# Contents

CHAPTER 1

# Theoretical Frameworks

In this chapter we survey influential theories of culture and technology. This survey ranges across many perspectives on the social and cultural significance of technology. We consider debates within media theory and cultural studies; we discuss various theories of technology and society. We also introduce a number of approaches that have been termed 'poststructuralist'.

Our survey will address many complex issues arising from the interplay of technology and culture. How do we live with technology? What impact does it have on our lives? How should we conceive of technology? Are technologies neutral in themselves, that is, does the way in which they are used determine their cultural impact? Or do technologies have intrinsic properties that shape the cultures into which they are introduced?

We commence this chapter with the debate arising from the last two questions. This debate can, in very broad terms, be said to involve a contest between a technological determinist position and a cultural materialist one. After considering the various arguments involved in this dispute, we move on to some of the broader perspectives on the interaction between culture and technology.

## Technological determinism

Technological determinism refers to the belief that technology is the agent of social change. It is both a popular attitude – reflected in such expressions as 'you can't stop progress' – and a theoretical position. The term was coined by social scientist Thorstein Veblen in the 1920s, at a time when social policy in industrialized nations was increasingly influenced by technical capacity – but the notion is older than this. Technological determinism is linked to the idea of progress; in this sense it was forged as a social attitude in the

Victorian period, in which progress was measured in industrial terms: speed of movement, volume of production. Of course, technological determinism is still with us. It is equally significant in the post-industrial era: the terms 'information society' or 'computer age' betray the technological determinist notion that society is shaped by its dominant technologies.

Technological determinism tends to consider technology as an independent factor, with its own properties, its own course of development, and its own consequences. Technological change is treated as if autonomous: removed from social pressures, it follows a logic or imperative of its own. This viewpoint holds that a successful technical innovation, if implemented on a sufficiently wide scale, will generate a new type of society: hence 'the steam age', 'the age of electricity', 'the information age'. The choices open to societies undergoing a technological 'revolution' are limited to restricting the upheavals caused by the 'culture shock' induced by the new technology. One example of this view is the 'future shock' predicted in the popular writings of Alvin Toffler, who warned that post-industrial societies need to protect themselves from the more dislocating effects of automation and computer-based technologies.

Technological determinism usually refers to the present, projected onto the future, as expressed in claims that 'we have no choice but to adopt this technology'. But as a theoretical approach it is also used as a means of interpreting cultural history. Several significant theorists, from a range of disciplines, have made studies of the cultural effects deriving from technological developments, often with regard to media. Eric Havelock (1963), for example, argues that the technology of writing, using the phonetic alphabet, made possible profoundly new modes of thought, first expressed in Plato. Walter J. Ong, a scholar of orality and literacy, similarly insists on the deeply significant consequences of writing as a media technology: 'More than any other single invention, writing has transformed human consciousness' (1982: 78). Elizabeth Eisenstein's (1979) study of the printing press analyses its key role as an 'agent of change' in European culture, with ramifications in religion, science, economics, exploration and politics. Jack Goody developed the notion of 'intellectual technologies' such as writing, print and electronic media, each of which creates a different 'cognitive potentiality for human beings' (1977: 128). Most recently, Pierre Levy has appraised digital networking as the latest intellectual technology to modify the 'intellectual ecology' (1994: 10) into which it has been installed.

Not all of these authors would agree to the description 'technological determinist', but in tracing the far-reaching cultural effects made possible by certain technologies (writing, print, the Internet), their focus is on the way in which a new technology creates a new potential and possibility for human thought, expression or activity. One theorist who was not at all reticent in pursuing a technological determinist line was Marshall McLuhan, the most well-known, and most controversial, exponent of a cultural theory emphasizing the properties of specific technologies.

## Technologies of media

McLuhan's basic premise is that all technologies are extensions of human capacities. Tools and implements are extensions of manual skills; the computer is an extension of the brain. McLuhan adopted this and other concepts from the earlier work of Harold Innis, whose *Empire and Communications* was published in 1950. McLuhan's fame – or notoriety – arose from his observations in the 1960s on the cultural effects of mass media and other technologies (his *Understanding Media* of 1964 is a collection of his popular essays). His writings received renewed attention in the 1990s and beyond, when several commentators and theorists of the Internet hailed McLuhan as a prophet of digital networking. Paul Levinson's 1999 book *Digital McLuhan* is a prime example of this interpretation. For Levinson, McLuhan's most famous idea – the global village – makes most sense in the age of the World Wide Web.

