hunter (Toffler 1970). Moravec's answer to these arguments is to radicalise the adaptationist strategy: our only choice is to accept the demise of the body and 'transmigrate' our cultural achievements (identified with the 'mind') into the computer; 'the machine, and not a biological body, becomes the repository of mind' (Figueroa-Sarriera 1995: 132).[13]

As I will suggest later, this argument about the danger posed to the human body by the acceleration of technological change can be resolved in two ways: as Moravec and the posthumanists suggest, by getting rid of the body altogether; or, as I will explore in the next chapter, by answering Lewis Mumford's call in 1934 for a more 'natural' technology, therefore bridging the gap between technology, biology, and culture (Mumford 1934).

Returning to posthumanism, genetic evolutionism offers not only a justification for the eventual 'genetic take-over' of nature by culture, but also the basis for its technical feasibility: the technology to accomplish it is still very far away, but the scientific foundations are all well laid. The gene is digital and culture is evolutionary. The gene is nothing but encoded information, the operating system of the organism, and it is theoretically

possible to translate the genetic structure of the organism in a digital series of information. This transferral would satisfy the evolutionary impulses of culture (ruled by its 'memes') and enable the passage to the next evolutionary stage.

The transferral of the human genome into a software construct is presented as a speculative, but objective scientific possibility. Moravec offers the possibility of 'transmigration', a hypothesis that cyberpunk writer Rudy Rucker used abundantly in his *Live Robots (Software/Wetware)* series. Transmigration is based on the idea that science will make it materially possible to transfer, or download, the human mind (which he distinguishes from the brain) into a new kind of robots.

> In time sophisticated scanning techniques may make it possible to move the contents of *biological human brains* into other machinery .... By such techniques our individual personalities may survive the obsolescence of their biological heritage to join in the future growth and evolution of our cultural progeny. (Moravec 1989: 13)[14]

Are there any concrete foundations to Moravec's wild theories? After all, science is supposed to be about abstract possibilities and it is only technology which can decide whether it is feasible or not. As molecular engineer Eric Drexler put it '[s]cience is about studying nature and describing what already exists.. Engineering is about taking what we know and making new things. So if a scientist says, 'Ah, I can predict the future of science', well this is nonsense - you can't predict what you are going to learn because you don't know it yet. But if an engineer predicts we're going to be able to fly to the Moon, there's reason to listen' (Drexler in Davis 1995: 15).

Drexler's work in molecular engineering at the Stanford Institute for Molecular Manufacturing is exactly what Moravec, the cyberpunks, *Mondo* and the Extropians, are counting on. Even if molecular manufacturing does not promise the transferral of humans into a computer, it promises infinite manipulation of the human genome. Molecular manufacturing, or, as it is better known, nanotechnology is based on a theoretical intuition formulated by the late Nobel physicist Richard Feynman (1918-1988) who argued that '[t]he principles of physics do not speak against the possibility of moving things atom by atom. It is something in principle that can be done, but in practice it has not been done because we are too big' (in Davis 1995: 3).

'Nano' as *Mondo* explains 'is a prefix which means "one-billionth," and

nanotechnology talks about machines that are on the order of one-billionth of a meter large... the size of molecules and atoms. The idea behind nanotechnology is that it should be possible to assemble a desired molecule one atom at a time, like a Tinkertoy' (Sirius *et al.* 1992: 186). The machine which grounds nanotechnologists' claim in actual technical possibility is:

> the scanning tunnelling microscope (STM), a device originally used to produce three-dimensional maps of the atomic structure, and now modified to allow the manipulation of single atoms. Drexler argues that the current limits of genetic engineering will be eventually overcome by the nanotechnology revolution which will eventually allow very detailed manipulation of the human genome (Moravec 1988: 73).

In *Engines of Creation,* nanotechnologist Eric Drexler explicitly acknowledges his debt to 'modern gene synthesis machines [where] genetic engineers build more orderly polymers—specific DNA molecules—by combining molecules in a particular order' (Drexler 1986: 6). Genetic engineers have already accomplished a degree of molecular manipulation by programming bacteria so as to make 'proteins ranging from human growth hormone to rennin, an enzyme used in making cheese. The Pharmaceutical company Eli Lilly (Indianapolis) is now marketing Humulin, human insulin molecules made by bacteria' (Drexler 1986: 7).

Nanotechnologists' claims, though, are even higher than those of genetic engineering—which justifies Steve Davis' title 'Nanotopia' for his BBC documentary. For example molecular manufacturing 'would create supercomputers the size of dust' (Davis 1995: 5); or it could be used to make anything at all: '[t]hey speak of embedding nanomachines everywhere - molecular robots that work invisible all around us, turning the real world into an extension of the computer world' (*ibid.*). In Drexler's vision, it could be used to solve the problem of world starvation (by rearranging the atoms in grass and turning them into beefsteak); and even pollution (by building molecular machines that would break down the toxic components).[15] Nanotechnology promises to bridge the gap between the poor and the rich by making the 'manufacture of things out of nothing' a technological possibility.[16]

> From a material point of view we'll have almost anything that we want - to the extent that you can describe and specify what it is you want, you'll be able to get it and get it inexpensively. So we're looking at a manufacturing technology which will make a

> difference to the cost of things. They'll be cheap, they'll be available, they'll be easy for anyone to get. We'll see just a major shift - where today only someone who is very rich could afford a very carefully handcrafted, very specially designed thing, in the future if one person can have it anyone can have it. (Ralph Merkle cited in Davis 1995: 15)

Drexler's most cited contribution to posthumanism is his concept of cellular machines that would repair the human body and prevent ageing. Nanotechnology would then join recent anti-ageing research promoted by the biotechnology industry, with companies like Senentek of Denmark and ICN Pharmaceuticals. Nanotechnology's cell repair machines can make the end of ageing even more feasible: 'They will be able to repair cells that have been destroyed. Either way, they will restore health. Ageing is fundamentally no different from any other physical disorder... By restoring all the cells and tissues of the body to a youthful structure, repair machines will restore youthful health' (Drexler 1986: 115).

Mondo and Moravec have eagerly embraced the 'posthumanist' possibilities of nanotechnology: nanotech enthusiasts dream that 'there will someday be tiny nano-machines which they can inject into themselves. These little helpers, it is hoped, will clear the cholesterol out of the arteries, the Alzheimer's disease-producing aluminium out of their brains and so on' (R. U. Sirius, Queen Mu, Rucker 1992: 186). In a 1994 interview with Charles Ostman, a consultant to Nanothinc of San Francisco, *Mondo* goes back to the posthumanist uses of nanotechnology:

> CO: Electronic pacemakers, other implants, and miniature prosthetic devices have been standard medical procedures for years. Ultraminiature cochlear ear implants allow thousands of people to year for the first time. Injectable blood gas monitoring sensors are now available. In physical therapy, implantable micro strain gauges and related circuitry now allow real time tension measurements in tendons and ligaments. We are really converging on the bionic man idea. (Thomas 1994: 22)

Nanotechnology completes the picture of the scientific narratives which inform posthuman fantasies. I have shown how posthumanism is based on the cybernetic injunction that there is no difference between humans and machines; on genetic evolutionisms which claims that the gene is digital and therefore transferable and that technology is genetic in its own right; and on nanotechnology that claims to be able to manipulate the structure of the

molecule atom by atom and ensure longevity and maximum manipulability of the human genome. Scientists engaged in disciplines as different as zoology, Artificial Intelligence, and engineering have also provided some of the explanations as to why posthumanism might be a very feasible future. Hans Moravec, an inspirational figure for posthumanists, has summarised the reasons why posthumanism is necessary: it is the result of a process of continuing evolution towards an increasing predominance of culture over nature. In the process of listening to his stories, I have encountered scientific accounts which promise utopia if only scientific ideas could be applied to society as a whole.

Posthumanism is therefore not just the result of wild speculations conjured up by extremist groups of technological utopians: in many ways it is fed by the flow of metaphors from a legitimate scientific culture which is attempting to colonise the future as a *scientific utopia*. Abundance and social equality are guaranteed by science and not by politics: the only price the former is asking is the freedom to manipulate or eliminate the body.

Posthumanism replicates all the structural faults of the humanist argument and it would be far too easy to point to its effacements of the differential positions of the 'obsolete human body' in the grid of power. The posthuman body is located inside the 'unmarked category, where the social conditions of one's existence are invisible' (Haraway 1991: 68). What is hastily dismissed as 'the obsolete body' is not a single entity, but is unequally distributed across the social space. By ignoring the social determinations of the body, posthumanism describes the differences between bodies as different temporalities: some bodies, are closer to the posthumanist goal; some others will take more time or die out altogether.

Instead of concentrating on the problems of humanism repeated by posthumanism, I will look at the particular contradictions (post)humanism tries to resolve. I certainly agree with all those authors and currents of thought who have criticised the genderless, raceless subject of humanism as a repressive political fiction, but in this particular case they might not provide the most insightful criticisms of posthumanism.[17]

I would rather focus on the function of posthumanism. Beyond the obvious desire for immortality, I have already suggested one of the problems in relation to which posthumanism was formulated—the desire to reappropriate science and technology as spaces of utopian possibilities, desired by social subjects deeply invested in technology and fostered by scientific figures interested in recapturing the lost terrain of scientific utopias.

In the following pages I will focus on another problematic addressed by posthuman philosophies, and in general by narratives of technological evolutionism: the contradictions between notions of evolution, technological mastery, and economic liberalism that belong at the heart of the posthuman theme.

The economic case for posthumanism

> But what a strange and tangled dream, this power that is only gained... through beating the system by being the system.
> (Rosenthal 1991: 99)

Posthumanist narratives are often supported simultaneously by scientific and economic arguments. Evolution into posthumans is justified as part of a necessary trajectory from nature to culture, but is also represented as an answer to the need for *economic survival*. Survival, however, is just the basic reward offered to the posthuman subject: technologically enhanced evolution is about achieving all the fabulous rewards promised by the economy of technology to its fittest subjects. Posthumanism is about surviving and winning in a post-industrial economy that promises huge rewards for those social subjects able to turn themselves into adaptable, fast, creative individuals. In this particular discourse, technological mastery is not about opposing the system, but about satisfying the conditions for being a winning member of the system. In this sense posthumanism and a larger cybercultural rhetoric overlap: the necessity to adapt to technology in order to survive and evolve is a transparent metaphor for the situation of the flexible, mobile knowledge worker operating in the fast machine of postindustrial capitalism.

Unlike the 'cyborg for earthly survival' of Donna Haraway, this evolutionism for economic survival endorses the free market economy as the primeval soup for the posthuman breed. Economy and evolution are never too far away in the writings of both scientists and subcultural exponents. Moravec, for example, describes the need for the postbiological age in economic terms, in terms of survival of the fittest in a global competitive capitalism:

> So why rush headlong into an era of intelligent machines? The

answer, I believe, is that we have very little choice, if our culture is to remain viable. Societies and economies are surely as subject to competitive evolutionary pressures as biological organisms. Sooner or later the ones that can sustain the most rapid expansion and diversification will dominate. Cultures compete with one another for the resources of the accessible universe. If automation is more efficient than manual labor, organizations and societies that embrace it will become wealthier and better able to survive in difficult times and to expand in favorable ones. If the United States were to unilaterally halt technological development (an occasionally fashionable idea), it would soon succumb either to the military might of unfriendly nations or to the economic success of its trading partners. Either way, the social ideals that led to the decision would become unimportant on a world scale. (Moravec 1988: 100-101)

Moravec, then, positions as an *evolutionary necessity* what in other discursive arenas is defined as *economic necessity*. The collapse of the two arguments is typical of political endorsements of technology. In this nationalist rhetoric technological innovation cannot be discussed or assessed. There is no time for assessment, in fact, when economic survival depends on adopting and developing the newest technologies as fast as possible. For example, as far back as 1978, British ex-prime Minister James Callaghan stated that if the UK did not adopt IT, they would be 'left behind in this technological race. We shall have to run fast to keep abreast of our European partners, and we shall have to run very fast to keep ahead of the newly emerging countries (since) we cannot resist the trend of progress' (cited in Robins and Webster 1986: 19).

Capitalism is defined at the same time as the evolutionary context which dictates the conditions of survival and as the only social arrangement that actually fosters evolution. The rules of the free market economy can be tough on losers, but its arrangements are the only ones which favour change, development, and therefore evolution. The free market is an evolutionary necessity.

The free market allows complex institutions to develop, encourages innovation, rewards individual initiative, cultivates personal responsibility, fosters diversity, and decentralizes power. Market economies spur the technological and social progress essential to the Extropian philosophy.... Expert knowledge is best harnessed and transmitted through the superbly efficient mediation of the free market's price signals -- signals that embody more information than any person or organization could ever gather. (Forste 1994)

The free market economy creates the ideal conditions for the evolution of posthumans. The free market, as management consultants Michael Hammer and James Champy put it, has created 'a world in which the only predictable constant has already become rapid and relentless change' (Hammer and Champ 1993: 6). In an economy ruled by change, which very often takes the form of continuous technological innovation, only the fastest and more adaptable survive. The story of the giant IBM losing the PC battle to a leaner corporate culture is the most flagrant example in the world of cyberculture of the necessity of being flexible in order to stay on top (Cringeley 1992).

The economy of high-tech in particular depends structurally on two groups of individuals and a single subjectivity: a fast, adaptable, innovative, and creative worker; and a fast, adaptable, innovative, and creative customer. Louis Rossetto, editor of *Wired* magazine, says that the high-tech industry needs 'a leading edge, people who take a risk on new, unproven products... who pay through the nose for the privilege of being beta testers...' (Rossetto 1996).

The dependence of the high-tech industry on accelerated turnover creates and supports a euphoric subject, who has survived the 'future shock' of accelerating technological and economic change to discover an exciting and challenging way of life. The accelerated turnover of technocommodities has shocked the subject into the next evolutionary stage. The theme of 'future shock' as the birthing moment of the subject of the information age is exemplified by R.U. Sirius's opening lines to *Mondo's Users Guide To the New Edge* :

> See, this is the situation. We're living in *extremely* fast and *extremely* dense times. One day you're lucky to have a FEDEX account, the next day everybody who calls you asks, 'What's your FAX number?"
>
> "Huh?" (Sirius 1992: 16)

The necessity to understand quickly and *turn into* the different sensorial and intellectual subjectivities necessitated by a fast-evolving technology is a thinly disguised metaphor for the necessity to follow the ebbs and flows of the job market—literally 'surfing' it. Technological change becomes interchangeable with economic change, and the necessity to evolve into posthuman bodies overlaps with the need for new empowered consumers/workers. Indeed in *Mondo'* s rhetoric, being an active consumer

is the key to becoming a successful member of the exciting free market economy. Technology is consumed in order to be able to produce: creative consumption makes a successful producer of knowledge. The borders between consumption and production are thus blurred:

> From desk-top video to hypermedia, from art software based on Mandelbrot sets to virtual reality, from the completely portable office-in-a-suitcase containing fax. computer, modem, and phone to the power of supercomputing on a desktop, the computer/high-tech industry has already reached beyond the limits of what a dulled, prosaic, practical-minded, slow-moving, middle-of-the-road public is going to find useful. Call it a hyper-hip wet dream, but the information and communications technology industry requires a new, ACTIVE consumer, or it's going to stall. This is one reason why we are amplifying the mythos of the sophisticated, high-complexity, fast-lane/real-time, intelligent, active and creative reality hacker. (Sirius, Mu, and Rucker 1992: 195)[18]

Technological mastery is thus required of the subject both in its worker and consumer incarnations in order to support the exciting turnover of technocommodities. Without such a worker and such a customer there will be no high-tech industry, and the pace of evolution will be irredeemably stopped. Technomastery is thus caught between the two poles of resisting the system and supporting the system: this apparent contradiction can be solved if we think about chapter 5 and its opposition between industrial and postindustrial technology. Everything cyberculture resists is a legacy of the old industrial age, everything it supports is part of the new exciting, decentralised postindustrial economy. Technological mastery is therefore a double-edged sword: one side turned aggressively against the obsolete past, the other eagerly towards the exciting future; one demolishes, the other builds.

A new social subject of the kind shown above is an absolute prerequisite for the establishment of the 'information utopia'. In the cybercultural register at large, this often takes the shape of an unconscious projection of the qualities required of the high-tech self into the machine. Kevin Kelly, editor of *Wired* magazine, describes the qualities needed in good software in strikingly anthropomorphic terms: 'Survival in the everyday world of daily use means flexibility and evolvability. And it demands more work to pull off. A program survives only if it constantly analyzes its status, adjusts its code to new demands, cleanses itself, ceaselessly dissects anomalous

circumstances, and always shapes and evolves' (Kelly 1994: 309). Posthumanism fits in with the culture of work developed around the new personal computer and software industry, what Rosenthal calls 'the cultlike workaholism of techies like the Silicon Valleyites who developed the Macintosh computer and wore T-shirts that said "Working 90 Hours a Week and Loving It" ' (Rosenthal 1991: 90).[19]

This 'refashioning' of the self to keep up with the demands of a faster and increasingly complex society is what posthuman narratives seem to outline. Posthumanism dresses this potentially nightmarish perspective of constant updating in the utopian language of an exciting adventure of masculinist transcendence.

In spite of its elitist language, posthumanism is not a new form of heartless social Darwinism. If on the one hand evolution is economic survival, on the other hand the total thrust of evolution is such that the evolved minority will perform the role of a vanguard, leading the slower subjects towards the ultimate posthumanist goal. Posthumanism and cyberculture largely agree in stating that there are no real losers, only different temporalities: it is not about losing or winning, it is about getting there first. The myth of the (electronic) frontier and the rhetoric of evolution are combined to sustain each other:

> The utterly laughable Marxist/Fabian kneejerk that there is such a thing as the info-haves and have-nots... This whole line of thinking displays a profound ignorance of how technology actually diffuses through society. Namely, there has to be a leading edge, people who take a risk on new, unproven products - usually upper tenish types, who pay through the nose for the privilege of being beta testers, getting inferior technology at inflated prices with the very real possibility that they have invested in technological dead ends like eight track or betamax or Atari. Yet they are the ones who pay back development costs and pave the way for the mass market, which, let me assure you, is every technology company's wet dream (the biggest market today for the fastest personal computer is not business, but the home). Not have and have-nots - have-laters. (Rossetto 1996)

One of the earliest formulations of this image of the 'queue to the future' comes from Alvin Toffler in *Future Shock,* where he arranges and categorises the peoples of the world in a neat 'proto-evolutionary' scale. The structural differences which produce economic and social inequality on a global scale

are reread in strictly temporal terms. Some people have adjusted faster and evolved better, others are still left behind but will inevitably proceed in the same direction. As in posthumanism, Toffler redefines social and economic inequality in terms of different temporalities and different individual responses to change:

> The inhabitants of the earth are divided not only by race, nation, religion or ideology, but also, in a sense, by their position in time. Examining the present populations of the globe, we find a tiny group who still live, hunting and food-foraging, as men did millennia ago. Others, the vast majority of mankind, depend... on agriculture... These two groups taken together compose perhaps 70 percent of all living human beings. They are the people of the past.
>
> By contrast, somewhat more than 25 percent of the earth's population can be found in industrialized societies. They lead modern lives... They are, in effect, the people of the present.
>
> The remaining two or three percent of the worlds population, however, are no longer people of either the past or the present. For within the main centers of technological and cultural change, in Santa Monica, California and Cambridge, Massachusetts, in New York and London and Tokyo, are millions of men and women who can already be said to be living the way of life of the future(..). And while they account for only a few percent of the global population today, *they already form an international nation of the future in our midst. They are the advance agents of man, the earliest citizens of the world-wide super-industrial society now in the throes of birth.* (Toffler 1970: 36-37) [emphasis added]

This chronological hierarchy fits easily with popular evolutionism, which organises all the living species in a medieval chain of being culminating with *Homo sapiens* (what Stephen Jay Gould has called the 'ladder of evolution' Gould 1995). If we accept the idea that the human species is in a *continued* state of evolution, then the chain keeps moving and some individual members of the species will be in charge with pushing evolution into the next stage. Some humans are therefore naturally closer to the top than others, but they are really doing it for the rest of the species, to keep evolution going. The hierarchical nature of the chain of beings is hidden under a chronological fiction: in the queue to the future some people, the fastest and the more adaptable, are further forwards than others. Posthumanism and cybercultural rhetoric at large then coincide in their naturalisation of socially structural differences as different temporalities.

Summary

After the demise of the blind faith in scientific and technological knowledge in the wake of World War II and the Nuclear Age, the subcultures I have analysed represent an attempt to recuperate the original status of science as a constructive and exciting road to the future. This recuperation of the possibilities of science uncritically incorporates the rational humanism science is founded on: the faith in limitless progress as a result of humanity's will to expand and evolve. In the particular examples I have used, this scientific, rational humanism actively endorses free market capitalism, represented as the ideal environment for competition and the development of the individual. Capitalism is the posthuman primeval soup, economic survival is the motivation fostering posthuman evolution. The merging of technology and flesh produces the ideal worker of the Information Age, the creative professional liberated by work. Posthumanism then sheds some troubling light on some of the possible implications of a fixation on technological mastery.

If mastery and technoliteracy in general are not conceptualised as social achievements differently regulated rather than liberated by the capitalist economy, then all the pitfalls of posthumanism will be repeated. Technoliteracy will be interpreted as a question of individual will and any failure to achieve it will be interpreted as an evolutionary failure. Cyberculture minimises these elitist implications by insisting that the goods will be delivered, that, as Rossetto put it, there are no 'haves' and 'have-nots', just 'have-nows' and 'have-laters' (Rossetto 1996).

As I show in the next chapter, this confidence in the future is also the result of the cybercultural faith in the inherent possibilities of technological change. In 1977 Langdon Winner noticed that '[i]n much of the literature about technological change two radically different languages are spoken at once, with little attention to how they can both describe the same set of events. One is the language of dynamic global process that moves ineluctably forward, transforming everything in its path. The other is the language of free agency, individual will, deliberation, and choice in which the path of technological advance is consciously directed' (Winner 1977: 54). In the next chapter I look at cyberevolutionism, the specific cybercultural version of the 'dynamic global process that moves ineluctably forward'.

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1 Pam Rosenthal argues that this feeling of symbiosis between the self and

the machine is related to the experience of working with cybernetic technology. Cybernetic technology, in fact, 'disturbs stable conceptions of the self, creating an uneasy sense of either elaboration or invasion of the self' (Rosenthal 1991: 91).