For McLuhan, media are technologies that extend human sense perceptions. In proposing that 'the medium is the message', McLuhan argues that the cultural significance of media lies not in their content, but in the way they alter our perception of the world. The impact of any technology is in 'the change of scale or pace or pattern that it introduces into human affairs' (1974: 16). The particular impact of media technologies is in the way they alter the 'patterns of perception steadily and without any resistance' (p. 27).

McLuhan is emphatically a technological determinist, defining history by technological change. The technology of writing induced a fundamental shift in the way human beings relate to each other, emphasizing vision over sound, individual readership over collective audiences. The cultural effects flowing from the shift from orality to literacy (which occurred over a long transitional period) have been itemized in the works of McLuhan, Ong, Havelock,

Goody and others: they include the development of analytical thought, the cultivation of artificial memory, of abstraction and linearity.

McLuhan's main focus, however, was the electronic mass media, which generated their own cultural consequences in the twentieth century. For him, radio, cinema, hi-fi and television constituted a shift away from the cultural conditioning of print, with its intellectual legacies of linearity and rationality. The globalized flow of information, which commenced with the use of satellite broadcasting in the 1960s, created the 'global village'. The 'electric speed' of communication, its primarily audio-visual basis, and the saturation of society with images and sounds from around the world, produced a total perceptual field, in contrast to the ordered patterns of print-dominated cultures. For McLuhan, the cultural effects of the print medium were rationality and social fragmentation; audio-visual mass media, by contrast, provided a continuous and instantaneous stream of information from an enormous variety of sources. The result was a cultural implosion, in which people were more aware of the world as a 'village' community: they could begin to think 'mythically' once again, throwing off the straitjackets of a culture determined by the properties of print.

McLuhan interpreted the cultural discord within Western societies in the 1960s as the result of culture lag: the older generation, determined by the hierarchical values of print ('a place for everything and everything in its place'), was threatened by the spontaneity and collectivity unleashed, within youth culture, by the new electronic media technologies. Walter J. Ong, a like-minded but more cautious scholar than McLuhan, also finds in the culture shaped by electronic mass media a 'secondary orality', reflecting the communal sense and instantaneity of preliterate culture.

McLuhan's writing is deliberately provocative and often simplistic; it also ignores the socio-economic factors underpinning these cultural developments, as his many critics have pointed out. Other theorists, however, have pursued a similar line of inquiry in more scholarly fashion. One of the most thorough analyses of the cultural effects of electronic media has been conducted by Joshua Meyrowitz, whose book *No Sense of Place* (1985) examines the impact of television in particular. For Meyrowitz, like McLuhan, the key to a medium's cultural effect is not found in its content, but in the way it conveys information. Unlike literacy, which demands the lengthy acquisition of reading and writing skills, electronic media are far more accessible to people of all ages. As a result,

television continually reveals hitherto hidden or private behaviour: children are exposed to adult behaviour; the private lives of individuals become public property. Meyrowitz therefore asserts that age and gender divisions have blurred in the age of TV; he also claims that the continuous exposure of politicians' private and public failings has destroyed the possibility of the Great Leader.

The staples of TV – the close-up, the probing camera, the revealing of private spaces – have been generalized, according to Meyrowitz, into a contemporary cultural condition: the obsession with exposure.

> The Victorian era – the height of print culture – was a time of 'secrets'. Our own age, in contrast, is fascinated by exposure. Indeed, the *act* of exposure itself now seems to excite us more than the content of the secrets exposed (1985: 311).

The intrinsic properties of TV also favour emotion and spectacle over reason and argument. TV news incorporates footage designed to trigger emotional responses: sorrow, fear, amusement. Reality TV raises the 'act of exposure' to the level of mass entertainment. The widespread international mourning at the death of Princess Diana, whose career was played out in front of cameras, is testament to the emotive power of the TV medium in particular.

## Baudrillard and the technologies of simulacra

The influential cultural theorist Jean Baudrillard follows on from McLuhan in several respects. Baudrillard's theories are provocative and controversial, as were McLuhan's; both push a theory of technology, media and culture to extreme positions. For Baudrillard, contemporary culture is increasingly determined by an array of technologically produced 'simulacra', which has come to hijack reality itself.

Baudrillard's theory of simulacra (signs which are copies of other signs), based as it is on the generative power of media technologies, owes a great deal to McLuhan. One difference between the two is that McLuhan's optimism regarding the effects of electronic media gives way to pessimism in Baudrillard. Yet both draw on the role of mass media in representing reality. Baudrillard explicitly modifies McLuhan's 'the medium is the message' dictum, so that it becomes 'the medium is the model'. It is the model for

behaviour, perceptions, knowledge of the world, sense of self, reality itself. In societies more mediated than ever before, bombarded with images of themselves, reality is reproduced so many times that it produces a 'hyperreal' condition: more real than the real. This is what Baudrillard means by 'the precession of simulacra': the representation of the real comes before the real, so that it becomes the real. Simulations no longer refer to real objects, people, facts and societies. They increasingly refer only to each other, moving faster and faster. Think of advertising. Think of the video clip. In this maelstrom of simulation the real disappears. No meanings, just media-produced simulations. No coherent society – just a whirl of signs through a now inconsequential ground of bodies. The Internet.

It is important to realize that reality was not hidden by this simulation – quite the opposite. It was hijacked by simulation and made obscene – too much of it was seen too fast. In its increasingly rapid movement the real was converted into something much more portable – the sign, the simulation. Wildlife and travel documentaries are a small part of this; reality TV is the 'pornography of everyday life' beamed back at us. This does not mean that people, objects and so on, have ceased to exist. It is just that it is no longer the exchange of objects, a common or known history, an assumed social cohesion or conflict that holds the social together. For Baudrillard, what moves through it is simulation. There is no more object and, subsequently, no more subject. Just saturation in simulation, in which everything is now everywhere and yet nothing can be pinned down.

What transports these simulations? How do they move through us? The answer is that they move through the screen and the network in the 'ecstasy of communication' (1988). We are more and more 'wired' to our interfaces. We react to simulations – to the television news rather than the world, to a computer program rather than social interaction, to email rather than vocal communication. In all of these we react to simulations rather than to the immediate environment. In the meantime we still consume – but now, where once we consumed objects, we consume signs.

Baudrillard thinks the obsession with communication for its own sake eradicates the message. There is nothing to be communicated but communication itself. This is like those many conversations on a mobile phone that are about the fact that one is talking on a mobile phone. As Baudrillard puts it:

> Ecstasy is all functions abolished into one dimension, the dimension of communication. All events, all spaces, all memories are abolished in the sole dimension of information: this is obscene (1988: 85).

For many critics, Baudrillard's position – even more extreme than McLuhan's – is untenable. It is certainly hyperbolic, and gives the appearance of fatalism, whereby nothing can be done to prevent the precession of simulacra. A more charitable reading of Baudrillard might point to a 'fatal strategy' in his work, which at least alerts readers to the influence of these media-generated simulations (we discuss his controversial *The Gulf War Did Not Take Place* in Chapter 7). For our purposes here, Baudrillard is significant as a latter-day technological determinist, founding his theories on the technologies of information and media. For him, like McLuhan, these technologies have exerted a profound effect on culture, an effect largely beyond social control.

## Cultural materialism

It is readily apparent that technological determinism, for all its insights into the specific properties of technologies, offers a one-sided perspective on the relation between technology and culture. In removing specific technologies from their social and political contexts, this approach treats technologies in isolation, as if they come into existence of their own accord and proceed to mould societies in their image. There is an alternative perspective, however, which is concerned to situate those technologies, at all times, in their social and cultural context.

We shall give the name 'cultural materialism' to that theoretical approach which foregrounds the complex interplay of factors associated with cultural change. Other terms could serve just as well: two such terms are 'the sociology of technology' or 'critical theory', which cover a range of critical thought within various disciplines. We shall concentrate for the moment on the genesis of 'cultural materialism' as a means of analysing the relationship between technology and culture.

Raymond Williams used the term 'cultural materialism' with reference to his own work, which has been highly influential in the discipline of cultural studies. The 'materialism' component of the term signifies that cultural change is to be interpreted as part of a

historical process, in which economic, political and institutional pressures play an integral part. Williams distanced his approach, however, from conventional historical materialist (Marxist) analysis, which overplayed the economic determinants of social and cultural forms. While he was critical of economic determinism, he was also vigorous in his refutation of technological determinism; his critique of McLuhan is especially significant for our purposes here.

Williams's criticism of the technological determinism articulated by McLuhan is concerned with all the things that McLuhan leaves out of his analysis. For Williams, such a narrow focus on the technology and its intrinsic properties constituted 'an attempted cancellation of all other questions about it and its uses' (1975: 126). Williams opposed McLuhan's reductionist version of cultural history, which posited each new medium as a cause from which inevitably flows a stream of new cultural effects:

> . . . if the medium is the cause, all other causes, all that men ordinarily see as history, are at once reduced to effects (p. 127).