[2] This statement must be read in the context of Michael Swanwick's description of the controversy between 'humanist' and 'cyberpunk' SF writers, which I have outlined in chapter 4 (Swanwick 1986).

[3] McHale argues that there are two kinds of attitudes to the metamorphosis of the body in cyberpunk SF: the cyberpunk attitude, which insists on the contamination man/machine (exemplified by Bruce Sterling's Mechanists in *Schismatrix*); and the biopunk attitude, which prefers the transformation of the body through genetic manipulation (as in Sterling's Shapers in *Schismatrix*) (McHale 1992).

[4] The term 'cyborg' was coined by Manfred E. Clynes, chief research scientist in the Dynamic Simulation Laboratory at Rockland State Hospital in New York, and Nathan S. Kline, a clinical psychiatrist in the same institution (Clynes and Kline 1960). In their article 'Cyborgs in Space' the two scientists outlined a series of technological modifications of the human body. These modifications aimed to minimise the discomfort of prolonged space travel. They argued that it was more efficient to manipulate the human body than to build a sophisticated and expensive Earth-like environment. This manipulation would create 'the enhanced man who could survive in extra-terrestrial environments' (Haraway 1995: xv). For example drugs could be used to diminish the astronaut's need to sleep; he could be fitted with an osmotic pump to regulate the intake of pharmaceuticals in appropriate doses and endowed with artificial lungs to breath CO_2. The Australian performing artist Stelarc has endorsed this idea of a 'space cyborg'. His performances often postulate the need for a redesigned human body for the exploration of space (Stelarc 1989). Bruce Sterling has also used the theme of the human body which is altered to survive in space in his novel *Schismatrix* (1985)

[5] Some authors claim that cyberpunk is not a postmodern genre at all. Neil Easterbrook argues that '[c]yberpunk is not a postmodern genre unless if by postmodern we merely mean a *style*, a set of thematic preoccupation. If it is "postmodern" it is so as is Lacanian psychoanalysis: *distinctly, emphatically, not poststructural.* Both Sterling's and Gibson's absolute dedication to dialectical models - of reasoning, of evaluation, of political struggle - reveals cyberpunk as the apotheosis of the Modern' (Easterbrook 1992: 392).

[6] Paul Brown has also described the experience of becoming 'angels' in cyberspace: 'Forget about Andy Warhol's petty promise of fame for fifteen minutes. We will all become angels, and for eternity! Highly unstable, hermaphrodite angels, unforgettable in terms of computer memory' (quoted in Stallabrass 1995: 22).

[7] In the special issue of the *Whole Earth Review*, Kathy Acker represents the party who defends the body: 'There's not much in this world I love, and among what I do and can love are my body and other people's bodies. I don't think I can even conceive of the body being obsolete unless I start thinking about suicide' (Acker 1989: 51).

[8] Most Extropians are renamed. I was not able to find out Tom Morrow's real name.

[9] R.U. Sirius also claims that 'a large portion of our [*Mondo 2000*'s] audience is successful business people in the computer industry, and in industry in general, because industry in the United States is high-tech' (R.U. Sirius 1990: 12).

[10] A FAQ is a collectively edited document. Although the whole FAQ was compiled by Eric Watt Forste, this particular section was written by Max More (therefore the [MM])

[11] Machines and living organisms have also other things in common. For example, they are pockets of order amidst the entropic drive to disorder. As Norbert Wiener put it 'there is no reason why they [machines] may not resemble human beings in representing pockets of decreasing entropy in a framework in which the large entropy tends to increase' (Wiener 1954: 32).

[12] In 1975, E. O. Wilson proposed in his *Sociobiology* that the humanities as a whole should be made a subset of biology: 'Let us now consider man in the free spirit of natural history, as though we were zoologists from another planet completing a catalog of social species on Earth. In this macroscopic view the humanities and the social sciences shrink to specialized branches of biology; history, biography, and fiction are the protocols of human ethology; and anthropology and sociology together constitute the sociobiology of a single primate species' (Wilson 1976: 271).

[13] Moravec's definition of the subject is based in cognitive psychology 'a major development in academic psychology relying strongly on the concept of information processing and models based on the computer' (Heims 1989: xxi). Cognitive psychology is also at the basis of research into Artificial Intelligence—Moravec' s own disciplinary field. Cognitive psychology disregards the importance of embodiment in the constitution of the human subjectivity. The mind is all that matters, as it was the case in the philosophy of Renee Descartes. According to Katherine Hayes, Moravec's 'transmigration' 'so... reinscribes the assumptions of Cartesian subjectivity that it is startling to see it still circulating at the end of the twentieth century... The wishful quality of this scenario is starkly apparent when it is placed alongside the large body of empirical evidence demonstrating the importance of embodiment to thought' (Hayles 1996: 158).

[14] William Gibson has used the idea that a human being could be 'downloaded' into a computer in *Neuromancer*. One of his characters, McCoy Pauley, is the 'personality construct' of a deceased hacker, 'a construct, a hardwired ROM cassette replicating a dead man's skills, obsessions, knee-jerk responses' (Gibson 1984: 97).

[15] Neal Stephenson used nanotechnology in his recent science fiction novel *The Diamond Age* (Stephenson 1995). In this novel, he explores the dangerous uses of nanotechnology, which could be used to build micro-weapons that penetrate the skin causing incalculable damage.

[16] Drexler is especially polemic towards Jeremy Rifkin and the Club of Rome's report on the limits to growth. He is particularly incensed at professor Mesarovic, who is a member of the Club of Rome. In a conference, Mesarovic answered 'no!' to the question whether he believed or not that new technological breakthroughs could expand the limits to growth. Drexler replies that '[s]uch models of the future are obviously bankrupt. Yet some people seem willing—even eager—to believe that breakthroughs will

suddenly cease, that a global technology race that has been gaining momentum for centuries will screech to a halt in the immediate future (Drexler 1986: 166).

[17] Posthumanist accounts openly celebrate symbols of humanism such as Prometheus and Faust. Timothy Leary sees Prometheus as the 'Classical Olde Westworld model for the cyberpunk' (Leary 1994: 62). R. U. Sirius argues that Prometheus and Faust are examples of '(hu)man at play with the creation of life, at war with the limitations of biology and time' (R. U. Sirius 1992: 16). The Extropians claim that they are part of a tradition of scientific humanism which includes figures like Voltaire, John Locke, Adam Smith, Ayn Rand and Friedric Nietszche (Forste 1994)

[18] In his book *Cyberia*, a journalistic account of the technocounterculture in the San Francisco/Berkeley area, Douglas Rushkoff also indicates that evolution is often read in economic terms. Rushkoff interviews Mark Heley, a young Briton and raver enthusiast interviewed by Douglas Rushkoff, who claims that he needs 'a hierarchical leap in his mind's ability to identify, process, store, and articulate the complexities of eschatological acceleration' (Rushkoff 1994: 137). This leap will make possible his transition into a new evolutionary stage. In the same chapter Lila Mellow-Whipkit, a local distributor of smart-drugs, claims that: 'Personal neuro-chemical adjustment - the equivalent is personal paradigm and belief adjustment. It's based on a basic presupposition stolen from cybernetics that's used in NLP [neurolinguistic programming]: the organism with the most requisite behavior - the broadest variety of requisite behavior - will always control any situation' (Rushkoff 1994: 135-136).

[19] For two very different accounts of the work culture promoted by the high-tech industry see Hayes (1989) and Cringeley (1992). Douglas Coupland has also recently written an interesting novel about the culture of software developers and programmers working for Microsoft in Seattle (*Microserfs* 1995).

Chapter 7
The biologisation of technology in cyberevolutionism

Cyberevolutionism

In this chapter I analyse another version of the breakdown between the natural and the artificial which I started discussing in chapter 6. After looking at various accounts of its possible consequences for the human body, I am going to consider those narratives which emphasise a new convergence between nature and technology as a whole. As the title of this chapter suggests, this convergence can also be read as a different kind of rhetorical move: in the case of the techno-body, technology invades nature; in the case of 'cyberevolutionism', nature invades technology. In the first case we have a technologisation of the natural; in the second a biologisation of technology. If posthumanism described the ideal subject of the Information Age, cyberevolutionism describes its technology and its social and cultural project.

I have coined the term 'cyberevolutionism' to describe a general formation present across different segments of Internet culture: cyberevolutionism is based on the idea that it is possible to understand complex systems, both natural and artificial, in biological terms. Biology, however, is already defined in a digital language, so it might be more accurate to say that technological systems are described in terms justified by contemporary biological discourse. I have chosen to use 'evolutionism' to emphasise the fact that the favourite language in which these narratives are couched is that of evolution, but a rather different version of evolution than that proposed in posthumanism. Cyberevolutionism's main tenet is that the 'veil between the organic and the manufactured has crumpled to reveal that the two really are, and have always been, of one being' (Kelly 1994: 3). This 'one being' is often described as a self-organizing system, evolving spontaneously from relative simplicity to higher and higher levels of complexity.[1] Cyberevolutionism generally eschews the Malthusian component of Darwin's work: instead of emphasising the notion of competition over scarce resources, it uses the rhetoric of limitless market expansion associated with new technologies to embrace a language of universal abundance and wealth.[2]

By portraying technology as a set of autonomous systems,

cyberevolutionism might be confused with the better known theme of 'autonomous technology'. There are, however, important differences, which I will briefly outline here. Langdon Winner describes 'autonomous technology' as a 'general label for all conceptions and observations to the effect that technology is somehow out of control by human agency' (Winner 1977: 15).

The idea of autonomous technology 'sets out to debunk the dream of mastery by showing that it has gone awry in practice' (Winner 1977: 25). Cyberevolutionism argues that we are not losing but gaining more control over technology and nature; human agency is recuperated in as much as, by virtue of their increasing technologisation, humans are part of the technological system. Technology is not evolving regardless of humans, humans and machines are *co-evolving*, they are *peers in a decentralised network.*

The idea of an autonomous technology blames technology for the destruction of nature. Cyberevolutionism promises to *bridge the gap between the natural and the artificial* for mutual benefit: by imitating nature's logic, cyberevolutionism constructs more nature-friendly technologies.

The evolution of human bodies into cyborgs could be interpreted as a surrender to technology. Cyberevolutionism does not emphasise the technologisation of the natural as much as the biologisation of technology—a coming together of the natural and the artificial.[3] Both natural and artificial systems (including culture and society) are ruled by the same principles and are directed by the same evolutionary force. The workings of this force can be understood through the principles of cybernetics, ecology and genetic evolutionism and are substantiated by the new discipline of artificial life.

Cyberpunk science fiction hinted at this possibility, especially when looking at computer networks and technology in its larger sense. Gibson's technologisation of the natural is a staple of the critical literature on cyberpunk: his opening sentence in *Neuromancer*, ('The sky above the port was the colour of television tuned to a dead channel' Gibson 1984: 9), is often quoted as an example of the invasion of nature by technological metaphors, or, as postmodern criticism would have it, as another sign of the blurred distinction between the organic and the artificial (Ketterer 1992; Fekete 1992). On the other hand, his consistent biologisation of technology has hardly been observed.

In particular, throughout the whole Sprawl trilogy, Gibson consistently represents the computer networks (cyberspace) as a self-evolving ecosystem, not only inhabited by its own indigenous population (the various

Artificial Intelligence constructs) but in a state of continuous development which can be characterised as more *evolutionary* than *historical*. For example, in *Neuromancer*, the Artificial Intelligences Wintermute and Neuromancer are not just rational minds created by human technology; they inhabit a (cyber)space, populated by its own fauna: reconstructed personalities, hackers, memories and viruses. This evolutionary theme is made explicit in the two other volumes of the Sprawl trilogy, *Count Zero* and *Mona Lisa Overdrive*. After Neuromancer and Wintermute merge, the whole of cyberspace becomes alive: 'Once, there was nothing there, nothing moving on its own, just data and people shuffling it around. Then something happened, and it... It knew itself' (Gibson 1986: 223). The merging of Wintermute and Neuromancer marks the genesis of cyberspace as an evolutionary space: their union generates a number of smaller AIs (Artificial Intelligence constructs), conscious and native entities inhabiting the electronic networks as organic entities would their own ecosystem.

I think that it is more in this characterisation of cyberspace as a developed ecosystem that Gibson has anticipated the biologisation of technology in Internet culture. Both Gibson's tales of an 'alive cyberspace' and cyberevolutionism have been facilitated by a new holistic movement in the sciences as a whole. This looks at nature and technology as systemic wholes. This is why part of this chapter is dedicated once again to tracing the scientific affiliations of these narratives; in particular I look at the development of Artificial Life, a new scientific discipline which aspires to 'evolve' forms of digital life on a computer screen.

I will also try to understand the circumstances behind the sudden popularity of biological metaphors on the Internet, namely activism against the Digital Telephony Bill and the Clipper Chip, and the powerful influence of a group of authors and journalists coalesced around a classic countercultural magazine, *The Whole Earth Review*. By looking closely at the development and the resulting influence of this group, I aim to explain some of the possible reasons behind the emergence of cyberevolutionism on the Net.

I will also look at one specific text produced by a member of this group: Kevin Kelly's *Out of Control: The New Biology of Machines, Social Systems, and the Economic World*. I will use Kelly as an example of someone who clearly endorses the self-evolving system.

I argue is that cyberevolutionism completes the utopian meta-narrative of cyberculture by representing the world ushered in by the Information Age

as an ideal and idealised environment. In opposition to the technologies and the Weltanschauung of the industrial age, cyberevolutionism has its own 'green' project, one that eschews the rhetoric of limits and scarcity employed by 'purer' environmentalist movements. The future promised by ICT and CMC is a natural democracy spontaneously producing abundance and harmony by way of radical decentralisation. Unfortunately, cyberevolutionism also seems to promote a discourse of control, echoing and even openly embracing the language of 'corporate re-engineering' (Hammer and Champy 1993). The self-organising system is described in terms which are implicitly and explicitly similar to the language of reorganisation which is sweeping away the bureaucracy of old corporations like IBM.

Cyberevolutionism sees in this form of organised and hierarchical power the only enemy worth fighting in contemporary society. This ideological and material confrontation is set up in terms of a better 'new' against a repressive 'old'. The problem, of course, is that all the signs indicate that the cybercultural project expressed in these narratives hides a new form of control. Control through a rigid and formalised chain of command belongs to the old world; the new world proposed by cyberevolutionism is about the redefinition of control as a problem of design. The artificial self-organising system, in fact, is free to develop and mutate only according to the rules set up in advance by the designer of the system.

As I will show, cyberevolutionism was adopted by the Internet as a political language of resistance at the time of the first legislative interventions in the matter of CMC. Netusers started talking about the Net as a self-evolving system in order to defend it against repressive legislation. If the Net was self-evolving, it should not be tampered with. In spite of their best intentions, however, cyberevolutionism is structurally a very limited language to talk about the development of a social medium. As a result, the landscape of power imagined by these communities stops at the confrontational border between netusers and the State, or netusers and the mass media. Political resistance as imagined from the inside of the Internet community often becomes just a defence of what is already there: an idealised self-evolving system including an organic, spontaneous technology and skilled and adaptive citizens.

From cyberspace to the self-evolving system

The first spatial understanding of the computer networks, one that largely survives today, was not expressed in terms of a 'living organism' but in term of a sense of 'place'. In 1980, the *Whole Earth Catalog* opened its new section on computer networking with this statement by 'Einear Stefferud, consultant for the US Army... who does much of his work via a computer terminal in his Huntington Beach, California, home':

> "When I log in I 'go' into the network. I'm not here in my room anymore. Ask my family. I'm in another place. In formal geographical terms, I'm inside a single point. Yet inside that point is all the space I need to meet with other people—plus my files, my records, and my entire office..." (cited in Kleiner 1980: 534)

Howard Rheingold confirms that logging on the WELL is like 'having the corner bar, complete with old buddies and delightful newcomers... except than instead of putting on my coat, shutting down the computer, and walking down to the corner, I just invoke my telecom program and there they are. It's a place' (cited in Brand 1987: 24). Computer chatlines, special lines which allow the users to communicate in real time, are similarly called 'chatrooms' (especially famous are those of America On Line).[4] On-line role games such as MUDs, MOOs and MUSHes are similarly constituted in terms of familiar spaces such as castles, spaceships, or mansions.[5]

Gibson's cyberspace was not exclusively an artificial ecosystem. On the contrary, his most famous description of cyberspace is 'A graphic representation of data abstracted from the banks of every computer in the human system. Lines of light ranged in the nonspace of the mind, clusters and constellations of data' (Gibson 1984: 67).[6]

Where did the language of the unstoppable cybernetic system come from? In popular culture the first obvious signs of the biologisation of technology go back to the computer virus scare in the mid-eighties (Elmer-DeWitt 1988). Computer hackers who designed viruses were possibly already describing the computer networks as some kind of militarised immune system. Some of this military, juvenile imagination can still be observed in more recent technological experiments such as artificial life (Alife). Dennis Hills, for example, was one of the early virus-writing hackers, and he still describes his first Alife worlds in terms of the military immune system: 'an arms race—parasite attack, host defence, parasite counterattack, host counter-defence' (cited in Kelly 1994: 296). It is also remarkable that

virus-writing was one of the (illegal) research areas channelled into Alife research (Dibbel 1995).

As compared with the late seventies and early eighties, the time of the first wave of hype on the 'informatisation' of society (Webster and Robins 1986), the mid-eighties saw the emergence of an unexpected backlash against IT. The hacker scare, very often connected to the issue of virus-writing, seemed to raise concerns about the frailty of the borders between nations and between individuals in the age of globalisation. Much of the language of computer viruses resonates with undertones deriving from the AIDS epidemic.

> In fact, media commentary on the virus scare has run not so much tongue-in-cheek as hand in glove with the rhetoric of AIDS hysteria—for example, the common use of terms like *killer virus* and *epidemic* ; the focus on high-risk personal contact (virus infection, for the most part, is spread through personal computers, not mainframes); the obsession with defence, security, and immunity; and the climate of suspicion generated around communitarian acts of sharing. (Ross 1991: 76)

The individual body (your personal computer) and the global body were seen both to be threatened by a process of globalisation which were intensified by Information and Communication technologies.[7] Some of the last products of the original cyberpunk group have explicitly confronted the epidemiological discourse which was a trait of the biologisation of technology in the eighties. In *Synners* Pat Cadigan has one of the heroes dying on line from a stroke; the stroke is then passed on to the computer networks, and from the networks to the human beings connected to them at the same time. As an AI wilfully remarks, the contamination between bodies and technology in the age of computer networks poses new dangers for both: 'You people got no shields. You put in the sockets, but you forgot about the watchdogs and the alarm systems and the antivirals and the vaccines. You people put those on every neural net except your own' (Cadigan 1991: 358).

In *The Lawnmower Man*, we find the same paranoia about the dangerous permeability of boundaries in the age of high-tech. In this film, a mentally retarded young man achieves great intellectual powers and world-dominating ambitions by interfacing with VR. When he dies, his deranged personality is dissolved into the computer networks. The film closes with the image of all the telephones in the globe ringing at the same time and the hint

of a world take-over by the now disembodied hero.

Cyberevolutionism can be read as a reversion of the biological metaphor applied to technological systems, a turning away from the paranoid register of the virus scare and a return to a positive emphasis on communication. The attention is shifted from a negative interpretation of connection (bodily and technological) to an emphasis on the pleasures of communication, on the strengths of collectivism.

The language of the self-evolving system became particularly evident in the early nineties, with the first public exposure of the Net: in particular it was embraced by the electronic communities in answer to the 'information superhighway' plans. Different images started to emerge to describe the space of the networks, mainly as a reaction to the industrial imagery implicit in the 'Information Superhighway' project. In 1994, the Republican Speaker of the US Congress, Newt Gingrich, sponsored a 'Magna Carta for the Knowledge Age... based primarily on the thoughts of four "co-authors": Ms. Esther Dyson; Mr. George Gilder; Dr. George Keyworth; and Dr. Alvin Toffler' (Dyson, Gilder, Keyworth and Toffler 1994). Attacking Clinton's project for its industrial age imagination, they claimed that 'the one metaphor that is perhaps least helpful in thinking about cyberspace is -- unhappily -- the one that has gained the most currency: The Information Superhighway. Can you imagine a phrase less descriptive of the nature of cyberspace, or more misleading in thinking about its implications?' (*ibid.*)

> More ecosystem than machine, cyberspace is a bioelectronic environment that is literally universal: It exists everywhere there are telephone wires, coaxial cables, fiber-optic lines or electromagnetic waves. This environment is "inhabited" by knowledge, including incorrect ideas, existing in electronic form. It is connected to the physical environment by portals which allow people to see what's inside, to put knowledge in, to alter it, and to take knowledge out. (*ibid.*)

In his book *Being Digital,* Nicholas Negroponte, popular columnist on *Wired* and director of the Media Lab at MIT, similarly considers the Internet to be a remarkable 'example of something that has evolved with no apparent designer in charge, keeping its shape very much like the formation of a flock of ducks' (Negroponte 1995: 181). The Electronic Frontier Foundation, a libertarian organisation with strong links to the *Whole Earth Review* group, used this quote from telcom pioneer John Gilmore as a rallying cry against the Digital Telephony Bill: 'The Net interprets censorship

as damage and routes around it' (quoted in Rheingold 1993: 7). In the same spirit, posters on alt.cyberpunk started discussing the characteristics of the Net as a spontaneous, self-organising system.

> Cyberspace is too big to handle. They can never 'have control over ALL cyberspace', because the very nature of it is to free up and speed up humans' ability to communicate.
>
> the net isa horizontal structure as you reach the edges, where there is no real hiearchy and no way to control the flow of information except by enacting sweeping laws that each and every service provider must follow, and that too is nearly impossible...
>
> There are somethings that have taken on a life of their own and the Internet is one of them. A government may try to regulate or compromise it, but that will ultimately fail.
>
> Thank god that the net, is not a single entity, solid, it is not an object or a controllable resource.
> (alt.cyberpunk, October 1994)

I argue that this rich organic language used to describe the Internet was fostered particularly by a small but powerful group which in the early nineties started to constitute itself as the voice of the Internet. The increased public presence of this group probably displaced the hackers from the centre of CMC, although undoubtedly it also incorporated some of their language. I am referring to the *Whole Earth Review* (*WER*) group, in particular to those who collected around the *WER'* s bulletin board system, the WELL (Whole Earth 'Lectronic Link). Their influence in shaping the language of Internet culture in its transition to a relative mass-phenomenon is greater than the hard-core cyberpunk hackers I have described in chapter 4. A brief encounter between the two was consummated on the WELL in the late eighties, but it was the WELL group who emerged as the cultural and political voice of CMC.[8]

The Whole Earth Review and the WELL

The WELL has produced some of the most public voices of Internet Culture: Kevin Kelly, executive editor of *Wired* magazine; Howard Rheingold, best-selling author of *The Virtual Community* (Rheingold 1994); Stewart Brand, author of *II Cybernetic Frontiers* and *Inventing the Future at M.I.T.* (Brand 1974; 1987); and Mitch Kapor and John Perry Barlow, the founders of the Electronic Frontier Foundation.

The WELL group formulated the idea of the net as a self-evolving system through the best-sellers produced by its members, the magazines it originated, and a relentless activism across the whole spectrum of CMC. The WELL has also claimed to be the political centre of computer activism, and has always been very hospitable to cyberpunk-inspired subcultures (although the opposite might not be true all the time):[9] it hosts a cyberpunk conference, and a cyberpunk archive—the on-line site where I downloaded some of the material about *Mondo 2000*. Without understanding some of the history of the *WER* and the WELL, it is not possible to understand the popularity of the metaphor of the self-organising system in cyberculture at large.

The *Whole Earth Review*, and its twin *Co-Evolution*, originated from another publishing enterprise, *The Whole Earth Catalog*, a countercultural 'access-to-tools' compendium started in 1968. In Howard Rheingold's words, the *WEC* emerged 'from the Haight-Ashbury counterculture as Stewart Brand's way of providing access to tools and ideas to all the communards who were exploring alternative ways of life in the forests of Mendocino or the high deserts outside Santa Fe' (Rheingold 1993: 39). Brand describes the first Catalogs (1968-1970) as 'made by three hippies in a garage and distributed by a local long-hair whole-saler' (Brand 1980: 5). Sterling's complaints that the counterculture did not care about technology are, then, not entirely true. The *Whole Earth* experience stemmed from a Do It Yourself (DIY) culture, which did not reject technology as a whole, but discriminated between helpful and dangerous technologies.

> We were touted as the voice of Back-to-the-Land and linked commonly with (the to us rather odious) *Mother Earth News*. Back-to-Basics certainly is a major point we make, but so is Onward-and-Upward (space, computers, electronic music) and Outward-in-All-Directions-So-Long-As-It-Doesn't-Hurt-Anybody-Probably. (Brand 1980: 5)

Compared with the two pages of the *Last Catalog* (1974), the 1980 *Catalog* contained 12 pages dedicated to 'computers, home computers, computer networks, computer games, robotics and computer futureness, all operable directly from the household'. (Brand 1980: 4) Brand's interest in technology, and specifically in cybernetics, dated way back. In 1974 the *Whole Earth Epilog* opened with a tribute to Gregory Bateson, author of *Steps to an Ecology of Mind* and *Mind and Nature: A Necessary Unity*— two eccentric transpositions

of cybernetic principles to the architecture of complex systems (Bateson 1972; 1979). Books on cybernetics reviewed in the 1974 *Epilog* also include: Anthony Wilden's *Systems and Structure;* Brand's own *II Cybernetic Frontiers;* and the acts of the Byonics Symposium *Cybernetic Problems in Bionics.* The *WER* group's interest in computers increased in the early eighties, when they launched the *Whole Earth Software Catalog.* In 1985 the WELL, the Whole Earth 'Lectronic Link, was born.

The WELL was started by Steve Brand and Larry Williams as a regional bulletin system catering to the San Francisco area; it was conceived from the beginning as a cultural experiment to bring some of the groups addressed by the *WER* in contact with the technology of CMC. In Rheingold's account, the WELL attracted three groups of people: firstly the *WER* crowd, 'the granola-eating utopians, the solar-power enthusiasts, serious ecologists and the space-station crowd, immortalists, Biospherians, environmentalists, social activists' (Rheingold 1993: 73). Secondly the Deadhead community, that is the fans of the cult band The Grateful Dead.[10] Thirdly and thanks to Kevin Kelly's intervention some hacker groups. By 1985, Kelly already defined the WELL in terms of the environmentalist, countercultural language of the *WER.* In his draft he proposed that the design goals of the WELL be directed towards the creation of a 'an open-ended universe... self-governing... a self-designing experiment' (cited in Rheingold 1993: 43).

The synthesis of cybernetics and ecology was developed by the WELL group as a satisfying model for a technology which they were trusting with the radical future of the world. It is possible to understand how simulation, the most common concept used to describe the computer and the computer networks, was not sufficient from their political position.[11] The language of simulation, which defined the relationship between technology and the real in postmodern theory, was maybe sufficient for the hacker and hard-core technical communities, but did not offer any of the utopian green politics we would expect from the WELL.[12]

In particular, the problem with simulation was that, in spite of its potential for individual empowerment, it effectively erased the category of the natural altogether. To respect some of the deepest ideological needs of these Californian groups, the gap between reality and simulation had to be filled more positively. If posthumanism willingly accepted the loss of nature as the price to pay for superhuman empowerment, cyberevolutionism offers the other solution: instead of giving up nature, it wants to hybridise it with technology. Technology is made more natural and therefore acceptable.

Cyberevolutionism is the West Coast's answer to Lewis Mumford's call for a new technological renaissance based on the incorporation of natural attributes in technological design (Mumford 1934).

The self-governing system also seems more in tune with a wider holism represented by the ecological interpretation of cybernetics in the work of George Bateson, one of the inspirations behind the *WER* (Bateson 1972, 1979). The technology of the computer network, which also promised a democratisation of politics and widespread access to information, was easier to interpret as the technology of the green, clean, egalitarian world than VR. Cyberevolutionism is the ideological answer to this need for a green politics of technology, but unfortunately a deeply problematic one. As I show later, cyberevolutionism ends up being a powerful meta-narrative which explains away the complexity of nature, society, culture and technology itself through a single sweeping generalisation. An example of the reductionism inherent in this approach is the recent work of British cultural studies exponent Sadie Plant, who claims that culture and technology are interconnected, self-organising systems (Plant 1996).

Once imported into Internet culture at large, the idea of the Net as a self-organising system rapidly spread as a viable language for describing both the experience and the nature of CMC. The scientifically-minded pioneers of electronic communication used evolutionism to explain the collective nature of the medium, its reliance on user's input and amateurish software programming, and the unpredictability of decentralisation. When the Clipper Chip scandal exploded, the language of the self-organising system lent itself marvellously to be used as a defence against attempts to external censorship.

Cyberevolutionism was a wonderfully fitting metaphor for the feeling and the history of the Net. Historically CMC was a technology developed not just by a single inventor but by a collective. Linda Harasim has stressed how '[t]he history of computer networking has been characterized by user input and definition... User input has transformed cyberspace into a social space characterised by open, lateral communication linkages' (Harasim 1993c: 33). As a result of this history, CMC tends to come across as a decentralised system, without a clear source of decision making. Since the cybercultural language of agency operates mainly in terms of individuals and personalities, the behaviour of a complex system has to be formulated in different terms. Lacking a language of agency that is not rooted in the individual, these users have chosen the opposite route and embraced the

idea of the Net as a self-evolving, decentralised, independent system, just like life as a whole. Being a part of this system does not mean giving up one's individuality. Unlike the industrial organisation, the self-evolving system is structurally dependent on the autonomy and the creativity of the individual, whom in exchange it protects by operating through its own superior and spontaneous logic.[13]

It was not just the green technophilia that cyberevolutionism imported into Internet culture, but also a language which imagined power only in terms of external, oppressive mega-entities. Anything that interferes with the spontaneous development of the system is bad. This is even more alarming considering that the language of cyberevolutionism as expressed by its most articulate representatives is fraught with the problem of redefining control through self-organisation. In order to explain this recurrence of control in cyberevolutionism, I am going to concentrate on Kevin Kelly's book *Out of Control*. Kelly was one of the ex-editors of the *WER* and is now executive editor of *Wired* magazine. By looking at Kelly's book I hope to define cyberevolutionism and its understanding of control more clearly.

Cyberevolutionism in Kevin Kelly's *Out of Control*.

Kevin Kelly's strategic relevance for Internet culture is undoubtedly due to his personal history as an editor in two different publications: in the late eighties and early nineties he was one of the editors and contributors to the *Whole Earth Review*, and, since 1993, he has been the executive director of *Wired* , the most internationally popular of the new Internet magazines.

Wired was started in 1993 as the first mass-circulation magazine to deal exclusively with computer and Internet culture. Its original and highly professional graphic design, and its willingness to cover a wide range of cultural and political issues in relation to high-tech have given the magazine a high-profile in the news-stands. As compared to *Mondo, Wired* is definitely the magazine of computer culture from the perspective of the professional freelancer or the corporate executive. It features regular columns by Nicholas Negroponte, the director of the Media Lab at MIT, it is heavily involved in the anti-censorship movement, and it combines a highly aggressive marketing of high-tech products with the ambition to be the magazine of ideas for computer culture in the '90s.

The centrality of *Wired* magazine to computer culture at large is not

strictly comparable to *Mondo'* s relatively low-budget countercultural appeal. *Wired* has significantly displaced *Mondo 2000* from the symbolic centre of the cyberpress. In 1994, the Cyberpunk FAQ (Frequently Asked Question) file, a document compiled voluntarily and regularly posted on alt.cyberpunk for the benefit of new members, stated that '*Mondo'* s reputation has been declining among cyberpunk fans lately, as the articles have become less and less technically-oriented' (Schneider 1994). In the same document *Wired* is described as a 'magazine that is very popular right now. It's aimed more at technically-oriented professionals with disposable income, but many cyberpunk fans like the articles on network- and future-related topics'. In relation to my specific focus in this chapter, it is interesting to notice that the two magazines also seem to symbolise two different interpretations of the breakdown of the nature/technology divide: while *Mondo* concentrated predominantly on the technologisation of the body, *Wired* seems to have taken the opposite route and concentrated on the biologisation of technology.

These are some of the articles published between 1994 and 1995 on the subject:

Mike Godwin 'Meme, Counter-meme', *Wired* 2.10, October 1994, p 85 on 'memes' as ideas as genes or viruses;
Julian Dibbel 'Viruses Are Good for You', *Wired* 3.02, February 1995, on evolution and computer viruses;
Greg Blonder 'Faded Genes', *Wired* 3.03, March 1995, on the obsolescence of humanity;
Michael Schrage 'Evolutionary Evolutionist', *Wired* 3.07, July 1995, on Richard Dawkins;
Thomas A. Bass 'Gene Genie', *Wired* 3.08, August 1995, on DNA as computer in the work of Leonard Adleman.

To these articles we might add the publication of *Out of Control* by editor Kevin Kelly, a full endorsement of the biologisation of technology. As the subtitle indicates, the book is about 'the new biology of Machines, Social Systems, and the Economic World'. In the book Kelly consistently upholds its central argument which is summarised here:

> The overlap of the mechanical and the lifelike increases year by year. The meanings of 'mechanical' and 'life' are both stretching until all complicated things can be perceived as machines, and all self-sustaining machines can be perceived as alive. Yet beyond semantics, two concrete trends are happening: (1) Human-made things are behaving more life-like, and (2) Life is becoming more

> engineered. *The apparent veil between the organic and the manufactured has crumpled to reveal that the two really are, and have always been, of one being*. What should we call that common soul between the organic communities we know as organisms and ecologies, and their manufactured counterparts of robots, corporations, economies, and computer circuits? I call those examples, both made and born, 'vivisystems' for the lifelikeness each kind of systems hold. (Kelly 1994: 3) [emphasis added]

This argument is consistently pursued through a variety of locales, disciplines, and objects. The whole book is a metaphysical search for the same truth across a series of different fields. Among the examples mentioned by Kelly to support his 'new biology' thesis we find insect colonies; robots; wildflower prairies; corporations; coral reefs; artificial and self-contained biological environments (Biospheres); industrial ecosystems; network economics; computer networks; money; artificial life and computer animation.

In all these locales, Kelly finds the same truth. Successful artificial and natural systems work according to the same principles: decentralisation, distribution, equality, and interconnection:

> There are four distinct facets of distributed being that supply vivisystems their character:
> * The absence of imposed centralized control
> * The autonomous nature of subunits
> * The high connectivity among the subunits
> * The webby nonlinear causality of peers influencing peers. (Kelly 1994: 22)

Successful complex systems are composed of many members, all of whom are semi-autonomous: 'each member reacts individually according to internal rules and the state of its local environment. This is opposed to obeying order from a centre, or reacting in lock step to the overall environment' (*ibid.*). In the successful system there is no central control and no hierarchy, but only the spontaneous coevolution of peers to their mutual benefit.

Nature, technology, and society are therefore seamlessly woven together to indicate a new organisational model of interconnection which is universally applicable. As I demonstrated in the previous chapter, there is a definite tendency in these high-tech circles to homogenise all cultural and natural phenomena within a single scientific paradigm. Once again, as we will see later, this paradigm is highly specific in its scientific codification of a

particular and global economic reality.

Out of Control makes intensely irritating reading for anybody engaged or interested in sociological and cultural questions. Kelly's neo-biological age takes place in a universe effectively emptied of the social. It also falls prey to the worst technocratic temptation—coupled with a shameless endorsement of corporate capitalism—by suggesting that science and technology will take care of the evil of the world. 'Evil'. of course, is everything the resembles the hated industrial organisation.

From a sociological and cultural point of view, Kelly's book runs against any theory of power and identity formulated in the last hundred years. I have, therefore, not judged it worthwhile to use the theoretical weight of classic sociology or recent cultural studies to bear against Kelly's argument. I will, however, offer a reading of an important theme in Kelly's book, one with a complex history and larger implications: his treatment of the problem of 'control' in a neo-biological age. I argue that the book redefines control as a hidden mechanism, a structural necessity which pretends to exceed the centralised command of cybernetics but in fact confirms and reinforces it. This new definition of control is borrowed from cybernetics, is reelaborated in artificial life, and re-emerges naturalised by science and technology as the new ideology of the information corporations. Control is redefined as a design problem in order to generate flexible, committed, creative, and responsible workers.

Redefining control as design

Recently in the UK, the 'vivisystemic' approach heralded by Kelly has been adopted by Sadie Plant as a new philosophical and methodological perspective. Plant adapts Kelly's model, which she calls 'connectionism', to the study of culture. By learning from writers like Kelly, cultural studies might learn to look at 'cities, cultures, and subcultures of every scale and variety as self-organizing systems with their own circuits, exchanges, contagions, flows, discontinuities, lines of communication and bottom up processes of development' (Plant 1996: 214).

There is nothing wrong in trying out new metaphors in our understanding of culture, and some of the connotations of cyberevolutionism powerfully express the complexity of decentralised cultural phenomena. 'Cyberevolutionism' or 'connectionism', as Plant prefers, is popular with many Internet communities exactly because as a

metaphor it fits the technology of CMC and also expresses the feeling of empowerment netusers experience through connection.

In the interpretation provided by *Wired*, however, cyberevolutionism is not so much a set of metaphors as a fully-fledged ideological construction that relies on scientific and technological developments to gain the authority of truth. Before cultural studies rushes into connectionism, then, it might be worth looking deeper into it to understand what kind of advantages and limits it might present as a general analytic framework.

One of the major problems of Kelly's cyberevolutionism is that it formulates a new logic of control, one that masquerades as a *liberation* from power. Kelly ostensibly sees the vivisystem as the expression of a *loss* of control: '[t]he world of the made will soon be like the world of the born: autonomous, adaptable, and creative but, consequently, out of control' (Kelly 1994: 4). Vivisystems are 'uncontrollable... there disappears human control' (*ibid.*: 23); 'in this Era, openness wins, central control is lost' (90). At the same time, Kelly repeatedly affirms the need to redefine control in terms more suitable to the current condition. In tune with a larger cybercultural rhetoric, Kelly does not reject all forms of control, but only the kind of control endorsed by the industrial factory: the centralised operation of power distributed in hierarchies and rigid chains of command. In his words, one of the most important preoccupations of the current time is how to trade more control for more power (Kelly 1994: 310). Cyberevolutionism re-organises the concept of control in the Information Age. This 'control revolution' can be framed in the technological and economic history of the last two centuries.

In *The Control Revolution*, James Beniger argues that the social and economic changes that came with the Industrial Revolution can also be read in terms of a revolution in social control. The most general definition of control, Beniger argues, is 'purposive influence toward a predetermined goal... *control* encompasses the entire range from absolute control to the weakest and most probabilistic form, that is, any purposive influence on behavior, *however slight*' (*ibid.* :7-8).

Beniger cites Emile Durkheim in his analysis of the transition from segmented to organised markets: the first are defined by a close relation between the producers and the consumer, where the demand and the offer are immediately visible to the local merchant; the second implies the loss of this immediate, visual control over the needs of the market as a result of what Beniger calls 'the growing "systemness" of society' (Beniger 1986: 11).

According to Beniger, the transition observed by Durkheim is 'nothing less than a crisis of control at the most aggregate level of a national system.... Resolution of the crisis demanded new means of communication, as Durkheim perceived, to control an economy shifting from segmented local markets to higher levels of organisation' (*ibid.*).

Beniger also refers to Max Weber as the first scholar who looked at the problem of redefining control on a macro-level in his study of bureaucracy. Bureaucracy is the industrial economy's initial response to the necessity to coordinate and control vast expanses of land, people and capital. Bureaucracy is the most important control technology of Weber's age:

> Before this time [the Industrial Revolution] control of government and markets had depended on personal relationships and face-to-face interactions; now control came to be re-established by means of bureaucratic organization, the new infrastructures of transportation and telecommunications, and system-wide communication via the mass-media. (Beniger 1986: 7)

On the basis of Beniger's argument, I maintain that cyberevolutionism is underpinned by a series of scientific and economic discourses whose main concern is not so much the loss of control mentioned by Kelly, but a redefinition of control. When Kelly and *Wired* magazine talk about control, they are really talking about the centralised, top-down organisation which is a legacy of the bureaucratic system described by Weber. Control is what comes in the old shape of the centralised, hierarchical bureaucracy. With such a limited definition of control, it is no wonder that so many things can be perceived as out of control.

Kelly's objections to centralised control are masqueraded in the language of radicalism, but in strict scientific and technological terms they are perfectly in keeping with developments in the life sciences which occurred in the last two decades. My use of the life sciences to talk about paradigms of control is provoked by Kelly's persistent use of biological arguments. Donna Haraway has described this shift in the life sciences between the 1930s and the 1970s as a passage from the 'age of the organism' to the 'age of the system'.

In *Simians, Cyborgs, and Women* she describes how the whole rhetoric of control in the pre-cybernetic age or 'age of the organism' was based on the image of the body as a system of collaborating organs and functions under the coordination of the brain. Pre-World War II biology was structured by two organizing ideas rooted in organismic physiology: domination and

cooperation 'closely connected on an organic level as forms of integration (Haraway 1991: 52). This old organismic biology reflected the needs of the well managed factory, organized on the model of the family. The 'harmonious' division of labour between the various organs in the body—and between man and wife in the family—provided the model for the organisation of the factory. The role of the brain was performed by the managers, and the natural order of things was respected if the workers accepted their status as 'hands', part of the same organism and with the same interests, but with a different role.

This highly centralist, hierarchical system is probably the model of control objected to by Kelly and the computer libertarians collected around *Wired*. Unsurprisingly the rejection of this model also occurs in the literature on corporate reengineering. Hammer and Champy in *Reengineering the Corporation* point out how the old model of organisation was based on Adam Smith's industrial paradigm: 'the division of labor, economy of scale, hierarchical control, and all the other appurtenances of an early-stage developing economy' (Hammer and Champy 1993: 49). Similarly, Haraway described how after World War II the life sciences changed their language from the hierarchical organism to the complex, flexible system:

> ...changed the strategy of control from the organism to the system, from eugenics to population management, from personnel management to organization structures.... Complex, stable configurations, stable evolutionary strategies, were essential to the realization of profit in immensely complex economic and political circumstances....Knowledge around range of variation and interaction effects among classes of variables replaced concern for individual states. The computer, a communications machine, both effected and symbolized new strategies of control. (Haraway 1991: 58)

These new strategies built the foundations of 'an engineering science of automated technological devices in which the model of scientific intervention is technical and systematic' (Haraway 1991: 44). This new type of control is redefined in pure cybernetic terms as the *programming* of a system so that it will perform the function it is meant to perform without direct and constant intervention. In the scientific and economic subtext underlying cyberevolutionism, there is also an added dimension which seems to differentiate it from older forms of cybernetic control. The purpose of this new form of control is not just to make sure that the system will run

smoothly, but that it will generate newness: as Kelly describes, in the work of computational evolutionist Tom Ray, evolution ' "is not just about optimization. We know that evolution can go beyond optimization and create new things to optimize." When a system can create new things to optimize we have a perpetual novelty tool and open-ended evolution' (Kelly 1994: 341).

Unlike the early cybernetic mechanisation of the factory, where the emphasis was on a uniform, reliable product, these narratives set the rules of the cybernetic system so as to create new and different products. The cybernetic worker in the Fordist factory was expected to secure the smooth production of the same commodity; the postindustrial worker in the Information Industry is expected to produce new and always different products, although always in the limits set by the system: 'If the old model was simple tasks for simple people, the new one is complex jobs for smart people' (Champy and Hammer 1993: 70). Control is exercised through the production imperatives inbuilt in the self-organising system, and productivity is ensured by the relative freedom of the system to organise and develop.

> Executives have overall responsibility for reengineered process performance without having direct control over the people performing them. These people are working more or less autonomously with the guidance of their coaches. Executives fulfil their responsibilities by *ensuring that processes are designed in such a way that workers can do the job required and are motivated by the company's management systems—the performance measurement and compensation systems—to do it.* (Champy and Hammer 1993: 79) [emphasis added]

This language of design, performance, and management also dominates the new discipline of Artificial Life (Alife), which Kelly regards as proof that self-organised systems are possible beyond the organic, and that they are indeed productive. As Richard Barbrook put it, '[t]he creation of 'Artificial Life' - the God-Man - will be the final proof of the superiority of the American way' (Barbrook 1995b). This productivity is fostered by giving up control over every single step of the system and letting it organise itself.