Whereas in McLuhan all media operations are desocialized, Williams emphasizes social need and political intention as significant factors involved in technological development. His book on television, for example, is subtitled 'Technology and Cultural Form'; in it he explores the cultural and social forces that created both the need for broadcasting, and the institutional frameworks that oversaw its implementation. Rather than simply accepting (and celebrating) the marvellous advent of radio and TV and the consequent shaping of culture in their wake (the McLuhanite approach), Williams looks for the particular circumstances into which these technologies were introduced. Developing social conditions after the First World War – larger cities, more mobile populations, greater emphasis on the family home – necessitated more extensive systems of communication. To meet this need, the technology of radio, originally used as a means of point-to-point communication in a manner similar to telegraphy (or the Internet today), was redeployed as a form of mass broadcasting.

The other pressing concern uncovered by a cultural materialist analysis is the political context of technological development. Broadcasting was an economic and political entity as much as a technological and cultural one. The transformation of radio into a mass broadcasting medium suited two sets of interests. Manufacturers of radio technology made profits from the large receive-only

sets that were installed in homes; state authorities nervous about the political potential of radio were concerned to limit its range of uses. A complex of government policy-making and capitalist economic interest was responsible for the implementation of radio (and then television) broadcasting. This complex differed in specific contexts: European governments exercised stricter controls than were applied in the United States, for example. But in all cases, political decision-making determined the technology's implementation, and its cultural shape (formats, content).

Williams's critical account of broadcasting history is one example of his cultural materialist approach in action. It can easily be observed that he fills in all the factors that McLuhan leaves out: social need, economic interest, political control, specific decision-making, the broader sociocultural context. McLuhan's assertion that radio 'created' Hitler in Germany and the teenager in the United States is condemned by cultural materialism as a gross form of shorthand at best, a collusion with conservatism at worst. Williams's critique of McLuhan indeed contended that 'the medium is the message' took its place within an active ideology of progress, a depoliticizing of technological innovation. The need to expose the political and economic decision-making behind new technologies is probably the greatest legacy of Williams's work. As we have seen, considerations such as these are virtually absent in technological determinist accounts. Although McLuhan prophesied the global village, he had nothing to say about ownership and control of that village; Baudrillard likewise writes in generalities, ignoring the specifics of political economy.

Brian Winston's historical study of media technology follows the cultural materialist path laid down by Williams. In his book *Media Technology and Society*, Winston analyses the development and implementation of media from the telegraph to the Internet. His concern is with the pre-existing social formations in which technological developments occur. Unlike McLuhan, Winston's analysis is historically based, focusing on the 'social sphere . . . conditioning and determining technological developments' (1998: 2). This orientation is able to provide answers to questions arising from the history of technology: why do some inventions succeed while others do not? Why are some inventions created simultaneously by inventors who have no contact with each other? Winston answers the second question as would Williams, by referring to the 'social necessity' to which inventors of any one period will respond.

The matter of the success or failure of inventions entails several

factors. Winston gives the name 'supervening social necessities' to those diverse social forces that affect the process of innovation. A technology prototype may not be taken up because no use for it can be foreseen; on the other hand, one technology may create the need for another (trains and telegraphy, aircraft and radar). Perfectly useful technologies may fail in commercial competition (Beta vs VHS videotape), while others are actively suppressed by market rivals through litigation or the securing of patents.

In the case of media technology, government regulation can play a major role. Winston proposes a 'law' of the suppression of the radical potential of media technologies, a process most clearly seen with the emergence of new media forms. The advent of digital television in the late 1990s created consternation in the media sector, as rival organizations bade for control of the radical new potential of this technology. Governments in Britain, Australia and elsewhere 'licensed the technology to established industrial entities', thus stabilizing the sector by 'constraining the radical potential of the latest development . . .' (1998: 14). The regulation of datacasting, which has largely protected established media proprietors from the threat of Internet broadcasting, is another example of this process.

The considerable body of work devoted to the social context of technologies operates as an antidote – or corrective – to technological determinism. *The Social Shaping of Technology*, a collection of essays edited by MacKenzie and Wajcman, summarizes in its title the orientation of this work. It opposes the doctrine of progress – 'we have no choice' – that has been invoked in the name of technological development since the nineteenth century. MacKenzie and Wajcman state their denunciation of technological determinism: 'a new device merely opens a door; it does not compel one to enter' (1988: 6).