Alife, the stronger form of computational evolution, 'attempts to simulate all the essential traits of life - not just evolution - using silicon (and other substrates) instead of carbon. A-life researchers believe life is an information process that can be exported from one matrix to another' (Schrage 1994:

123).[14] We have already seen in chapter 6 how this translation of life in the language of computer science was enacted by way of the genetic revolution and how this was translated by Richard Dawkins in evolutionary terms.[15]

Artificial life is divided into three research fronts: '*Wetware* is the attempt to create artificial biological life through such techniques as building components of unicellular organisms in test-tubes. *Hardware* is the construction of robots and other embodied life-forms. *Software* is the creation of computer programs instantiating emergent or evolutionary processes' (Hayles 1996: 147). Here I will focus mainly on the third front, which is also more central to computer culture.

The idea at the base of Alife is the possibility of developing self-replicating and self-mutating electronic organisms starting from simple programs. These programs are encoded with simple instructions, usually to replicate by mutating one of their characteristics: the result is that by sheer repetition and mutation simple rules and simple programs evolve into increasingly complex digital environments.

> ... the idea is to begin with a few simple local rules, then continue through structures that are highly recursive, and allow complexity to emerge spontaneously. Emergence implies that properties or programs appear on their own, often developing in ways not anticipated by the person who created the simulation. Structures that lead to emergence typically involve complex feedback loops in which the output of a system is repeatedly fed back in as input. As the recursive looping continues, small deviations can quickly become magnified, leading to the complex interactions and unpredictable evolutions associated with emergence. (Hayles 1996: 147)

The whole rhetoric of artificial life, as reflected by Kevin Kelly's work, is about giving up control in order to achieve better products. The giving up of control is a necessary condition not just for increased productivity, but for better products. Alife is not a speculative discipline, but is geared towards a refinement of production. Alife is used to evolve bug-free programs, intelligent software agents and, in its biogenetic version, even new solutions to problems such as AIDS and cancer (Kelly 1994: 287). One Alife researcher, for example, tells how some of his creatures 'surpassed the programming skills of software engineers.... What humans can't engineer, evolution can' (Kelly 1994: 287-288).[16]

Alife is the strongest incarnation of the evolutionary principle Kelly finds at work across social, technological, and biological systems. In this sense it

represents both a justification for his theory of the self-organised system and a model for it. Alife shows that artificial systems can evolve spontaneously, without control, and if logarithms can do it, the computer networks can, the free market can, the corporation can. The holistic model which culminates in the Alife project is an important foundation of the ideology of the Net as an independent, self-evolving system and is at the basis of libertarian objections to its regulation. In this sense, cyberevolutionism is a reassuring call for deregulation as a better strategy for more power:

> The trouble of evolution is not entirely out of our control: surrendering some control is simply a tradeoff we make when we employ it. The things we are proud of in engineering—precision, predictability, exactness, and correctness—are diluted when evolution is introduced.
>
> These have to be diluted because survival in a world of accidents, unforeseen circumstances, shifting environments—in short, the real world—demands a fuzzier, looser, more adaptable, less precise stance. Life is not controlled. Vivisystems are not predictable...
>
> That's the evolutionary deal. We trade power for control...
>
> Give up control, and we'll artificially evolve new worlds and undreamed-of richness. Let go, and it will blossom. (Kelly 1994: 310-311)

At least in Kelly's case, it is very clear that a rereading of cybernetics through some of its recent applications such as Artificial Life aims to produce what Shoshana Zuboff, in a rather optimistic tone I do not share, calls 'new landscapes of authority' (Zuboff 1988: 392).The rhetoric of sixties decentralisation here facilitates a new ideology for the restructured economy of the nineties.

There are important convergences, for example, between this cyberevolutionary rhetoric and recent organisational theories of the 'informated corporation'. According to Sadie Plant, economics and biology have been the first disciplines to formulate and understand connectionism (Plant 1996: 209). Economy plays a central role in Kelly's understanding of the ecosystem. For Richard Barbrook ' 'Out of Control' [sic] argues that American-style 'free market' capitalism is not a peculiar social creation, but an ahistorical natural eco-system. The 'invisible hand' of the marketplace and the blind forces of Darwinian evolution are one and the same thing'. (Barbrook 1995b). The convergence of technology and economy by way of recent evolutionary theory is a trademark of much cybercultural rhetoric. Mark Dery has also underlined the explicit parallelism between economy and science drawn by recent popular science writing:

> Imagine a factory [that] can self-reproduce—that's a form of life' contends Steven Levy, author of *Artificial Life: The Quest for a New Creation*. In *Bioeconomics: The Inevitability of Capitalism*, business consultant Michael Rothschild argues that 'what we call capitalism (or free-market economics) is not an ism at all but a naturally occurring phenomenon' (and therefore presumably beyond reproach). Likewise Eric Drexler maintains, in *Energies of Creation* [sic]: *The Coming Era of Nanotechnology*, that '[e]cology and 'economy' share more than linguistic roots': corporations, he argues, are 'evolved artificial systems' born of the marketplace's 'Darwinian' competition. (Dery 1994: 87-88)

Cyberevolutionism then is a singularly powerful synthesis of ecology, biology, cybernetics, and economy. I cannot make a case here about which one of these disciplines made the original contribution, but I can certainly argue about the existence of an open consistency between cyberevolutionism and recent management literature. Shoshana Zuboff uses a similar language, which includes biological metaphors, in her discussions of how work should be reorganised in the informated company. For example she equates giving up control with giving up 'imperative control'. This traditional system, which is the main foil of current attacks on centralisation, 'was designed to maximize the relationship between command and obedience [and] depended upon restricted hierarchical access to knowledge' (Zuboff 1988: 394). The new informated corporation needs to overcome the traditional hierarchical, centralised organisation and rediscover a self-managed, spontaneous, learning work environment. The language of the informated company uncannily duplicates that of artificial life:

> The empowerment, commitment, and involvement of a wide range of organizational members in self-managing activities means that organisational structures are likely to be both emergent and flexible, changing as members continually learn more about how to organize themselves for learning about their business. (Zuboff 1988: 395)

In an article published in August 1995 in *Wired*, another member of the original *Whole Earth Review* group, Art Kleiner, makes the connection between cyberevolutionism and recent restructuring of major corporations explicit. In an article on the restructuring of NYNEX, the phone company for the New York area, he claims that:

> ...as corporations like NYNEX suss out their own arcane and

> convoluted systems, they invent a new form of governance. The industrial-era model - giving order, in military fashion, through a hierarchical chain of command - doesn't work anymore. It's too slow for a rapidly changing wired age. And it may be responsible for the deadening lack of quality in the world today.
>
> *Yet if we want the infrastructure of daily life to evolve into an adaptive and warmhearted system, large scale corporations have to participate in that evolution* .... (Kleiner 1995: 125) [emphasis added]

The article is on the work of Michael Hammer, an interesting figure in the interbreeding of computer sciences and management consulting. Co-author with James Champy of *Reengineering the Corporation* (1993), Hammer was a mathematics student and computer-science professor at MIT during the 60s and the 70s and a member of the famous hacker culture described by Steven Levy in his bestseller *Hackers*. In Kleiner's explanation, Hammer started developing his ideas about re-engineering corporations as a natural extension of technology-management consultancy. Now Hammer is one of the most successful management consultants in the US, called in to restructure companies as big as NYNEX. Similar ideas have also resulted in the restructuring of IBM.

It is no wonder then that the language of cyberevolutionism, Alife, and corporate re-engineering would show deep similarities. In Alife, for example, there is a constant tension between the emphasis on self-evolving systems and the necessity to control and supervise their progress. The programmer has to be very careful about laying out the rules at the beginning and has to intervene constantly in order to make sure that only the 'better' specimen survives. Better is defined according to the ergonomic principles of the need of the breeder: better is increased performance. The 'breeders' of artificial systems described by Kelly are careful calculators both at the planning stage when they have to make rules enabling a world to evolve 'spontaneously', and when they have to intervene to shut off undesirable results. In his Alife experiment, BioMorph Land, Richard Dawkins built an 'inherent grammar into his universe which prevented any old nonsense from appearing' after having selected 'the most pleasing forms (his choice)' (Kelly 1994: 267).

Similarly, as Kleiner puts it, '[c]orporate leaders tend to like Hammer's approach because they can get rid of the cumbersome, bureaucratic chain of command without losing control. *Instead of giving orders they can "program" the corporation'* [emphasis added] (Kleiner 1995: 168). The corporate re-engineer acts like the breeders of Alife first by designing the system, and second by rewarding his preferred forms of behavior.

Rudy Rucker is even more clear about the special kind of constraints imposed on the evolving system by the will of the programmer:

> Once the reproductive process is in full swing, evolution can be brought about by instituting the survival of the fittest. The programmer defines some 'fitness function' that measures how well the critters are doing, and periodically removes the low-scoring critters and replace them by the 'children' of high scoring critters. All kinds of fitness functions are possible.... Alternately, one can hover over the world like a jealous God and use a mouse to reward and punish individual critters according to wholly subjective criteria. (Rucker 1992: 30-32)

Hammer similarly emphasises the need to reward and punish the workers on the basis of performance: 'There won't be any sinecures, he says.. Jobs will be like franchises; indeed, people might pay companies for real good jobs, and make back the money in fees, as doormen do now at fancy New York Hotels. "You can call it cold", says Hammer, "you can call it relentless. You can call it real life"' (Kleiner 1995: 169).

In spite of the rhetoric cyberevolutionism, like biological engineering, is 'directed evolution', which attempts to exploit the capacity of a system to create complexity for purposes dictated by the researcher/breeder/idle God. The scientist and director of the experiment do not relinquish control; on the contrary, like the organisational manager, they are looking for a flexible way to exploit and direct to their own purposes the very unpredictability of complex systems.

The whole rhetoric of cyberevolutionism is about getting rid of control, and at the same time reinforcing control, both at the level of design and at the level of monitoring. Control is redefined as designing the rules that allow the vivisystems to work by removing unwanted variations. Self-organising systems are systems which work better and without direct supervision and their purpose is to create a new kind of creative productivity. As Haraway commented about sociobiology, Alife too might be based on 'a patriarchal analysis of nature, which requires domination, but is very innovative about its form. The limits of engineering redesign...are set by the capitalist dynamic of private appropriation of value and the consequent need for a precise teleology of domination'(Haraway 1991: 67).

Summary

This chapter has clarified the problems implicit in netusers' reliance on a

rhetoric of pure and spontaneous self-regulation. Initially, I started working on cyberevolutionism only because it was an important ideological reference for the burgeoning Internet culture. By looking at *Wired* magazine I then came to realise that it is also becoming a powerful ideology in its own right, whose appeal is strong enough to lure some exponents of British cultural studies.

In the last two chapters I have examined the specific functions performed by posthumanist and cyberevolutionist stories; in both cases I have found a strong connection with the experience engendered by a new kind of work environment, and its need for a new kind of worker. Cyberevolutionism and posthumanism try to represent these developments in positive terms and choose to ignore their more negative implications.

In both cases I have tried to understand what these limitations might mean for those social subjects who genuinely believe in their radical potential. The contradictions of posthumanism, its readiness to be appropriated by a new corporate culture, have been recently acknowledged by R. U. Sirius. In an interview with John Lebkoswki, he complains that

> It's particularly sad and poignant for me to witness how comfortably the subcultural contempt for the normal, the hunger for novelty and change, and the basic anarchistic temperament that was at the core of *Mondo 2000* fits the hip, smug, boundary-breaking, fast-moving, no-time-for-social-niceties world of your wired mega-corporate info/comm/media players. You can find our dirty fingerprints, our rhetoric, all over their advertising style. The joke's on me. (Sirius 1996)

At the moment, cyberevolutionism is still an undisputed ideological narrative for cyberculture and as such it constitutes a troubling limitation for cybercultural politics. To claim that the Internet is a self-regulating system does not do much to shape political strategies that acknowledge the different distribution of technological skills and access in a social space. The emphasis on individual autonomy inside a self-evolving system cannot solve the problem of *structural differences*, as in the case of gender. Many women have found it very hard, or at least not very easy, to fit into the 'free' ecosystem of the computer networks. I am concerned with gender on the disembodied Internet is paradoxically the most visible difference of all. The Internet is a place of 'gender trouble' and in the next chapter I analyse how feminists have interpreted the nature of this trouble.

[1] There are different versions of cyberevolutionism. The version espoused by Kevin Kelly and many netusers is the most popular of them all. Michael Benedikt gives a different explanation of the evolution of cyberspace. He sees cyberspace as an Hegelian super-synthesis of the history of the universe and as a triumph of consciousness: '...with cyberspace a whole new space is opened up by the very complexity of life on earth: a new niche for a realm that lies between the two worlds. *Cyberspace becomes another venue for consciousness itself. And this emergence, proliferation, and complexification of consciousness must surely be this universe's project'* (Benedikt 1991c: 124) [emphasis added].

[2] Darwinism was never just concerned with 'scarcity' or the 'survival of the fittest'. Darwin was also influenced by a more Romantic view of nature. This version emphasised how 'nature is imperfect and unfinished, creatively evolving as a realm where species can create new roles and niches for themselves at the expense of no other competing species. According to this view the key to natural selection lies in the creation of complexity, variation and divergence in a world where co-dependence and diversity, rather than warfare and limitation, are the code' (Ross 1994: 259). This aspect of evolutionism is clearly reflected in Michael Hauben's view of the Net: '[p]opulation growth now does not mean limited resources any more - rather that very growth of population now means an improvement of resources.... The old model looks down on population growth and people as a strain on the environment rather than the increase of intellectual contribution these individuals can make. However, access to the Net needs to be universal for the Net to fully utilize the contribution each person can represent. Once access is limited - the Net and those on the Net lose the possible advantages the Net can offer' (Hauben 1994).

[3] I am using the term 'biologisation' rather than 'naturalisation' in order to avoid some of the implications of the second term. The term 'naturalisation' emphasises the fact that social and cultural phenomena have been defined as natural phenomena. Although the 'biologisation' of technology is certainly a naturalisation, it has a different emphasis. 'Biologisation' stresses the fact that scientifically constructed traits of human and animal biology are applied to technical systems. In this chapter I would like to stress more the specificity of cyberevolutionism rather than the fact that it simply naturalises social phenomena.

[4] Gareth Branwyn, ex-editor of cybercultural magazine bOING bOING, has written about the chatrooms of a popular service provider: '... one of the most popular features is the public chat areas, called "rooms." Users are able to view a list of rooms that have been created by other users. The conversational theme of each room, embodied in its name, runs the gamut of possible interests...' (Branwyn 1993: 783).

[5] LambdaMOO, for example, the popular MOO run from the Xerox Corporation's Palo Alto Research Center, is modelled on a Californian mansion. This modelling is accomplished by keeping the descriptions of the 'rooms' in a single database: 'When users dial into LambdaMOO, for instance, the program immediately presents them with a brief textual description of one of the rooms of the database's fictional mansion (the coat closet, say). If the user wants to leave this room, she can enter a command to

move in a particular direction and the database will replace the original description with a new one corresponding to the room located in the direction she chose. When the new description scrolls across the user's screen it lists not only the fixed features of the room but all its contents at that moment--including things (tools, toys, weapons) and other users (each represented as a ``character'' over which he or she has sole control)'. (Dibbel 1993: 38)

[6] David Tomas has described Gibson's cyberspace as a Euclidean space, in Michel Serres' sense of the term: 'Gibsonian cyberspace can be distinguished according to three dominant, "Euclidean" characteristics. First, it is conceived as a common transnational work environment. Second, it is a transportation space designed to accomplish work related tasks... Third, it redefines and restructures *what it means to be human* in technoeconomic terms through a databased collectivization of the human sensorium....' (Tomas 1993: 36).

[7] As Ross has suggested, this early biologisation of technology bears the evident traces of the paranoid rhetoric deployed by Defense Department during the Cold War (Ross 1991). In her work on the recent history of biology, Donna Haraway has also noticed that the scientific metaphors for the immune system are increasingly becoming militarised (Haraway 1991).

[8] The WELL was essential for the beginning of the Electronic Frontier Foundation (EFF). The EFF is the major lobby for CMC rights and has its own offices in Washington D.C. John Perry Barlow and Mitch Kapor, who founded the EFF, met in a WELL conference on hackers and became later involved in defending the rights of two young hackers they met on-line—Phiber Optic and Acid Phreak. Acid Phreak and Phiber Optic had been charged as a result of a police operation against hackers—the Operation Sundevil (Sterling 1993). Operation Sundevil was the first event behind the formation of the EFF. The second event 'occurred when Barlow and another WELL user, Mitch Kapor (a founder of Lotus Development Corp. and On Technology) compared notes about their respective visits by FBI agents. The agents were investigating the unauthorized copying and distribution of Apple's proprietary source code for the ROMs in Apple's Macintosh computer, and both Kapor and Barlow were startled by how little the FBI seemed to know about the nature of the alleged crimes they were investigating, and Barlow later published an account of the visit on the WELL (and print-published as "Crime and Puzzlement" in WER #68)'. For a more detailed account of the history of the EFF see Barlow (1990).

[9] J.C. Herz cites a user of the cyberpunk BBS Mindvox who claimed that '[t]he Well in particular is not liked by most cyberpunks... It's *fake* and the people who hang out on it are yuppie wannabes. Beside maybe 100 cool people, its [sic] populated by poseurs' (Herz 1994: 215).

[10] The Grateful Dead, who started from the same milieu as the *Whole Earth Catalog*, have originated a whole subculture of travelling fans—the so called Deadheads. Rheingold feels that the Deadheads immediately liked the WELL because they have a strong feeling of community which they can usually exercise only during concerts. In the mid-eighties 'several technology-savvy Deadheads started a Grateful Dead conference on the WELL. GD, as it came to be known, was so phenomenally successful that for the first several years, Deadheads were by far the single largest income for the enterprise... Those

Deadheads who did "go over the wall" ended up having strong influence on the WELL at large' (Rheingold 1994: 49).

[11] In spite of the involvement of the military Research & Development in VR, Virtual Reality was initially very welcomed by exponents of the WELL. Rheingold and much of the Bay counterculture invested a good deal of energies in VR, which they considered a technology which could help individuals to build their own reality (Rheingold 1991).

[12] In 1993 Oliver Stone produced the first VR dystopia in his TV serial *Wild Palms*. In *Wild Palms*, Virtual Reality is introduced by an evil group who conspires to dominate the world.

[13] The ground for this biologisation of technology had already been prepared by the 'virus' metaphor and by McLuhan's understanding of electronic communication as the nervous system of the World (Elmer-DeWitt 1988; McLuhan 1964) This image of the electronic network as the global matrix of minds is another source which probably helped net-users to see the net as an ecosystem (Quarterman 1993).

[14] In this chapter I treat the American version of Alife. Research into Alife is mainly conducted in the US, especially at the Santa Fe Institute in California (Langton 1992; Levy 1992; Hayles 1996). In the UK, Alife has been mainly explored by artists. The British rhetoric of Alife is therefore different. Jane Prophet's 'TechnoSphere', for example, is an Alife project based at the University of Westminster in London. Jane Prophet's background is in Fine Art and Media Practice, but the TechnoSphere project as a whole is run by a team of people with various kinds of technical training. Prophet is very clear (at least in principle) about not making biological claims for her 'techno-creatures': '... there is a large cultural dis-ease with computer simulations of nature which is subtle and persistent. Rather than a dilemma, it seems to us that TechnoSphere could be seen as having a kind of gestalt effect: of being simultaneously metaphoric or allegorical, and mimetic in that as you look at it... the mimesis is interrupted by a flat facet or an improbable life-forms and we are reminded of the digital source of the image' (Prophet 1995).

[15] Richard Dawkins himself, in an example of his famous 'multidisciplinary, interdisciplinary fluency', proved his theories by building his own Alife project. He has applied his concept of the selfish gene to a computational simulation of organic worlds, Biomorph Land. Biomorph Land, started in 1985, 'is the space of possible biological shapes constructed with short straight lines and branches. It was the first computer-generated library of possible forms that could be searched by breeding' (Kelly 1994: 266). Dawkins described the experience in detail in his third book, *The Blind Watchmaker*, published in 1987.

[16] The popular versions of these 'managed' evolutionary systems are the SimCity/SimEarth CD-Rom games, based on the systemic 'Gaia' paradigm of James Lovelock (Haraway 1995). In these games, which have a cult following among computer aficionados, you are the mayor of a city (SimCity) or the manager of the whole world (SimEarth): both are represented as complex systems where every decision has various unpredictable consequences (Friedman 1995).

Chapter 8
The gender of cyberspace: feminist readings of gender on the Internet

Cybercultural rhetoric about the nature of technology (especially CMC technology) has been described up to this point as a fairly consistent construction. The political imagination outlined in chapter 5, for example, shows a remarkable consensus about what the Internet can produce in terms of new forms of power and resistance; posthumanist narratives, although extreme, similarly indicate a certain consensus about the nature of the subject of the information age; cyberevolutionism is also a widespread description of the nature of contemporary technology.

In this chapter I will look more at inconsistencies and internal debates in discussions about gender and communication technologies. Gender is a source of substantial disruption in the content solipsism of cyberculture. Michael Hauben, a firm believer in the huge possibilities of the Net as a democratic medium, acknowledges gender as one of the sour points of net-politics:

> With all the positive uses and advantages of the Net, it is still not perfect. The blind-view of people on the Net seems to shield everyone, but women. There is a relatively large male to female percentage population on the Net. The women feel the effects of this difference. Women who have easily identifiable user names or ids are prone to be the center of much attention. While that might be good in itself, much of that attention can be of a hostile or negative nature. This attention might be detrimental to women being active on the Net. (Hauben 1994)

Gender seems to problematise all those comfortable narratives about technological mastery and spontaneous systems. Gender is the difference which still forbids cyberculture *from the inside* to erase completely the issue of structural difference. While the Net seems able to cope with differences of opinion, women are not easily incorporated: people with different ideas can meet in their own electronic sites and discuss their difference with like-minded individuals; women, of course, have their own newsgroups and electronic sites, such as discussion areas dedicated to feminism (alt.feminism) or to issues of computer literacy for women (Virtual Sisters, Spiderwoman and similar mailing lists), but cannot be confined there. Women are the difference which cannot be incorporated unproblematically in the rhetoric of

difference in equality which rules Internet culture.

In this chapter I have decided to look at the issue of gender from the perspective of feminists, or at least those feminists who have chosen to speculate about technology in general and CMC in particular. Although some of these authors might not be described as computer activists, they represent an important attempt to understand the function of gender in relation to the disembodied nature of communication technologies. As usual I have chosen cyberpunk SF as a starting point, where technology was read as a gender equaliser: technologically-enhanced heroines such as Molly in *Neuromancer* could fight better than any man; more rarely they could also enjoy the advantages of the disembodied nature of electronic communication to beat the men in a context where physical strength was not an issue. How have feminists and women in general, in and outside the Net, read the effects of technology as a gender equaliser? In particular, how have they interpreted the effects of electronic disembodiment on gender?

In this chapter I argue that the historical coincidence which produced *Neuromancer* in 1984 and 'A Cyborg Manifesto' in 1985 was the beginning of a new wave of feminist theorising around the relationship between gender and technology. This revaluation has expanded in the last three years in a specific reflection about gender and electronic communication and has to be read in the context of a 'gender war' around the presence of women on the Internet. The debate has involved different definitions of gender, technology and gendered technology.

Cyberpunk and feminist SF

The debate around cyberpunk SF and gender was originally formulated in relation to the role of feminist science fiction in providing adequate and radical possibilities for rethinking not only the relationship between gender and technology, but the nature of both. Feminist work on the relationship between gender and technology, in its various disciplinary and interdisciplinary forms, emphasised not only how technology was often rooted in gender, but how gender itself had been defined and often produced by scientific and technological knowledge (see Rothschild 1983; Kramarae 1988; Hynes 1991; Keller 1992). Feminist science fiction was one of the terrains where this investigation was pursued.

Feminist science fiction was central in early formulations of the debate around cyborg identity and around the relevance of cyberpunk fiction for feminist speculations on technology. In 1985 Haraway saw feminist SF as

one of the genres of cyborg writing. If the cyborg figure is about the deconstruction of fixed identities, '[t]he cyborgs populating feminist science fiction make very problematic the statuses of man and woman, human, artefact, member of a race, individual, entity or body' (Haraway 1991: 178). In 1990, Joan Gordon compares the possibilities of cyberpunk science fiction to the disappointing figurations produced by feminist SF's dying tradition, a tradition paralysed by essentialist and archetypal definitions of femininity (Gordon 1991).

Feminist science fiction is a subgenre of SF which includes, in most critics' perspective, both those SF authors who define themselves as feminists and those who generally write SF concerned with women (Le Fanu 1988; Palusci 1990). Officially born in the seventies, feminist SF provided feminists both with an experimental laboratory where to articulate their criticisms towards the gendered set up of science and technology *and,* at the same time, a constructive space for *imagining* alternative futures.

Examples of this popular and critically acclaimed genre (at least for feminists) include texts such as Joanna Russ's *The Female Man* (1975); Marge Piercy's *Woman on the Edge of Time* (1978); Ursula Le Guin's *The Left Hand of Darkness* (1976); Suzy McKee Charnas's *Motherlines* (1978); Sally Miller Gearhart's *The Wanderground: Stories of the Hill Women* (1979) and James Tiptree Jr'. s acclaimed short stories published in different anthologies and SF magazines through the 1970s and early 80s. This wave of feminist or women-oriented SF was informed 'by the feminist, socialist and radical politics developed during the 1960s and 1970s' (LeFanu 1988: 3). In particular Sarah Le Fanu has pointed out the importance of these writers' exploration of the radical feminist possibilities of the technology, as endorsed by 70s texts such as Shulamith Firestone's *The Dialectic of Sex* (Firestone 1970; Le Fanu 1988).[1]

Authors included in this group vary widely in terms of their approach to, and definitions of, gender and technology: Sarah LeFanu distinguishes between 'essentialist' feminist SF, which recuperates and re-evaluates 'archetypal' definitions of Woman (noticeably the association of woman with 'nature), and 'deconstructionist' feminist SF which aims to reveal the socially constructed nature of gender identity. Very broadly she assigns to the first group texts located in the complementary traditions of dystopia and utopia: novels such as *Motherlines* and *The Wanderground* consciously reject advanced technology as incompatible with woman's essence, and usually erase it altogether from the picture by concentrating more on the social

arrangements of power between the genders. Women's utopian societies are usually separatist, matriarchal, and ecologically in touch with nature. Instead of hard technology they use traditional women's wisdom and their knowledge of holistic medicine.

Deconstructionist feminist SF, on the other hand, usually engages with technology as a means to produce differently gendered societies. In a classic text such as *Woman on the Edge of Time*, technology is informed by gendered interests but it can also potentially redraw the boundaries between the genders. In the dystopic present, Connie, an oppressed Mexican woman, suffers the effects of a medical technology which considers certain kinds of human beings as little more than guinea pigs. In the future, possible world where she is teleported through her psychic abilities, technology is used to free women from the obligation to reproduce. Children are gestated in tanks and men, if they feel like it, can develop breasts and feed the babies themselves. As a result, gender is irrelevant, bisexuality is the norm, and marriage can involve more than two persons.

It is remarkable how Donna Haraway and Joan Gordon read the state of feminist science fiction in 1985 and 1990 so differently: for Donna Haraway it provides useful tools to invent a future which will go beyond gender dichotomies and the search for wholeness and unity which informs the patriarchal imagination. In this sense feminist SF writers offer a radical alternative to American feminists like Susan Griffin, Audre Lorde, and Adrienne Rich who insisted 'on the organic, opposing it to the technological' and supported the perspectives of ecofeminism and feminist paganism (Haraway 1991: 174). Writing in the SF semi-professional zine *Science Fiction Eye* in 1990, Joan Gordon describes feminist SF as a genre in decline. In her opinion this decline is related to the increasing consensus among feminist SF writers about both the nature of gender (what is masculine and what is feminine) and the nature of a proper feminist/feminine technology. The definition of gender endorsed in recent feminist SF, according to Gordon, embraces the value of woman's long-term association with the maternal, the natural, and the nurturing.

> Virtually every feminist SF utopia dreams of a pastoral world, fuelled by organic structures rather than mechanical ones, inspired by versions of the archetypal Great Mother. And virtually every feminist SF novel, utopian or not, incorporates a longing to go forward into the idealized past of earth's earlier matriarchal nature religions.... (Gordon 1991: 199)[2]

Gordon and Haraway are in a way talking about the same thing: the rejection of ecofeminism and pagan feminism as satisfying bases for building alternative feminist futures—what Judith Shapiro calls the 'unprincipled marriage of convenience between a social constructionist view of gender and an essentialist view of womanhood' (Shapiro 1991: 259). Gordon's dissatisfaction in 1990 with a novel like Joan Slonczewski's *A Door Into the Ocean* (1986) equals Haraway's distrust of 'organicist feminisms'. Both refer with enthusiasm (and in Gordon's case with nostalgia) to Joanna Russ's *The Female Man,* which portrayed the fragmentation of gender and the empowering potential of technology. In spite of their different outcomes (Haraway's endorsement and Gordon's rejection of feminist SF), both texts reveal a dissatisfaction with essentialised notions of 'womanhood'. These archetypal and matriarchal definitions of Woman are at the core of feminist movements and have a remarkable popularity among important groups of women.

New Age Goddess cults, portrayed in the popular work of Starhawk, and movements like cultural ecofeminism fully endorse this positive revaluation of a mystical, physical, universal womanhood. Cultural ecofeminism, for example, argues that '[w]omen and nature have an age-old association—an affiliation that has persisted throughout culture, language, and history' (Merchant 1980: xv). [3] Merchant and the ecofeminists argue that the mentality which has produced science and technology is profoundly hostile to women. As an answer, they propose that women should learn to discover the value of their special relationship with nature and resist the technologisation of life.

Gordon sees this tendency as a kind of 'escapism', an essentialist return to definitions of womanhood as a 'gentle, caring, natural' entity. Gordon was one of the first women to celebrate cyberpunk science fiction as 'covert feminist' literature, one that provided empowerment for women by erasing, instead of heightening, gender differences:

> At first glance it seems to be overt masculinist science fiction—men are men, waving guns and knives, competing like all getout and plugged up to the gills with pollutant technology. But look at the women in mirrorshades—Molly in Gibson's *Neuromancer* (1984), Deadpan Allie in Cadigan's *Mindplayers* (1987), for instance—aren't they tougher than the rest? I would argue that cyberpunk is covert feminist science fiction. On that night foray into the underworld which is the central experience of what we

> will conveniently call cyberpunk, men and women travel as equals. (Gordon 1991: 196)

I do not think that this desire for 'equality' is just as the obvious slogan of liberal feminism; I think that Gordon is expressing a widespread dissatisfaction for normative categories of gender *as sclerotised by feminists.* Eco-feminism and Goddess cults based in New Age spirituality are equally the target of Haraway's famous quip 'I would rather be a cyborg than a goddess' (Haraway 1991: 181). In this sense Haraway's intervention in the gender/technology debate operates in two ways: it tries to imagine a different relation between women and technology, but it also tries to see how we could imagine different genders by way of a technology *differently* gendered.

Her cyborg myth is meant to open up other metaphors for our relationship with the machines: these metaphors are not to be based on the usual dialectic of Self/Other, but emphasise a new politics of connection and hybridity against the fixedness of gender and identity. Haraway attempts to see how recent developments in high-tech, which questioned the boundaries between organisms and machines could be used as a challenge for the dualistic nature of Western logic and for feminism itself .

> It is not clear who makes and who is made in the relation between human and machine. It is not clear what is mind and what body in machines that resolve into coding practices. Insofar as we know ourselves in both formal discourse (for example, biology) and in daily practice (for example the homework economy in the integrated circuit), we find ourselves to be cyborgs, hybrids, mosaics, chimeras. (Haraway 1991: 177)

> Why should our bodies end at the skin, or include at best other beings encapsulated by skin?... For us, in imagination and in other practice, machines can be prosthetic devices, intimate components, friendly selves. We don't need organic holism to give impermeable wholeness, the total woman and her feminist variants (mutants?). (Haraway 1991: 178)

I argue that the real impact and implications of this project did not happen through the feminist SF endorsed by Haraway in her 'Cyborg Manifesto', but through cyberpunk fiction in conjunction with the birth of a Net culture in the early 1990s. This event is paradoxical because, as we will see later, Gordon's was one of the last wholesome endorsements of cyberpunk fiction by a feminist; in 1991 and 1992, when cultural critics 'woke up' to cyberpunk,

one of the major criticisms was aimed explicitly at its irredeemably masculine gender politics.

Cyberpunk fiction as male fantasies

Until two years ago, when the voices of women/feminist/gender radicals on the Net became more vociferous, discussions about cyberpunk and cyberpunk culture took place around a series of definitions of gender with a well established history in feminism. Gordon's intervention was republished in Larry McCaffery's germinal cyberpunk anthology *Storming the Reality Studio* (McCaffery 1991): significantly the anthology did not include any trace of the acrimonious debate in 1986 between feminist SF writers and cyberpunk spokesperson Bruce Sterling which took place on the pages of the SF fanzine *Aurora* (quoted in Dery 1993b: 756). The debate started with Jeanne Gomoll's piece 'An open letter to Joanna Russ', and Sterling's reply in 'Letter to the Editor', and it was focused around the latter's very partial interpretation of SF history in his preface to the *Mirrorshades* anthology.

Sterling had omitted not only the important contribution of feminist SF to SF as a whole, but SF women writers in general—in spite of the very obvious influence of Joanna Russ and Alice Sheldon (aka James Tiptree Jr). on William Gibson's fiction. For example, Molly Millions, the surgically altered female ninja in *Neuromancer,* presents conspicuous similarities with Joanna Russ's Jael in *The Female Man,* and the theme of the cranial sockets, a real cyberpunk icon, was first elaborated by James Tiptree Jr. in her famous short story 'The Girl Who Was Plugged In'.

In the early 1990s the analysis of cyberpunk and masculinity was extremely recurrent in scholarly criticism: according to Peter Fitting, cyberpunk's is 'a violent, masculinist future' (Fitting 1991: 307). Andrew Ross sees it as the expression of a new, sexy 'nerd' masculinity, by definition white and suburban, in love with the romance, but not the harsh reality, of inner city life. Cyberpunk's are 'the most fully delineated urban fantasies of white male folklore' in the eighties, and 'one barely needs to scratch the surface... to expose a baroque edifice of adolescent male fantasies' (Ross 1991: 145).

More characteristic of the feminist position is Claudia Springer's article on cyborg imagery in popular culture published in 1991, where she argues that there are unconscious drives behind the experience of 'jacking in', of projecting one's consciousness into cyberspace:

> The pleasure of the interface, in Lacanian terms, results from

the computer's offer to lead us into a microelectronic Imaginary where our bodies are obliterated and our consciousness integrated into the matrix. The word matrix, in fact, originates in the Latin *mater* (meaning both mother and womb), and the first of its several definition in *Webster* is 'something within which something else originates or develops'. Computers in popular culture's cyborg imagery extend to us the thrill of metaphoric escape into the comforting security of our mother's womb, which, as Freud explained, represents our earliest *Heim* (home). (Springer 1991: 306-307)

Although she argues that 'cyborg imagery as a whole, implies a wider range of sexualities' (Springer 1991: 310), she thinks that most cyborg narratives represent a fundamental crisis of masculinity. In some of its cinematic manifestations, this crisis is even comparable to the Nazi psychology analysed by Klaus Theweleit in *Male Fantasies* (Theweleit 1977). In films like *Robocop* and *Terminator*, 'cyborg imagery epitomizes the fascist ideal of an invincible armoured fighting machine' (Springer 1991: 317). Springer, unlike Gordon, sees cyberpunk fiction and its spin-offs in films and comic books as being willing to relinquish all categories but for gender: 'patriarchy upholds gender difference' (Springer 1991: 310).

Springer is very careful about making definite arguments about the gender of technology. However, with the simple exception of the comic book *Interface*, she consistently analyses images of cyborgs and of technological interfaces in terms of a male subjectivity: the space of the computer networks, for example, is often represented as the space of the original loss of self (the machine/matrix/womb). This space is the theatre for the deeds of the male character who returns to it to re-establish not only gender difference, but specifically masculinity. In the comic book *Cyberpunk* the main character, Topo, jacks into the matrix to confront Neon Rose, a woman he defeats by reshaping his male body into an armoured, steel entity.

Arguments about gendered subjectivities and their different relationship to technology are not new. Sherry Turkle, in her work on male and female students in computer science, relied on psychoanalytic definitions of gender, using object-relations theory, to explain the different relationship of men and women to computers (Turkle 1985, 1988). In the work of Nancy Chodorow, object-relation theory argues that child-rearing practices where infants are reared almost exclusively by women produce different psychological make-ups for men and women (Chodorow 1978):

> According to these analyses, masculinity is defined through the achievement of separation, while femininity is defined through the maintenance of attachment. This causes masculine gender identity to be threatened by intimacy or by close identification with particular others' needs and interests, whereas feminine gender identity will be threatened by separation from others and by too little identity with others' needs and interest. (Harding 1986: 133)

In Turkle's understanding of men's relationship to computers, computers are 'an abstract structure of personality', akin to the maternal figure, which promises the dream of simultaneous loss and enhancement of control—back in the womb but this time in charge. In any case, men's relationship to computer technology, both the imaginary relationship established by cyberpunk heroes and the real relationship of male computer programmers, is structured by the masculine yearning for and fear of the omnipotent maternal body. This ambivalent desire structures not only their relationship with technology, but technology itself.

Rosi Braidotti similarly argues that '[c]yberpunk dreams about the dissolution of the body into the Matrix (as in 'mater' or cosmic womb), in what strikes me as a little boy's final climactic return to Big Mama's organic and forever expanding container' (Braidotti 1996: 12). Women, she argues, have different problems and they cannot relate to this image of the matrix in the same way:

> We, the riot girls who have been persecuted, hassled and repressed by Big Mama all our life; we who had to fight mama off our backs and chase her out of the dark recesses of our psyche, we have quite a different story to tell. Virginia Woolf's famous injunction that the creative woman needs to kill the 'angel in the house' that inhabits the most ancient layers of her identity is quite relevant. It is the image of the caring, nurturing, self-sacrificing soft female that stands in the way of self-realisation. Women cannot be expected to share easily in the fantasy of a return to the Matrix. If anything, we want out of it and fast. (Braidotti 1996: 12)

In cyberpunk fiction and in cyborg fantasies technology is feminised into the figure of the matrix/mother: biological men, psychologically constituted into social males, relate to and build a technology which they define as feminine. Its femininity (an argument we will see Sadie Plant take in a different direction) lies in its 'simulation' and in its horizontal, indistinct quality. Men simulate the structure of the maternal body not simply in order

to return to the womb, but to enjoy its bliss without losing their control. The re-establishment of gender identities is one of the forms in which this control is reasserted.

We can therefore explain Springer's remark that high-technology dissolves the self but does not want to let go of gender: the dissolution of the bounded subjectivity in a world of prostheses and interfaces is counteracted by an insistence on excessively masculine or feminine bodies. High-tech is, for Springer, a space of possibility: 'What is really being debated in the discourses surrounding a cyborg future are contemporary disputes concerning gender and sexuality, with the future providing a clean slate, or a blank screen, onto which we can project our fascination and fears' (1991: 322).

Springer's is an example of one of the last attempts, spanning a very limited amount of time, to read cyberpunk fiction and cyborg imagery as gendered without referring explicitly to the Internet. In the last three years, it has become impossible to talk about cyberpunk fiction or cyberculture without referring to the experience of gender produced by the Net. The debate around the relationship between cyberpunk science fiction and gender is highly relevant to the experience of gender on the Internet: is gender erased or heightened in CMC? Is the masculine desire to reassert gender repeated in electronic interactions? What do women think about what the technology of CMC does to gender?

Feminist readings of CMC

In the last two years feminist interventions in the debate around electronic communication have been involved in rethinking the relationship between cyberpunk fiction, Haraway's cyborg figure, and electronic communication. In all these cases feminist writers have made important contributions not only to the debate around the relationship between gender and new technologies, but also around definitions of gender and technology as two distinct (but not separate) categories. Definitions of gender rooted in a larger feminist history have been fundamental in shaping the perspectives embraced by different authors. These perspectives map some interesting areas of the heterogeneous topography of feminism in the nineties and its different investments in the controversial word 'gender'.

The range of authors who have talked about women and new communication technologies in the last five years spans generations, geography, cultures, and even limited definitions of gender. Among the

women who have made significant contributions to the debate are Male to Female (MtF) transsexuals like the American Rosanne Alluquere Stone and Kate Bornstein, and the Italian Helèna Velena (Stone 1991; 1993; Bornstein 1994; Velena 1995), liberal, old-school feminists like Dale Spender, rooted in the politics of radical feminism established in the '60s and the '70s (Spender 1995); feminists influenced by French feminism, like the British theorist Sadie Plant (Plant 1993; 1994; 1995); feminists influenced by the outcomes of identity politics in the complex political scenario of the States, like Anne Balsamo (Balsamo 1993; 1996); and the new wave of women cyberpunk writers, like Melissa Scott and Wilhelmina Baird (Scott 194; Baird 1993). Other women involved in thinking about issues of gender in computer communication include artists such as VNS Matrix; online journalists like Rosie X in GeekGirl; women hackers such as St Jude of the cypherpunk movement and Cass of the cyberpunk BBS MindVox; young women writers who have been formed by Net culture and written books about it like the recent *Surfing the Internet*, by J.C. Herz; and all those feminist organisations involved in the gender politics of the Internet. These range from the women of Virtual Sisters, the Electronic Witches, the hostesses of the ECHO BBS, to all those feminist organisations who are helping women on the way to a new technoliteracy. All these organizations and individuals start from widely different definitions of gender and usually end up with widely differing definitions of gendered technology.

In a certain sense most of the questions about gender asked of information technology (even when ideas of gender are already in place) stem from the peculiar quality of electronic communication: its capacity to 'disembody' and 're-embody' because of its 'narrow bandwidth'.

> 'Bandwidth', as I use the term here, refers to the amount of information exchanged in unit time. 'Reality' is wide-bandwidth, because people who communicate face to face in real time use multiple modes simultaneously—speech, gestures, facial expression, and so on.... Computer conferencing is narrow bandwidth, because communication is restricted to lines of text on a screen.... The effect of a narrowing bandwidth, then, is to engage more of the participants' interpretive faculties. (Stone 1992: 614-615)

'Narrow bandwidth' means that everybody has to work with a reduced set of information to recreate a total image of the body. There is an important gap, therefore, between the physical body and the description of

the body offered to the electronic audience. As Stallabrass put it, 'identity can be fluid in virtual communication where accent, looks, wealth, posture, and gender are screened out in text-only dialogue..'. (Stallabrass 1995: 16).[4] This gap and this fluidity, some people argue, opens up all kinds of deconstructive/productive possibilities.

This body/subjectivity dichotomy is central to feminist interpretations of electronic communication. The 'decoupling' of subjectivity from the body, it is argued, offers radical possibilities for redrawing gender boundaries. The results of this decoupling are interpreted differently according to preconstituted definitions of gender, and the theoretical and political stakes.

According to Sadie Plant, for example, this decoupling necessarily implies a re-gendering of the interfaced subject. In a series of scattered articles since 1992, Plant has built her own version of a possible cyberfeminism. Plant maintains that the experience of 'jacking in' to the computer networks described by cyberpunk fiction does not reinforce the basic psychoanalytic structure of the male personality. Cyberpunk, and the whole cyberpunk movement, sees 'men participate in a feminine way or increasingly feminised way' (Plant 1994). According to Plant, the 'femininity' of cyberpunk derives from technology itself, specifically computer technology, which carries the symbolic connotations traditionally associated with woman:

> The computer, like woman, is both the appearance and the possibility of simulation. 'Truth and appearance, according to his will of the moment, his appetite of the instant'. Woman cannot be anything, but she can imitate anything valued by man: intelligence, autonomy, beauty... Indeed, if woman is anything, she is the very possibility of mimesis, the one who weaves her own disguises. The veil is her oppression, but 'she may still draw from it what she needs to mark the folds, seams, and dress making of her garments and dissimulations'. (Irigaray, 1991 p 116).... Woman, like the computer, appears at different times as whatever man requires of her. She learns how to imitate; she learns simulation. And, like the computer, she becomes very good at it, so good, in fact, that she too, in principle, can mimic any function. (Plant 1995)

Computers and women, then, belong to the same symbolic space and have 'evolved' at the same pace. In fact the definition of her project, 'cybernetic feminism', is based on drawing a parallel between women's emancipation and the development of computer technologies: 'a long standing relationship was evident between information technology and

women's liberation. You can almost map them onto each other in the whole history of modernity. Just as machines get more intelligent, so women get more liberated!' (Plant 1994). The result is that when men interface with computer technology, in spite of their illusion of total control, they are, in fact, losing their sense of identity, becoming 'not quite a subject'. This position, according to Luce Irigaray, defines the non-space of the female (Irigaray 1974, 1977).

> Cyberspace certainly tempts its users with ultimate fulfilment of the patriarchal dream, leaving the proper body behind and floating in the immaterial. But who is adrift in the datastream? All identity is lost in the matrix, where man does not achieve pure consciousness, final autonomy, but disappears on the matrix, his boundaries collapsed in the cybernetic net. (Plant 1993: 16)

Sadie Plant reads the experience of 'jacking in' portrayed by cyberpunk fiction as an evident symbol of the feminisation of men. Significantly she reads this experience not so much as a reenactment of penetrative masculine sexuality, but as an invasion of the fixed boundaries of male subjectivity. Cyberspace turns all users into the female, the historical symbol of weak subjectivity.

The definition of gender grounding Plant's work is explicitly located in Luce Irigaray's feminist critique of phallogocentrism. Irigaray, a heretic Lacanian psychoanalyst, defined her position on the question of gender and sex in two classic texts: *Speculum de l'autre femme* (1974) and *Ce sexe qui n'en pas un* (1977). In these works she argues that women are a paradox and a contradiction for the discourse of identity itself: 'there are not really two sexes, but only one. A single practice and representation of the sexual. With its history, its requirements, reverses, lacks, negative(s)... of which the female sex is the mainstay' (Irigaray 1977: 86). In Judith Butler's words, for Irigaray

> [w]omen are the 'sex' which is not 'one'. Within a language pervasively masculinist, a phallogocentric language, women constitute the *unrepresentable*. In other words women represent the sex that cannot be thought, a linguistic absence and opacity. Within a language that rests on univocal signification, the female sex constitutes the unconstrainable and undesignatable. In this sense, women are the sex which is not 'one' but 'multiple. (Butler 1990: 9)

The subject, therefore, is a masculinist construction and cannot contain the

possibility of a female subject (these words constitute, effectively, an oxymoron).

Plant interprets the loss of self in the interface with the computer in similar and different ways to Springer. They agree, in as much as they are more or less based in Lacan's psychoanalysis, that 'cyberspace' is female (a gendering of technology also embraced by Rosanne Stone). However, they invest the gendered interface with the cybernetic machine with different outcomes. Following Springer's argument it is possible to argue that this interface (at least in its representations in popular culture) *reinforces* masculinity. If 'cyborg imagery in popular culture invites us to experience sexuality by losing our bodies and becoming pure consciousness' (Springer 1991: 307-308), then it is arguable that it is men who have equated the body with the female and that such a gesture is the realization of the archetypal dream of masculinity. Rosanne Stone sees this forgetting of the body and the impulse to transcend the flesh as a dangerous part of the male psychological make up. She traces the contours of this tendency in a continuum that covers both the narratives elaborated by cyberpunk authors and the motivations structuring the work of virtual systems engineers:

> The imagery of cyberpunk authors, and of a few virtual world builders, echoes with images of purely phantasmatic bodies, freed from the constraints that flesh imposes. They take for granted that the human body is 'meat' —obsolete, as soon as consciousness itself can be uploaded into the network. This, too, has unsettling religious resonances. Because of the ways that power works, it is important to remember that forgetting the body is an old Cartesian trick, one that has unpleasant consequences for those bodies whose speech is silenced by the act of our forgetting; that is to say, those upon whose labor the act of forgetting the body is founded—usually women and minorities.... (Stone 1991: 113)

If, on the other hand, interfacing with technology does not provoke transcendence but weakens subjectivity, and this 'weakness' is read as female, then cyberspace is feminine in another sense. It is feminine according to the definitions of femininity produced by the Western philosophical tradition and it effectively femininises the subject—that is it reproduces the experience of a female subject position. Therefore it will be a comfortable place for women to be and an unsettling and unknown place for men:

> Women have of course been roped into the patriarchal privileging of identity, so that much feminist struggle has been

> devoted to the search for the true self, the missing ingredient which would give women a full and equal presence in society. Cyberfemininity is something quite different, it is not a subject lacking an identity, but a virtual reality, whose identity is a mere tactic of infiltration. VR is a disturbance of human identity far more profound than pointed ears, or even gender bending , or becoming a sentient octopus. (Plant 1993: 16)

The centrality of theories of gender is obvious from these examples: all these feminists base their description of the relationship between gender and technology on a specific definition of gender as elaborated in the theoretical history of feminism. They also draw on this definition to describe technology as *gendered* in a particular way. This process is not innocent and holds important consequences for the development of feminist politics in relation to new information technologies. Unlike Springer, who is very careful about making statements about the gender of technology, Plant is very specific both in her definition of gender and of gendered technology. As we have shown before, her theory of gender is rooted in Luce Irigaray's work and reproduces the Irigaray's problem with universalising definitions of 'woman' and 'man', which was widely criticized in the 1980s.

> Although Irigaray clearly broadens the scope of feminist critique by exposing the epistemological, ontological, and logical structures of a masculinist signifying economy, the power of her analysis is undercut precisely by its globalizing reach. Is it possible to identify a monolithic as well as monologic masculinist economy that traverses the array of cultural and historical contexts in which sexual difference takes place? Is the failure to acknowledge the specific cultural operations of gender oppression itself a kind of epistemological imperialism, one which is not ameliorated by the simple elaboration of cultural differences as 'examples' of the selfsame phallogocentrism? (Butler 1990: 13)

Butler goes on to argue that 'the category of 'women' is normative and exclusionary and is invoked with the unmarked dimensions of class and racial privilege intact. In other words, the insistence upon the coherence and consistency of the category of women has effectively refused the multiplicity of cultural, social, and political intersections in which the concrete array of 'women' are constructed' (Butler 1990: 14). Plant's cyberfeminism essentialises women by effacing the variety of experiences embodied by different women within the generic 'woman' of Western philosophy. Luce Irigaray's image of woman as 'the sex which is not one' is meant to convey

how women have been represented in the master discourse of white Western philosophers. Plant's adoption of this notion of the 'feminine' is part of another kind of rhetoric: by collapsing all women within the philosophical definition of 'woman', she can argue that all women participate in the evolution of technology in the same way. With all the problems in Irigaray's theory, she is still answering back from within a certain philosophical tradition. Plant, on the other hand, is discussing technological developments which do not exist solely within a masculine subject's imagination.

There are political consequences of this reduction of the multiple spaces occupied by gendered subjects in the grid of power: one of these consequences regards the construction of technology itself, and the other regards the construction of a feminist politics of technology. In Sadie Plant's work this is evident in her unproblematised incorporation of cybernetic evolutionism and in her allegiance to free market rhetoric:

> RosieX: Can I infer from your work that the term cyberfeminism implies that patriarchy is doomed?
> Sadie: The interesting thing about this is that obviously a number of tendencies have developed. Tendencies of feminisation exist economically, particularly in industry and employment practices. It's not happening because people are trying to make it happen - or even because feminist politics are driving these changes (although that is a part of it), but changes are occurring almost as an automatic process. This process is underway, and women do become more important, especially in advanced capitalist cultures. And it seems there is a shift right across the world that this is happening. In every sense, geographical shifts are occurring - from the centre to the periphery. Sexual relationships are shifting as well. It's beautifully effortless, it's an automatic process! (Plant 1994)

Plant's cyberfeminism is an ambiguous construction: on the one hand it does provide one of the few theoretical spaces where women's relationships with computers is celebrated optimistically as a space of possibilities. On the other hand this is accomplished at a serious political and theoretical cost: the reification of the signifiers 'woman' and 'technology', the erasure of the conflicts around CMC, and the celebration of *conforming* to the automatic process of a self-evolving technology.

The reification of the category of 'woman' into a monolithic figure of male desire runs against the grain of disputes internal to feminism in the last ten years: working class women, women of colour, lesbians and transgenderists have repeatedly denounced the effect of this reification for subjects who

participate very differently in the category 'woman'. In this sense, Plant's cyberfeminism is radically opposed to Haraway's cyborg: the 'cyborg' figure stresses connection through the recognition of difference; Plant's celebrates homogenisation in a generic and vague femininity.

Plant's perspective also reifies technology in its adherence to a narrative of teleological progress. One of the consequences of this double reification is a surrender to narratives of evolutionism which unproblematically collapse 'nature' and 'culture' by naturalising cultural and social phenomena. Plant shows a remarkable enthusiasm for Kevin Kelly's cyberevolutionism. Her double reification of gender and technology under the sign of the spontaneous self-organising system erases not only women's differentiated relation to power, but any kind of agency. In her view, the emancipation of women is due to the natural tendencies of advanced capitalism, not to women's historical struggles. In this sense, Plant's cyberfeminism fits in better than any other with Net culture's own mythology, but seems to clash somehow with a wider feminist consciousness, which is ideologically resistant to 'free market' ideologies. The barely concealed scepticism of Rosie X, the Australian GeekGirl and editor of one of the most lively feminist sites on the WWW, is evident in some of her replies:

> RosieX: But at the moment, generally speaking, only a few women have access to this power - or are they capitalising on these shifts? What about the gap between information-rich and information-poor women?
>
> Sadie: It's important to realise that there is never an instantaneous change - but, neverless [sic], if you look at the historical situation and women's lib so far, you can begin to track future potential. Access to technology is widening. Even though we still have problems, it seems implicit in economic and political terms that these processes are automatic....
>
> RosieX: But aren't we positioning women in stereotypical relationships with the technology? I mean what image is being created? (Plant 1994)

It is remarkable how the same set of assumptions about the psychoanalytic constitution of gendered identities produces a different theory of technology and gender in the work of Rosanne Alluquere Stone. Stone grounds her gendering of technology in her understanding of the psychology of the young men responsible for designing virtual systems. Following David Tomas's characterization of cyberspace as a place of bodily freedom (Tomas 1989), she argues that this is 'a freedom *from* the body, and

in particular, perhaps, freedom from the sense of loss of control that accompanies adolescent male embodiment. Cyberspace is surely also a concretization of the psychoanalytically framed desire of the male to achieve the 'kinaesthetically exciting, dizzying sense' of freedom' (Stone 1991: 107).

Like Sadie Plant, she regards this aspiration to disembodiment as being self-defeating: on the one hand it reproduces the longing of the male for the female, and on the other it transforms the allegedly male subject who thinks he is 'penetrating' cyberspace, but is really 'enveloped' by it:

> Penetration translates into envelopment. In other words, to enter cyberspace is to physically *put on* cyberspace. To become the cyborg, to put on the seductive and dangerous cybernetic space like a garment, is to put on the *female*. Thus cyberspace both *dis* embodies, in Sobchack's terms, but also *re* embodies in the polychrome, hypersurfaced cyborg character of the console cowboy. As the charged, multigender, hallucinatory space collapses onto the personal physicality of the console cowboy, the intense tactility associated with such a reconceived and refigured body constitutes the seductive act of what one might call the *cybernetic act*. (Stone 1991: 109)

The reason why Stone does agree with the celebratory position assumed by Plant lies again in a different concept of gender. Stone is interested in how gender in CMC is constituted as an interaction of three elements: technology, community and the subject/body binary. This multiple perspective enables her to interpret gender in the context of a more complex *interaction* than in Plant's work. Gender is not reducible to its philosophical attributes and technology is not just a set of radical reconfigurations of personality gendered in the female.

In particular Stone is interested in the constitution of the classical subject (what she calls the *fiduciary subject*) as a fiction which poses the coincidence of body and subjectivity (in the singular). The idea that there is a consistent continuity between 'a single physical body and a single awareness of the self' is a fiction that constitutes the legal and philosophical basis of modern society. Cyberspace, or 'the mode of the technological', undermines this fiction, allowing *discontinuities* in the formation of the subject to emerge. This is the radical, utopian aspect of cyberspace: it can facilitate the performance of multiple subjectivities (all differently gendered) by a single individual. Cyberspace is gendered not so much as female as the *multiple*, which eludes the classical formulation of masculinity and femininity.

On the other hand the interface does not happen in a vacuum: individuals

interface with a technology which is socially constituted, and, in the case of electronic communication, in the context of communities produced by technology but still rooted in the social. Virtual communities meet 'in phantasmic spaces enabled by, and constituted through communication technologies' which offer a kind of social laboratory with a 'potential for emergent behavior, for new social forms that arise in circumstances where 'body', 'meeting', 'place' and even 'space' mean things quite different from our accustomed understanding' (Stone 1992: 610). The subjectivity of the CMC users, however, has been shaped in the first place through their social experiences of the body, which are not going to go away the minute they log on. Furthermore CMC users interact thorough a technology generated out of the wishes and desires of embodied subjects, that is young, male computer engineers. Every single aspect of the technological experience implies the presence of embodied subjects, and gender is of course one of the fundamental categories which constitutes subjectivities rooted in physical bodies.

It is important, therefore, to specify what Stone means by 'gender': gender is not something that belongs to bodies naturally, neither is it something which is imposed on the raw material of sex by culture. Gender is an *embodied* effect, the material expression of discourses and practices about gender. The idea of gender as an embodied effect is rooted in Foucault's theories of sexuality as being something which is constantly produced. Teresa de Lauretis offered an early version of the possibilities of Foucault's theory when applied to the production of gender in her *Technologies of Gender* (de Lauretis 1987). In this perspective gender neither pre-exists bodies nor follows them: bodies come in genders in as much as they are produced through discourses and technologies about gender.

In Stone's theory, this is translated in a double tension: on the one hand she does not want to reify gender by suggesting that there is no escape from the gender we are assigned at birth or that, indeed, this gender is 'natural' (a position we expect from the author of 'A Posttranssexual Manifesto'); on the other hand she does not want to suggest that gender is just a piece of garment (either made of bytes or lace) which can be worn and dismissed at will.

Stone's statements about the 'wearability' of gender make sense in terms of the increasingly diffused practice of computer cross-dressing. It is fairly common for users of electronic communication to go online as the 'other' gender. Stone refers to an example of this phenomenon at the beginning of

'Will the Real Body Stand Up?': a wise and disabled older woman, who is very popular in one of the many computer conferences on the Net, is unmasked as a male, middle-aged psychoanalyst from New York. A lot of the hype of Virtual Reality was similarly based on the erotic possibilities of gender-switch, where users could experiment with the pleasures of experiencing with the sexual organs of the other sex (Stone 1993).

According to Stone, computer cross-dressing does not necessarily imply that the cross-dresser now owns the knowledge of the long-term, crystallised effects of an upbringing in a body gendered in the opposite sex. At the same time neither does this mean that gender can be owned in an exclusive and natural sense by those who can legally claim it as their own. In an interview available from the WELL site, Stone was particularly keen to argue against the myth that CMC and Virtual Reality allow men and women to experience how it feels like to be the 'other' gender:

> JL: But this is the whole gender switch thing that they keep talking about doing in VR, about how now you're a man, but you can be a woman...
>
> ARS: It's bullshit! All bullshit, folks!
>
> ....The hype about sex in VR is, you can be a physical male and experience being in a woman's body. Well, it doesn't work. Bodies are bodies, but it's the *meaning* you assign to bodies, and to different parts of bodies -- including your own -- that makes them erotic and desirable, and meaning is one hundred per cent social. You could look down in the simulation and see that you had a woman's body, and maybe you could feel a simulacrum of certain sensations, but you wouldn't be experiencing a woman's body...you'd be experiencing your *fantasy* of what a woman's body might be like...and that's sometimes true even if you happen to *be* a woman. That is, a genetic female who performs woman socially. (Stone 1993)

Following Judith Butler's well known work in *Gender Trouble* and *Bodies that Matter* (Butler 1990; 1993), Stone is arguing for an idea of gender rooted in the performative. Gender is described by Butler as 'the repeated stylization of the body, a set of repeated acts within a highly rigid regulatory frame that congeal over time to produce the appearance of substance, of a natural sort of being' (Butler 1990: 33). This argument does not suggest that gender is constructed out of the raw material of sex (Rubin 1975), but that gender is *radically* constructed. There is no substance out of which gender is built, there is no being; 'the 'being' of gender is an *effect*....' (Butler 1990: 32).

This idea of gender as effect does not imply that it is an effect that can be

unravelled, for example by donning a virtual suit which would provide a woman with a penis and a man with a clitoris. The constitutive nature of gender as performance means that its effects are deeply consolidated in the gendered person's psyche, they *constitute* his/her psyche in an embodied way. Therefore it is not enough to perform the other occasionally in order to experience it, precisely because of the crystallised nature of our performance of gender. The idea that gender is an *effect* without origin, on the other hand, means that gender is never certain, but it has to be produced (and reproduced) constantly: deviant reproductions of gender through parodic or excessive performance deconstruct from the inside the meaning of *legible* bodies (legible because supporting a unity of sex, gender, and desire). Electronic communication potentially allows the subject to disrupt the continuity of sex/gender/desire/sexuality which keeps alive the fiction of polarised gender identity. In this sense, CMC is potentially the space of the *transvestite,* of the figure which deconstructs the fixed nature of gender through the parodic and dissonant performance of gender difference.

In an interview in *Mondo 2000,* Kate Bornstein, another MtF transsexual, is much more explicit in conceptualising cyberspace (electronic communication) as an ideal space for the emergence of what, following Marjorie Garber, she calls the 'third gender' or the 'third space' (Garber 1992). This third space would be probably created through the mutation of perspective provoked by impersonating the other gender online. In her opinion, it is essentially the impersonation of men by women which bears more radical possibilities for the deconstruction of gender:

> 'Cyberspace would be a doorway into the Third space', according to Bornstein. 'Cyberspace free us up from the restrictions placed on identity by our bodies. It allows us to explore more kinds of relationships.
>
> 'I can go online as various kinds of women. I've gone online as a guy a couple of times; I'm playing a stable boy in a vampire scenario now; I've gone online as different monsters...
>
> 'Cross-gender identity surfing online is so telling: Men slum and women step into the trappings of power as men. You talk to a man after he's been a woman online and he'll usually laugh and describe some kind of sex he had, usually lesbian sex. But you talk to a woman who's been surfing as a man, there's this spark there. There's this wonder. There's this—'They really *do* have this power!' As soon as men cop to the idea that women are learning this, they're gonna be more frightened'. (Bornstein 1995: 116)

Stone, however, neither conceptualises the experience of the interface as

an automatic form of gender-switching, nor sees computer cross-dressing as intrinsically radical: one of the reasons for this lies in the 'nature' of gender as a crystallised performance constitutive of the self. Another reason relates to the nature of technology (its ambiguous disembodiment/re-embodiment effect) and the nature of the communities constituted through this technology.

The potential for emergent behavior in these communities is not guaranteed by any intrinsic quality of the technological space: the mode of the technological is potentially multigendered and potentially subversive of the unitary subject, but it still works in a relationship with communities emerging from the social, and bodies grounded in, among other things, genders. The result is ambiguous: virtual communities tend to reproduce *legible* bodies, which, at least nominally, reproduce the continuity of sex/gender/desire which characterises legible bodies in real life. This legibility is always a fiction, we cannot be absolutely sure all the time which gender *really* is our disembodied interlocutor. The fiction of consistent polarity is supported only by the desire to see it: 'Gendered modes of communication themselves have remained relatively stable, but who uses which of the two modes has become more plastic' (Stone 1991: 84). Springer, quoting Janet Bergstrom, similarly argues that 'where the basic fact of identity as a human is suspect and subject to transformation into its opposite, the representation of sexual identity carries a potentially heightened significance...' (in Springer 1991: 310).

Stone imagines a multigender cyberspace, a space which can potentially accommodate different genders and definitions of gender; at the same time she acknowledges the persistence of binary gender in electronic communication and the obsessive need of virtual communities to reconstruct a material image of the body starting from gender. Cyberspace is therefore that space which potentially offers a multiplicity of subject positions in relation to gender, but which is usually used in the binary mode. These multiple positions can only be taken up by subjects who are radically constructed by the sedimented effects of gender performance over the years. The possibilities for gender politics in cyberspace occur across a spectrum which covers basic forms of gender switching, and the potentially radical possibilities of subjectivities which effectively disrupt the continuity of sex/gender/desire in every possible direction.

As with the other authors analysed in this chapter, Stone does not explore

how race and class might complicate the category of gender in these virtual worlds. This silence seems to be totally unresolved in feminist analyses of computer-mediated communications. It is possible to argue that in the debate around electronic communication attempts at understanding the effects of categories of race and class have been, at best, scattered and rather unfruitful. Race and class are *invisible* differences for most users of electronic communication: nobody asks about them nor discusses them. In this sense cybernetic feminism runs against the grain of the most fruitful political developments of feminism in the last twenty years.

Anne Balsamo's failure to address positively this absence bears to witness the serious impasse represented by race and class in contemporary discussions on CMC. Balsamo's main contribution to the debate around cyberpunk and cyberspace is an article published in a special issue of the *South Atlantic Quarterly* in 1993, called 'Feminism for the Incurably Informed', a quote from Pat Cadigan's novel *Synners* (1991). Pat Cadigan was the only woman writer in the cyberpunk anthology *Mirrorshades*, and *Synners* is an elaboration of her short story 'Rock On'. Balsamo, therefore, locates feminism right at the heart of cyberpunk fiction, not in William Gibson's novels but in its main (and only) original woman writer.

Balsamo's angle on cyberpunk is very different from the other writers analysed: she looks at cyberpunk as setting the 'stage for the elaboration of a feminist theory of the relationship of material bodies to cyberspace and the construction of agency in technological encounters' in order to build 'a feminist analysis of the politics of new information technologies' (Balsamo 1993: 693). In the course of the article Balsamo tries to make sense of technology in terms of a multiple perspective which includes class, gender and race. Race and class gradually disappear as she touches on electronic communication.

Unlike most feminist interventions in the 'cyberpunk/cyberspace' debate Balsamo seems to start from a definition of gender which takes into account the fragmentation of the signifier 'woman' in terms of categories of class and race. This notion of gender as a differently embodied difference informs her approach to technology too. Her fragmented notion of gender is at the basis of her critique of postmodern theories of technology, which tend to present it as part of a 'continuous present' without continuities and historical memories:

> Presentism augments two ideological projects of the

> information age: the construction of social theories narrated by disembodied virtual minds, and the construction of technological histories written without women, without workers, and without politics. (Balsamo 1993: 699)

Balsamo's project, then, aims to re-root technology in historical identities, specifically in historically constituted bodies. *Synners*, with its multi-racial and socially diverse characters, seems to fit the need for different 'tales' about technology, tales which would emphasise 'the critical importance of the materiality of bodies in any analysis of the information age' (Balsamo 1993: 693).

My argument is that the attempt is not very successful in as much as the technological environment analysed by Balsamo has actually flattened any other category of identity through the gender dichotomy: in Net culture bodies come only in genders, they rarely come in races or classes. One of the possible explanations for this would be that, up to this moment, cybercultural bodies constitute a rather homogenous group in terms of class and race: gender and sexuality constitute in cyberculture not some marks of difference among others, but *the* marks of difference. Balsamo's attempt to analyse cyberculture in terms of gender/class/race is locked into the vortex of invisibility that swallows up race and class in electronic communication. In the end, when she actually comes to talk about cyberspace and VR, gender is reconstituted in the modality of this persistent dichotomy.

Balsamo starts her paper by recounting the tale of her mother and her grandmother, two working class women engaged in various forms of technological practices. Her grandmother was one of the first women to drive a car; her mother was a 'computer', an operator of the 'comptometer' a widely used electromechanical calculating machine which made her redundant a few years later. After this brief autobiographical account, she then proceeds to analyse the role of Cadigan's black protagonist, Gina, whose body is the only one to be marked by colour in the novel. In the last instance, however, Balsamo differentiates mainly between male and female relationships to technology. Although referring at length to the peculiarity of Cadigan's choice to have a black woman as protagonist of her novel, her conclusion replicates a familiar pattern: men and women have different relationships to their machines.

> Cadigan's novel is implicitly informed by Donna Haraway's cyborg politics: the gendered distinctions between characters hold

> true to a cyborgian figuration of gender differences whereby the female body is coded as a body-in-connection and the male body, as a body-in-isolation. Sam and Gina, the two female hackers, actively *manipulate* the dimensions of cybernetic space in order to communicate with other people. Gabe and Visual Mark, on the other hand, are *addicted* to cyberspace for the release it offers from the loneliness of their material bodies. (Balsamo 1993: 693)

Gender as a unitary category also seems to ground the other two important theoretical arguments she makes here and elsewhere (Balsamo 1996). She argues that VR technologies (the technological project inherent in electronic communication) are rooted in subjectivities with an interest in transcending the body, that is in male subjectivity. She also argues that the removal of the physical body does not mean that identities grounded in the body are obsolete. On the contrary, very often it implies a reproduction and a paradoxical naturalisation of identity.

In the first case she argues that there is a gender-bias in the 'supposedly disembodied (and gender-free) world of virtual reality' (Balsamo 1996: 123). This gender-bias aims to hide the fact that these technologies do not produce new subjectivities but are the product of the 'rearticulation of old identities to new technologies'. The main identity that is rearticulated has obvious stakes in having 'an illusion of control over reality, nature, and especially over the unruly, gender and race-marked, essentially mortal body' (Balsamo 1996: 127).

She also follows Sandy Stone's analysis of the inherent disembodiment/reembodiment process characteristic of electronic communication: 'In the speculative discourse of VR, we are promised whatever body we want, which doesn't say anything about the body that I already have and the economy of meanings I already embody' (1996: 128). For example '[i]nside of cyberspace, or out, the relations between these cybernetically connected bodies often recreate traditional heterosexual gender identities' (1996: 129). Balsamo concludes that this particular technology is very far from fulfilling its dreams of doing away with the body as a mark of identity; cyberspace is nothing else but

> an enticing retreat for white men from the burdens of their *cultural* identities. In this sense, it is apparent that although cyberspace seems to represent a territory free form the burdens of history, it will, in effect, serve as another site for the technological, and no less conventional inscription of the gendered, race-marked body. (Balsamo 1996: 131)

Hacker/cyberpunk subcultures, for example, believe that electronic communication is gender- and colour-blind. This assumption, in its turn, 'rests on the assumptions that 'text-based channels' represent a gender-neutral medium of exchange and that language itself is free from any form of gender, race, or ethnic determination' (Balsamo 1993: 695). Although insisting on race and ethnicity as constitutive of gender, Balsamo cannot help but miss the operation of the former in the working of computer culture.

When talking about online communication, Balsamo seems to share her idea of gender with a feminist like Dale Spender, whose stakes in the definition of woman as a *cohesive* and *consistent* category have not been altered by the recent, sometimes bitter, fragmentation of feminism. In her recent book *Nattering on the Net,* Dale Spender regards most of the on-line forums as being inhospitable to women, dominated by an adolescent aggressiveness that 'scares' women off and in urgent need of regulation. In a similar way, Balsamo's attempts to bring gender back into the disembodied rhetoric of electronic communication focus on the 'inhospitability' of cyberspace for women: 'on-line communication is structured similarly to communication in other settings and is overtly subject to gender, status, age and race determinations' (1993: 698). If we can actually see through her examples how gender operates in providing an unequal context for communication we cannot see a similar account for the raced and gendered body. Such a body exists as a liminal possibility, a means of debunking the neutral, optimistic rhetoric of computer culture.

Balsamo's predicament in trying to apply a fragmented notion of gender to electronic communication and VR remains to be solved by gender theorists analysing electronic communication and cyberculture. Endorsements of race, class, and ethnicity as factors complexifying the notion of 'woman' seem to come only from 'outside' of Net culture, and serve as a reminder of the still predominant whiteness (real or perceived) of CMC. Any attempt to reintroduce them at the heart of discussions around gender and electronic communication ends up revolving around a 'void' (the absence of bodies specifically marked by race and class).

Technology, gender, and class can and have been articulated in the context of a wider definition of technology which does not focus on online communication (women in the workplace) (Fuentes and Ehrenreich 1983; Haas and Perucci 1994); technology and race are similarly articulated in other spaces (surveillance technologies in the ghetto; the popularity of videogames

with young, black males; hip hop and music technology) (Dery 1993b; ; Davis 1990). Technology, gender, and race belong at the lowest level of the technological food chain, as witnessed in the classic evocation of the underpaid and overworked Asian worker in the microchip industry upon whose unacknowledged body the fortune of the computer empire is built (Ong 1987).

Race, class and ethnicity represent in theories of gender and CMC the same things they represent in mainstream analyses of cyberculture: a constitutive empty space. This empty space does not imply the absolute absence of voices of non-whites on the Net; it is rather a comment on their invisibility and the inability of cyberculture to deal with the substantial issue of *structural* difference.

Women on the Net

The ambiguities of gender identified by Rosanne Stone are those which are closer to the concerns of netusers. In her doubts around the real or potential possibilities of cyberspace for gender, Stone echoes the general wariness surrounding gender identity on the Net. The first thing somebody who goes online without a clear gender identity is destined to be asked is the famous 'MorF' question:

> MorF - An acronym for 'Male or Female?' Posed as a question in the People Connection 'rooms' of America Online as conversants try to determine the sex of other occupants. 'Sandy - *MorF??* ('Jargon Watch' *Wired*, March 1994: 30)

Women have reacted in many ways to this gender-obsession on the Net. Where gender politics is concerned, female users of electronic communication easily shift from an angry defence of their gendered subjectivity to a full endorsement of disembodiment as a new and unprecedented weapon for women willing to engage in a public space. Here again we find deep cross-overs between academic feminism and more public disputes around gender in cyberculture at large. Unsurprisingly, discussions about gender and cross-gender are inflected in the historical languages of the various feminisms developed in the last twenty years.

Some groups of feminists and women involved in electronic communication define gender politics in the 'virtual' space of the Net in terms similar to the way they see it in 'real' space. This position usually implies a belief in an essentialising version of gender which ties women

together in opposition with men. Dale Spender complains of increased levels of sexual harassment for women on the Net, a phenomenon made worse by the anonymity of electronic communication: '...the virtual reality is one where aggression, intimidation and plain macho-mode prevail' (Spender 1995; 198). According to Anne Balsamo 'electronic discussion lists are governed by gendered codes of discursive exchange that are often not hospitable to female participants' (Balsamo 1993; 697-698). Doctress Neutopia, a real personality on Usenet, complains in a letter to *Mondo 2000* that she has been censored and expelled from an electronic mailing list because of her feminist politics:

> I am a subscriber to a Listserve called Lery@pyramid.com. This group has about 200 people who are subscribed. when I began to point out the blatant sexist language and attitudes on Leri, I was 'flamed' by members of this so called 'virtual love commune'. We are seeing here a rise of a new form of tribalism. If the tribal leaders—the Patriarchal Writers—sense a voice which might be threatening to the tribal harmony of the old-boys network, then the group attempts to eliminate that voice in opposition. (Neutopia 1994: 9)

These women see no automatic reversal of power in electronic communication: women who want to speak have to go through the same process of harassment they have to put up with in real life. These women would not agree with Plant's claim that cyberspace is inherently a very comfortable place for women to be.

Other women, on the other hand, cling to the idea that the 'disembodiment' effect of electronic communication establishes a new terrain which women cannot give up: St. Jude, a famous hacker and co-founder of *Mondo 2000*, definitely argues for the advantages of the absent body:

> Cyberspace is better than an acre of warm tapioca for a tussle (I see no bruises here). This is the best training ground for women; we may start 10 down in a physically fight, OK, but the keyboard is a real equaliser — *better* than the Glock .45...
>
> ...Cries for niceness don't make it. Toughen up! You're dealing with people here, and primates act better when you stand up to them and give them a reason to respect you. I hate this waaaaah-I'm-a-poor-sensitive-weak-woman-protect-me shit. This kind of stuff generates more contempt for women. So *fuck* niceness. (St. Jude 1995: 119)

Laura Miller and J.C. Herz agree with St. Jude that disembodiment is a

definite advantage for women. For Miller online conversations allow women 'to forestall various 'alpha male' rhetorical tactics like interrupting, loudness, or exploiting the psychosocial advantages of greater size or deeper voice' (Miller 1995: 55). Herz agrees that 'men have no physical advantage in cyberspace. I am five six, but no one is taller than me on the Net. I'm not a big person, but no one can muscle me aside. To paraphrase FDR morphed into Naomi Wolf, there is nothing to fear but the victim mentality' (Herz 1995: 54).

Laura Miller also reacts strongly to the suggestion, advanced in an article in *Newsweek* in 1994, that the Net is 'an environment hostile to women' (Miller 1995: 49). She argues that these statements, increasingly common in mainstream media, have a definite political agenda . She fears that these arguments foreground attempts to regulate the Net. The idea is that once women and children are introduced in a frontier town 'the law must follow because women and children must be protected' (Miller 1995: 52). Miller fully endorses Bornstein's argument that the Net denaturalises gender: even the relentless attempts to interpret the gender of the disembodied other are proof that our gender system is artificial: 'If it comes 'naturally', why does it need to be perpetually defended and reasserted?' (Miller 1995: 53).

These arguments can be read as reactions against the trend in mainstream media, and in computer culture itself, of representing women in terms of a 'problem'—the point of entry of censorship into the anarchy of the Net. Sex and gender have been the major point of controversy in CMC in the last five years, and in some cases these controversies have involved the intervention of the law. I will give some examples just to make it clear how central gender is in the most recent public debates around CMC.

In 1993, Julian Dibbel described the first 'virtual rape' in an electronic site. The virtual rape happened on the popular LambdaMOO and involved a New York University student, whose pseudonym was 'Mr. Bungle'. LambdaMOO is a textual universe, objects and actions are always represented through words, and the degree of identification between individuals, their characters, and their actions is very high. Mr. Bungle created some 'electronic voodoo dolls' and literally acted as a ventriloquist with some female mooers as puppets: whatever he typed would come out on the screen as if the other character was saying it or doing it. By being able to type actions which would appear as if enacted by the character, he 'made' them speak and perform whatever he wanted. Everybody who logged into that particular room would read a very detailed description of sexual acts performed by

these mooers on themselves and on Mr. Bungle. The female mooers were also logged on at the same time so they went through the trauma of seeing their characters acting against their will in particularly degrading ways. The episode resulted in the end of 'free anarchy' on LambdaMOO and in the establishment of more classic democratic rules, such as petitions and ballots.

> In a few days, Haakon [Pavel Curtis from Xerox Parc] announced, he would build into the database a system of petitions and ballots whereby anyone could put to popular vote any social scheme requiring wizardry powers for its implementation, with the results of the vote to be binding on the wizards. At last and for good, the awkward gap between the will of the players and the efficacy of the technicians would be closed. And though some anarchists grumbled about the irony of Haakon's dictatorially imposing universal suffrage on an unconsulted populace, in general the citizens of LambdaMOO seemed to find it hard to fault a system more purely democratic than any that could ever exist in real life. Eight months and a dozen ballot measures later, widespread participation in the new regime has produced a small arsenal of mechanisms for dealing with the types of violence that called the system into being. (Dibbel 1993)

Another famous case that, this time, made it to the 'real' courts concerned Jade Baker, a student at the University of Michigan imprisoned for publishing a violent SM story about a female classmate (Elmer-DeWitt 1995b). In December 1994, sophomore student Jade Baker composed three sexual fantasies and posted them on alt.sex.stories. The tone of the stories was particularly violent.

> Women (and young girls) in his stories are kidnapped, sodomized, mutilated and left to die by men who exhibit no remorse. Baker even seemed to take pleasure in the behavior of his protagonists and the suffering of their victims. "Torture is foreplay," he wrote in the introduction to one of his pieces. "Rape is romance, snuff is climax". (Elmer-DeWitt 1995b: 69)

Baker was arrested and then released, but Catherine McKinnon immediately used the story to propose new laws that would address pornography on the Net (*ibid.*). MacKinnon's brand of feminism is also deemed responsible for the Canadian crackdown on Bulletin Board Systems in 1993 (Margulis 1995).

In the June of 1995, Nina Martin reported a case of women causing havoc on the Net. At Santa Rosa's Junior College in California, a network run by

the university was closed down because of the 'gender war' between women and men on the network. Following some women's requests, the network allowed the set-up of men-only and women-only conferencing areas. The women who requested the exclusive area claimed that they had been harassed and prevented from speaking in some of the mixed conferences. The separation only resulted in more trouble. The men used their conferences to make obscene and insulting remarks about one of the women users, which were referred back to her. The result was a fight which ended up in the US Department of Education's Office of Civil Rights in San Francisco. The network was consequently shut down (Martin 1995).

Finally sex and gender have been used in Democratic Senator James Exon's 'Communication Decency Act'. The Act declares the service provider responsible for the posting of obscene material on the Net and has resulted in widespread anti-censorship computer activism (Meeks 1995; Heileman 1996).

All these cases show the existence of a gender/sex war around electronic communication, which in many cases is perceived to be women's fault. For example in the Santa Rosa's case, Nina Martin thinks that maybe things would have been different if the woman involved 'had been more accustomed to the rough-and-tumble of online discourse' (Martin 1995: 101). Feminist attempts to redress the balance of power between the genders by using the law, it is argued, just bring in more censorship. Against this stereotyping which would see them as hapless victims or the gateway to censorship, St. Jude, Miller, and Herz argue that they are active agents in relation to technology. Furthermore they claim that the 'disembodying' effect of CMC is both an empowering weapon and a means to deconstruct the gender system altogether. In their accounts, the Net is neither male or female, but belongs to a potentially *post-gender* space, a deconstructive space where the fiction of gender reveals itself for what it is.

In all its multiple forms, gender will undoubtedly continue to be an issue in Internet culture. Old feminist debates around the nature of gender will keep being deployed to understand the role of women on-line. In relation to the idea of the Net as postgender, for example, we can already see the emergence of old arguments about transsexuals and transvestites. In the new environment of disembodied communication, cyberspace as 'post-gender' will eventually reproduce old and new feminist disputes around the 'radical' nature of cross-dressing.

We can already point out some convergences of the two areas. Both

transvestites and CMC help us to see through the artificiality of gender: Miller argues that electronic communication hints at 'how artificial, how created, our gender system is' (Miller 1995; 53). Discussing transsexuals, Judith Shapiro claims that they 'make us realize that we are all passing' (Shapiro 1995; 257). Both cross-dressing and CMC allow us to imagine different kinds of gender: Bornstein claims that cyberspace is the door to the 'third space' a metaphor introduced by Marjorie Garber in her discussion of cross dressing; J.C. Herz believes that 'the Net has become a gender laboratory for the twenty-first century' and a 'bevy of virtual transvestites' (Herz 1995: 150; 152).

CMC and cross-dressing also display the same gender asymmetry. When women perform the male they are usually understood to aspire to an authority which is not allowed to them as biological women. Herz again points out that 'when female netters do talk, they often use male pseudonyms' (Herz 1995: 53) and Balsamo quotes a female net-user saying that 'women purposefully choose gender-neutral identities' in order to be able to speak (Balsamo 1993: 698). Shapiro argues that Female to Male (FtM) cross-dressing has completely different connotations that MtF, in as much as a woman who aspires to be a man is seen to really aspire to be a person:

> ...our notions of what a man should be like are linked to our notions of what a person, in general, should be like. This is an important factor in the differential tolerance for cross-gender behavior in women and in men. Women wanting to be like men can be seen as engaging in an understandable project of upward mobility. (Shapiro 1991: 270)

There is also a certain irony about the fact that the author of *Surfing on the Internet* chose to 'hide' her gender from the reader by shortening her first name to J.C. We get to know J.C'. s gender only after one hundred pages—a tribute, we suspect, to a market for Net-literature which is still predominantly male. In the same way we expect to see the righteous anger of Janyce Raymond (1979) against MtF transsexuals and cross-dressers replicated in women's hostile reaction to men trying to pass for women in order to get attention or a glimpse of lesbian sex ('You talk to a man after he's been a woman online and he'll usually laugh and describe some kind of sex he had, usually lesbian sex' Bornstein 1995: 116). William Gibson anticipated the erotic thrills for men in gender-switching: in *Neuromancer*, Case is hooked in a system which allows him to feel Molly's body, and he

finally gets to know 'just how tight those jeans really are' (Gibson 1984: 70). CMC will probably continue to provide men with another voyeuristic thrill and at the same time will enable more 'gender outlaws' to build their 'third space'. In any case gender on the Net will continue to be another theatre where the historical relationship between the genders is played out—not regardless of the body, but in relation to the body.

Summary

In this chapter I have used feminist discussions about gender and technology as a way of understanding a possible gendered experience of CMC. This gendered experience contradicts many of the cybercultural claims about the natural, spontaneous operation of electronic communication. Gender creates a fundamental fissure in the cybercultural consensus and cyberculture cannot deny that gender generates differences which cannot be spontaneously ignored.

I have therefore explored at length just how many different genders CMC has been given and on what basis: cyberspace is female in as much as it replicates the experience of the maternal womb (Springer) and because it replicates women's subject position in a patriarchal system (Plant). It is male because it reproduces the subjectivity of the male computer engineers in charge of designing it (Stone, Balsamo) and because men are a majority (Spender). It is multigender because it opens up important spaces in the consistency of gender/sex/desire (Stone, Balsamo), demonstrates the artificiality of gender categories and erases the physical advantages of the male (Bornstein, Miller, Herz).

In particular I have used Stone's characterisation of cyberspace as potentially 'multi-gendered', but practically dominated by binary sex as a way into wider discussions about the function and stability of gender in Net culture. I have tried to point out some ways in which the question of gender in electronic communication covers different spaces and locales, ranging from the internal politics of computer conferences to political agendas in the regulation of CMC. I have enumerated the ways in which genders are essentialised (harassment), played against the grain (positive effects of disembodiment) or dismissed altogether (CMC as postgender). In all these cases, the question of gender in cyberculture demonstrates the unsustainability of the cybercultural emphasis on spontaneous self-regulation and equality in technomastery.

[1] Shulamith Firestone's *The Dialectic of Sex* was a fundamental text in popularising ideas about the radical feminism of the 60s and 70s—what Toril Moi has defined as the 'second wave' of feminism (see Moi 1985). Firestone argued that the real dialectical conflict of history does not occur between the classes over production but between the sexes over reproduction. She argued that a technological revolution which would liberate women from the exclusive duty to have children would be the end of sexual oppression and consequently of women's subordinate status in most societies (Firestone 1970).

[2] Gordon's appeal to a new kind of feminist SF has been taken up by women like Melissa Scott (*Trouble and Her Friends*, 1994) and Wilhelmina Baird (*Crashcourse* 1993), who use cyberpunk as a generic frame for their deviant female characters.

[3] See also Ortner (1974) and King (1981). It is worth mentioning here that there are some communities on the Net which embrace paganism and its revaluation of womanhood. These communities (the technopagans) do not see electronic communication in contradiction with an ancient spirituality. We have to remember that electronic communication is potentially susceptible to being interpreted as a 'mystical' technology itself, nominally non-pollutant and non-hierarchical (see Borsook 1995 about the 'Goddess' in the machine).

[4] Benjamin Woolley reports on Alan Turing's original gender game in the 50s where a man and a woman in separate rooms tried to convince each other that they were women. Gender swapping is still a favourite game on the net (in Woolley 1995: 105).

Conclusion

In this thesis I have illustrated how some of the groups most involved in the cultural politics of high-tech conceptualise technology, their role in it, and the future it promises for the world. I have demonstrated how cybercultural rhetoric ignores the structural differences which mediate access to technology and wealth. In the process I have engaged with discourses around the politics, technology, subjectivity, and gender of the Internet, and demonstrated their debt to popular science writing and other cultural traditions. This thesis is meant to help scholars to understand and therefore confront some discourses concerning the popular perception of new technologies.

In chapter 1, I have asked how 'cyberculture' can be theoretically defined. I have therefore looked at how Mark Dery and Anne Balsamo understand the meaning of the term 'cyberculture' (Dery 1993b; Balsamo 1993). For both authors, cyberculture includes a diverse field of practices and texts. Cyberculture comprises many technological subcultures, a certain kind of performing arts, cultural practices involving the consumption of smart drugs and techno music, a new kind of specialised press and communities collected around the use of CMC. Since cyberculture seems to cover a large cultural field, I have decided to focus only on some cybercultural groups. These groups should present some fundamental traits—such as being actively involved with CMC and expressing themselves mainly through texts.

I have also considered carefully the ways in which 'cyberculture' has been defined in more theoretical terms. I was particularly interested in Anne Balsamo's statement that cyberculture is a 'cultural formation' (Balsamo 1993) In Lawrence Grossberg's definition, a cultural formation defines a fragmented, but articulated set of cultural practices (Grossberg 1992). I have come to the conclusion that 'cultural formation' is a useful term to work with, but it also needs to be reviewed and modified. In particular I have established that Grossberg's use of the term does not take into account the different status of the texts or practices included in the formation. Some texts have more power than others (such as in the case of scientific discourse). A cultural formation also operates in relation to other discourses and practices which define it from without (such as the mass media). A cultural formation is also never just a 'field', but is always constituted out of very complex histories, histories which need to be understood.

I have then come to the conclusion that a methodology for the study of cyberculture should use tools as different as subcultural theory, textual analysis, Internet fieldwork and sociological studies of class, science, and technology. Subcultural theory helps to understand the relationship between a cultural formation and the mass media. Textual analysis is also particularly pertinent to cyberculture, especially those sections of cyberculture involved in the computer networks. These sections communicate through texts and are very involved in all kinds of textual activities—such as publishing magazines, participating to electronic discussion groups and writing books. Finally, an assessment of the class position of cyberculture and of the nature of science and technology can help to recover the specificity of the cybercultural discourse.

Since CMC is essential to the sections of cyberculture I have analysed, I have come to the conclusion that this thesis should also offer an account of discussions taking place on the Internet. I have therefore outlined the nature of fieldwork on the Internet and its differences from more traditional kinds of fieldwork. Fieldwork on the Internet has specific advantages and disadvantages. The main advantage is the fact that discussions on the Internet can be studied by a position of virtual invisibility; all the researcher needs to do is to log on. There is no danger that the field will be affected by the physical presence of the researcher. There is also no danger of losing nuances such as intonations and facial expressions, because of the textual nature of CMC. On the other hand, the researcher can never be sure of the identity of an Internet user; the sheer abundance of textual material also poses new problems—such as how to select meaningful and accurate data out of the hundred messages which are posted online. I therefore concluded that since the focus of this thesis is not exclusively on Internet fieldwork, I would just use a few statements as representative of a generalised consensus. These statements are used mainly to show that some themes present in the cyberpress are shared by the users of CMC. This research does not aim to explore the complex nature of Internet newsgroups. It just demonstrates that opinions expressed by the specialised press are shared by users of CMC.

In chapter 2, I have asked how cyberculture can be located in relation to a specific class position. I have argued that cyberculture can be understood in relation to the emergence of a particular kind of knowledge worker. By looking at the critical literature on the nature of the 'information society' and 'knowledge work', I have come to the conclusion that cyberculture is not the

expression of an homogenous 'knowledge class'. Following Frank Webster, Stanley Aronowitz and William DiFazio, I have demonstrated how the so-called 'knowledge class' is very fragmented (Webster 1995; Aronowitz and DiFazio 1994). Knowledge workers occupy all kinds of position in the hierarchy of salary and rank. Cyberculture is the expression of a particular section of the knowledge class. Although this section is generally international, it is mainly located in North America. According to Kroker, Weinstein, Hayes and Barbrook the centre of cyberculture is North California, but its ideas are also popular wherever there is a developed high-tech industry (Kroker and Weinstein 1994; Hayes 1989; Barbrook 1995). Cyberculture is the expression of a new class of high-tech workers, whose relationship with technology is active and rewarding.

These groups share a new experience of work. This experience is mainly common among (but not limited to) those individuals who work in the high-tech industry. Its main characteristics are high mobility, autodidacticism and the formation of communities based on networking. These workers are usually highly independent; they either own their own business or change company according to how interested they are in a particular project. This combination of the fact that they are not attached to a specific company and that they work with ICT makes them particularly receptive to CMC. CMC allows them to build communities of like-minded individuals, who very often share the same interest in technology. My conclusion has been that the characteristics of this high-tech workplace can be productively used to understand the context of the cybercultural discourse. In the rest of the thesis, for example, I underline the cybercultural emphasis on the exchange of ideas and on individual autonomy and creativity; both these traits are typical of this new class. Cyberculture also reacts ferociously to any attempt to impose limits on the access to technology and stresses the importance of advanced technoliteracy as a way to build a better future. People who work in the high-tech industry are mainly technological entrepreneurs. They combine a scientific outlook with economic savoir-faire; economy and science are also very often combined in cybercultural narratives about the nature of technology.

In chapter 3, I have asked what theory of technology might be more helpful to understand cyberculture. I have therefore analysed the ways in which different approaches to the study of technology can be related to the study of computer-mediated communications. I have rejected the technological determinism underlying many analyses of cyberpunk and

cyberculture. I have therefore assessed the usefulness of theories that see technology as affected by economic and social factors. In particular I have asked how the theory of the social construction of science and technology can facilitate an understanding the history of CMC. Theories about the social construction of science and technology argue that technology is always the result of an interaction between different actors. In the case of CMC, these actors include the US government, scientists engaged in military research, hackers and computer hobbyists.

However, I have also found that studies of the social construction of technology are not sufficient to explain the nature of cyberculture and its relationship with CMC. I have come to the conclusion that in the study of CMC it is very difficult to distinguish between the cultural uses of technology and technology itself. Netusers are involved in the process of shaping CMC; many of them are involved in writing software and in campaigning for the freedom of CMC. The structure of CMC, however, influences in its turn the nature of the communities formed around the use of electronic communication. It encourages the formation of communities based on partial anonymity and textual exchange. In order to use CMC, one has to fulfil a certain number of characteristics—such as being sufficiently technoliterate, located in a connected area and being able to afford the technology.

I have come therefore to the conclusion that the technology of CMC is constituted through the activity of its users, as in social constructionism, but also constitutes its users. The current structure of CMC is such that some individuals have more chances of using electronic communication than others. Those individuals who have access to CMC communicate in circumstances which are shaped by CMC itself—such as the fact that they cannot see each other and they have to communicate through textual exchanges. I have therefore come to the conclusion that CMC is not a closed technology; it keeps being constructed by its users and it constructs its users in its turn.

In chapter 4, I have asked questions about what exactly cyberpunk science fiction is and how it can be related to cyberculture. I have therefore looked at the history of cyberpunk science fiction, its early association with young hackers, the adoption of cyberpunk by magazine *Mondo 2000* and the current status of cyberpunk in Internet culture.

I have looked at statements expressed by cyberpunk writers and science fiction critics in order to understand the nature of cyberpunk as a movement

in the science fiction genre. I have found that cyberpunk writers wanted to change science fiction by introducing a new literary style and a new interest in cybernetic technologies. They claimed to be able to represent technology as it is lived in the streets. They also claimed that contemporary technology is very different from anything that preceded it; it is intimate, closer to the body and it changes the nature of human beings' relationship to the real. Cyberpunk writers also claimed that they were inspired by contemporary youth technological subcultures. I therefore concluded that cyberpunk drew its specificity from its location in the history of SF and from its relation to emergent technological subcultures.

I have then demonstrated how cyberpunk science fiction came to be associated with a new generation of hackers. These hackers identified with the figure of the 'console cowboy'—Gibson's name for young computer criminals. Between 1988 and 1991, these hackers were identified with cyberpunk by the police and by investigative journalists such as John Markoff. Markoff and Katie Hafner wrote a book titled *Cyberpunk*, in which they describe a new generation of computer criminals (Hafner and Markoff 1991). I have also found that hackers have been deeply involved with the history of computers in the US. Hackers could rely on cultural traditions which exceeded cyberpunk science fiction. In the 50s and 60s, hackers were involved with research on mainframe computers and in the '70s they substantially contributed to the PC revolution. The '80s hackers, or cyberpunks, were the first hacker generation to be actively involved in CMC.

I have also analysed the ways in which the magazine *Mondo 2000* adopted cyberpunk in the mid-eighties as part of its cultural project. This project aimed to reappropriate technology as a means of personal empowerment. *Mondo* borrowed much of its rhetoric from the sixties counterculture which it mixed with cyberpunk and postmodernism in order to shape the first explicit definition of 'cyberculture'.

I have therefore gathered that cyberpunk science fiction is deeply related to cyberculture; the early cyberculture inspired cyberpunk writers and welcomed cyberpunk fiction in its turn. I have also established that many of the groups who were associated with cyberpunk science fiction have a very complex history of their own and that this history is an important legacy of cyberculture as a whole.

In chapter 5, I have asked what kind of political imagination structures the relationship between netusers and the technology of CMC. I have started

from Jameson's idea that cyberpunk science fiction is a deeply paranoid genre. I have therefore looked at Internet culture and established that this paranoia also exists among netusers. As in cyberpunk science fiction, however, paranoia is not the only attitude towards technology expressed by Internet culture. Paranoia is often balanced by an ecstatic celebration of the potential of the technology of CMC, which Internet culture considers a revolutionary technology. One of the findings of this chapter regards the widespread presence throughout Internet culture of this split between paranoia and ecstasy, fear and celebration.

I have looked in particular at the atmosphere of unrest on the Internet which followed two proposals put forward by the Clinton administration: the Digital Telephony Bill and the Clipper Chip. Both proposals increased the control exercised by the government on CMC. I have found that Internet culture responded by emphasising how CMC can generate a more democratic society. CMC can accomplish this democratisation because it is based on a many-to-many broadcasting model: many people communicate with many people. This promotes diversity and creativity, whereas the mass media promote standardisation and passivity. I have found that this contrast is often defined as a contrast between industrial and postindustrial technologies and institutions. The government and the mass media belong to the industrial age and they are trying to modify the new technologies and turn them into something similar to the mass media. Internet culture argued that this could be avoided if netusers exploited their superior technological skills to fight the repressive legislation imposed by the government. I have therefore found that advanced forms of technoliteracy, which I call technomastery, are essential to political agency in the cybercultural discourse.

In chapter 6, I have asked how cyberculture has interpreted the contamination between the body and the machine which was a characteristic trait of cyberpunk. I have also asked whether cybercultural accounts of the techno-body could help us to understand what are the implications of the emphasis on technomastery demonstrated in chapter 5. I have therefore looked at posthumanism, a philosophy which argues that humans will be superseded by a new technologically-enhanced species. I have analysed posthumanism in two sites: the Extropy group and the magazine *Mondo 2000*. The analysis of documents produced by these groups reveals deep consistencies between posthumanism and cyberpunk science fiction. I have also found that these consistencies might be due to the fact that both

posthumanism and cyberpunk science fiction have been influenced by the work of the same scientists.

I have therefore looked in detail at the work of three scientists: Hans Moravec, Richard Dawkins and Eric Drexler. Moravec and Drexler have been repeatedly quoted by *Mondo* and the Extropy group. Richard Dawkins has also been very influential within cyberculture at large, but in this chapter I have looked at his work and its implications for posthumanism. Dawkins has popularised the idea that genes are the fundamental evolutionary unit and that genes are just encoded pieces of information. His idea that life is just information has provided the basis for Moravec's theory of 'transmigration'—the idea that the chemical structure of the human brain can be translated into digital units and downloaded into a computer. Posthumanists consider 'transmigration' to be the culmination of the evolutionary process. I have also found that nanotechnology has provided posthumanists with the idea that posthumanism is technologically possible. The nanotechnologist Eric Drexler claims that infinite manipulation of the human genome is possible by moving atoms around with very sophisticated machines. This manipulation would allow human beings in the future to live in a world of infinite prosperity mediated by nanotechnology. I have therefore established the importance of science in helping cyberculture to formulate posthumanism.

Both posthumanism and the scientific narratives that support it also offer an interesting perspective on the nature of technomastery. They define technomastery as an evolutionary quality. They also claim that evolution is not just a biological process, but an economic necessity. If the individual and the nation want to survive in a competitive global economy, they have to keep ahead of the race for technological innovation. This unstoppable race will result in the evolution of the species. My conclusion has been that these narratives are not just about evolution; they are also about the need to become a certain kind of subject who is able to survive and win in a competitive economy. Many of the qualities which an aspiring posthuman must possess are also highly valued by the technological workplace: adaptiveness, creativity, autonomy and advanced technoliteracy. I have concluded that in posthumanism technomastery is not a weapon against repressive legislation, but a quality which helps the subject to survive in a competitive economic system.

In chapter 7, I have asked how Internet culture conceptualises the technology of CMC. I have answered this question by looking at cyberpunk

science fiction, Internet newsgroups and the work of a group of journalists and writers collected around the magazine *Whole Earth Review* and its BBS, the WELL. Many of the writers and friends of the *Whole Earth Review* have become central figures of cyberculture. In particular, I have looked at the work of Kevin Kelly, who was a writer for the *Whole Earth Review* and later became editor of another influential magazine, *Wired*.

I have found that netusers often describe the technology of CMC as a self-organising system. The Internet is described as a huge organism which cannot be controlled because it acts according to its self-defined rules. I have called this idea 'cyberevolutionism'. I have also found that the group collected around the *Whole Earth Review* had a fundamental role in popularising the notion of the Internet as a self-regulating system. By looking at the history of the *Whole Earth Review*, I have come to the conclusion that cyberevolutionism was conceived as a way to bridge the gap between the environmentalist concerns of the *WER* and the technology of CMC.

By looking in detail at the work of Kevin Kelly, I have also established that cyberevolutionism has some very problematic implications. Cyberevolutionism, in fact, claims that we live in a world where control is out of reach of any central locus of decision-making. However, systems are always designed by somebody and cyberevolutionism erases the issue of who makes the decisions about how a system should work. This erasure establishes a new kind of control, which is less direct and hierarchical than the control promoted by the industrial model, but no less efficient. Like posthumanism, cyberevolutionism is explicitly articulated in economic terms and shares much of its rhetoric with contemporary management literature.

In chapter 8, I have asked how gender is read in the context of women's relationship with technology. I have therefore looked at feminist readings of technology in general and CMC in particular. I have then analysed how the problem of gender is lived on the Net and what women who are involved in CMC have to say about gender and the computer networks. By looking at feminist criticisms of technology in general and CMC in particular, I have come to the conclusion that different definitions of gender generate different perspectives on CMC. Claudia Springer and Sadie Plant, for example, conceive of gender in terms defined by Lacanian psychoanalysis. Therefore they define the Internet as a space where the individual personality is dissolved—literally a 'matrix', a 'womb' in the Lacanian sense. Rosanne Stone, however, sees gender as an embodied performance. Therefore she

thinks that the Net encourages deviant performances of gender that disrupts the continuity between body/sexuality/subjectivity.

I have also found that gender is often the subject of controversy on the Net. From pornography to sexual harassment and discrimination, gender is often at the centre of legal disputes on the Internet. I have also found that many women who are involved in CMC reject the idea that women are vulnerable on the Internet. On the contrary, they claim that the fact that CMC disembodies them makes them stronger. Women on the Net cannot be physically bullied as in real life. Other women have remarked how the invisibility of gender on the Internet has created the phenomenon of the 'virtual transvestite'—women or men who pretend to be the opposite gender. According to many women, the 'virtual transvestite' phenomenon illustrates the precariousness of the category 'gender'. I have therefore come to the conclusion that gender is a structural difference which creates considerable conflict and therefore undermines the utopia of difference in equality which rules Internet culture.

By looking at all these different aspects of the cybercultural discourses on CMC, I have therefore produced a study of a contemporary formation at the centre of the culture of high-tech. I started by asking questions about the cultural specificity of cyberpunk science fiction, a literary genre which had often been treated as the expression of an abstract spirit of the age. This specificity has allowed me to understand the complexity of those sections of cyberculture most involved with CMC. This complexity is the result of the deep crossovers between fields as different as literature, economy, science, and subcultural and countercultural traditions.

Cyberculture claims to be politically radical because it promotes a culture which allows the individual to express himself/herself. I have come to the conclusion that there are deep problems with this position. One of these problems regards the fiction of the autonomous individual who is liberated by the use of electronic communication: individuals are not autonomous but are always connected to a set of cultural and economic relations. These relations determine not only who will have access to CMC, but also how this access will be lived. A woman is less likely than a man to have access to CMC. If she is privileged enough to be part of the Western knowledge class, her gender will still make her relationship to CMC different than a man. I have also come to the conclusion that these flaws might be the result of the unresolved participation of cybercultural rhetoric with a new kind of economic discourse. This discourse stresses technological mastery,

innovation, and entrepreneurial self-regulation as important characteristics to join a new economic order. This economic discourse is also replicated in many scientific discourses. This combination of economy, science, and political radicalism is very powerful and needs to be confronted critically.

If I had to start a similar project today, however, I will probably no longer use cyberpunk to understand cyberculture. I would feel confident enough to understand cyberculture on its own. This option was not available to me when I started. As a European student trained in literary criticism, I would have not been able to understand the phenomena I have researched without the extensive literature on cyberpunk. Cyberpunk has been extremely relevant in understanding cyberculture, but I have also aware of its limits as a guide to the culture of CMC. Cyberculture, after all, cannot be understood exclusively through a literary genre—as popular that genre might be.

In spite of its limits, cyberpunk served well the purposes of this thesis. I started looking for the specificity of cyberpunk science fiction and I ended up discovering the complexity of a larger cultural formation. In this sense, this study has satisfied its initial motivation: it has counteracted the process of 'forgetting' history, which is typical of a discourse which emphasises the importance of the new.

According to some of the groups I have analysed, in fact, obsolescence is the worst possible fate in the age of Information. Obsolescence also haunts any project based on the ever-shifting and developing ground of cyberculture. To counteract this rhetoric of enforced updating, I would like to stress that historical moments are not equivalent to technocommodities, they cannot be discarded as irrelevant once they cease to be 'new'. Many of the developments analysed in this thesis are certainly transitional, but this does not imply that they should be forgotten the minute they have passed. If one lesson can be learned from the pitfalls of cyberculture, it is that it is important to keep a sense of how historical moments are articulated in order to understand the legacies they bequeath.

The transitional moment examined in this thesis is important because it represents the emergence of some powerful stories about the nature of a new medium. This emergence is unique only in as much as it coincides with the rise of this medium to public centrality; the stories have been formulated in the passage of a new technology from a minority underground status to a position of hegemony concerning the representation of the future. The Internet defines the contours of the 21st century across magazines, journals, films, comic books, and advertising campaigns. It is important therefore to

understand how this past future has been articulated by those who feel they were there first—by the so called 'pioneers on the electronic frontier'. Their narratives will be there to welcome future users of electronic communication and will probably shape the development of the technology. They are determining the shape of computer activism, the bills and acts which are fought, and the issues which are not discussed. These decisions will have consequences not just for the bodies of the wired minorities, but also for those who do not know or do not care about 'wiredness'.

I have two reservations, however, about the way this project has developed. I am concerned about the feeling of consensus which I have conveyed in order to trace the emergence of certain themes. Although I do believe that this consensus exists, I am also aware that it might be a lot less stable than it appears to be. I decided to downplay some of the instabilities because at this stage they have not yet developed in any way which might crack the overall consensus. I think that the differences I refer to are not yet divisive, but I would like to emphasise that they are there and they might develop further and in unpredictable ways.

The fissures in the consensus of cyberculture will almost certainly emerge more powerfully in the next couple of years, and some signs are already visible. *Wired* magazine might play a central role in cracking this consensus in as much as its free market liberalism cannibalises the most cherished countercultural and oppositional values of cyberculture. *Wired* represents a strong formulation of what the new medium is about, and its unabashed propagandism is bound to attract dissent from the ranks of the high-tech subcultures. Contradictions will probably emerge from inside these communities which will have to learn to work with categories other than posthuman bodies and self-organising systems. I am convinced that it is by working on these inconsistencies that we might create a useful debate *with* cyberculture—and not just an analysis *of* cyberculture. With the possible exception of *Wired,* cyberculture at large is far from being a conservative monolith, and some of the scary narratives which have emerged in this research call more for confrontation and dialogue than for rejection and stigmatisation.

My second reservation is that I have also downplayed my participation in the discourse of cyberculture; in spite of my humanist and sociological affiliations, there is more in common between me and these groups than I have acknowledged. I am convinced that this is not a personal problem, but it derives from a, so to speak, *class proximity* in the great pool of knowledge

work. The culture of work encouraged by the increasing privatisation of higher education resonates with the milieu out of which these narratives emerge. Many of the stories I have explores are also very close to a tradition of left radical thinking which I feel protective of. My consistent exorcism of this affiliation might be the result of a genuine dread of looking in the inverted mirror of cyberculture and recognising the perversion of keywords like 'decentralisation', 'active reappropriation of' and 'access to knowledge production', and 'spontaneous organisation'. The proximity of traditional left thinking and the more conservative aspects of cyberculture has to be acknowledged. A positive engagement with cyberculture cannot be achieved without addressing it.

Finally I would like to try and imagine what the future of cyberculture might look like. Recently Lachlan Brown, a colleague at Goldsmiths' College, suggested to me that the future might come from the interaction of three groups: what he calls the 'techies', the computer studies people, the artists and designers who are busy exploring the possibilities of the Net and the humanists who are trying their out a new technological expertise. These three groups might become the new composite voice of cyberculture; the techies/artists/humanists triad imagined by my friend would still be a minority phenomenon, but at least it might generate a wider range of opinions and perspectives.

There are also all kinds of dimensions that are changing and will continue to change cyberculture in the near future. When I started this project, the Web was very much in its infancy. Now with its emphasis on commercial interfaces and search engines, its possibilities for one-man publishing ventures, the requirement of minimal technical expertise, and the neglect of communication between two engaged speakers, the Web has already changed the Internet I knew. The expansion of the Web also coincides with the expansion of the Internet at large beyond North America and offers the first experience of electronic networks for most European users. Unlike the US, most British students have very limited access to the Internet. Undergraduate students at Goldsmiths' College, for example, have immediate access to e-mail and the Web, but no access at all to Usenet or irc, and they need to be really interested and persevering to find out about gopher, FTP, or MOOS and MUDs.

Finally we are yet to know when and whether the Internet will stop expanding, how it is going to develop in different geopolitical contexts, what kind of legislation will regulate it, and what kinds of technical protocols will

become predominant.

These weighty issues will demand a more detailed and engaged reading of particular aspects of CMC. The study of cyberculture as a single cultural formation will probably become gradually increasingly obsolete. I predict that the cybercultural consensus is about to disintegrate, although some of its features will undoubtedly be replicated. One of the questions I am interested in pursuing beyond this thesis is whether the use of scientific metaphors and narratives will be one of these features. What kind of function will science perform in a less techno-oriented Internet culture? How will science be deployed in the future, more fragmented cyberculture? Two of the electronic mailing lists I have been monitoring lately, Future Culture and Cybermind, seem to include individuals whose disciplinary allegiances are more varied than the techies analysed in this thesis. Science, though, seems to have persisted as an authoritative, explanatory category and recently has been exported in cultural studies by the likes of Sadie Plant (Plant 1996). I am interested in pursuing further what Downey, Dumit and Williams have recently called 'the flow of metaphors in both directions between the realms of science theorizing and technological production on the one side and of popular theorizing and technological participation on the other'. (Downey, Dumit, and Williams 1995: 344) My next project will probably concern this function of science as a legitimising strategy in the construction of cultural narratives related to the politics of high-tech.

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