The characteristics of a society play a major part in deciding which technologies are adopted, and how they are implemented and controlled. The research and development facilities of transnational corporations control much technological development in the contemporary world. Military research has contributed a myriad of technological devices to civilian society, not least digital computers. In other areas, as we have seen, the state has direct decision-making powers regarding technology and its development. This can mean that within any culture, specific technologies may be either developed or repressed. Many of the technological inventions associated with Europe – including the printing press and the clock – had been pioneered centuries earlier in China, but

these inventions were given no support by the ruling Chinese elite, which favoured stability over innovation.

The 'social shaping of technology' approach, then, is careful to consider the overall dynamics of society. For MacKenzie and Wajcman, the relationship between technology and society cannot be reduced to a simplistic cause-and-effect formula: it is, rather, an 'intertwining'. By highlighting the 'social shaping' of technologies, they support a 'politics of technology' in order 'to shape technological change with human betterment and environmental protection in mind' (1999: xiv–xv).

Stephen Hill, in his book *The Tragedy of Technology*, describes this subtle interplay of forces as the 'cultural text' that includes new technologies as one of its elements. Any cultural ramifications of a new technology must be appraised within the many strands of this text.

> Technological change . . . is not, by itself, productive of social change. Instead, the direction of change is a product of the particular alignment between the technological possibilities and the society and culture that exists (1989: 33).

Hill discusses the proposition that 'barbed wire destroyed the aristocracy in Britain', in that it rendered the traditional fox-hunt much more difficult. On the surface this seems an instance of technology (barbed wire used to parcel off property) generating cultural effects (the decline of the aristocracy). But Hill argues that this connection can only make sense if analysed as part of a long, involved social process, keyed by the changing nature of class relations during the Industrial Revolution. Economic and political factors are entwined with cultural activities and their use of various technologies.

Barry Jones, in his book *Sleepers, Wake!* discusses the example of the motor car, and the shaping of twentieth-century urban development in its wake. A city like Los Angeles may seem to be a huge cultural effect of a technological cause: the advent of the car as an alternative mode of transport. Jones, however, exposes the economic and political decision-making that lay behind this model 'car-based city of the future' (1988: 214). The public transport infrastructure of Los Angeles was purchased by the car and rubber-tyre manufacturers, then eliminated; citizens came to accept that the use of their own vehicles was a superior alternative to a deficient public transport system. But this was not, as Jones points out,

the inevitable cultural result of a new technology. One can imagine different cultural choices and outcomes.

The 'cultural text' includes many other elements beside the technology and decision-making such as those mentioned above. Existing patterns of ownership, class relations, gender relations, the role of advertising and public relations, the flux of social attitudes and beliefs: each of these contributes to the way in which technologies are developed, introduced, used, even resisted. The nineteenth-century Luddites – English cloth workers who smashed textile frames in protest at the industrialization of their craft – have their equivalents in the twenty-first century. Contemporary Luddites share with their predecessors the concern that technological innovations may work to the detriment of society, rather than its improvement. Large-scale developments often meet resistance from protestors suspicious of the developers' economic and political motivations, and alarmed by the developments' social and environmental consequences. Apart from 'neo-Luddism', a well-documented adverse reaction to technological innovation is 'technophobia'. Mark Brosnan summarizes this condition as a fear or anxiety towards new technologies, particularly computers; it is estimated to affect up to a third of the industrialized world (1998: 36).

## Is technology neutral?

Those theorists concerned to refute technological determinism affirm the importance of choice in implementing, or opposing, new technologies. Integral to their case is the claim that technologies may be used in a number of ways, resulting in a number of possible cultural effects. Technologies do not determine; rather, they operate, and are operated upon, in a complex social field. It is the way technologies are used, rather than any intrinsic properties of those technologies, that is crucial. In defusing technological determinism, then, we are often left with the notion of technology as neutral, awaiting deployment for specific ends.

Barry Jones, for instance, regards technology in this way. He proposes that any technological change 'has an equal capacity for the enhancement or degradation of life, depending on how it is used' (1988: 231). This argument is certainly common in theoretical discourse; it also has a common-sense appeal as a social attitude: 'it's not the thing itself, but the way it's used that counts'. The

argument strikes against the generalizations of technological determinism; it also rebuts the idea that a new technology generates inevitable consequences.

How do theorists sympathetic to technological determinism respond to this criticism? McLuhan is forthright in his rejection of it; in fact he treats this view with contempt. Discussing media technologies, and the idea that 'it is the way they are used that counts', he denounces this argument as 'the numb stance of the technological idiot' (1974: 26). For him, the most profound cultural change occurs due to the structuring role of new technologies – on cultural behaviour, on consciousness, on our perceptions. For McLuhan, technologies, especially technologies of media, radically alter the way we are; it is a petty distraction to isolate the way those technologies may or may not be used.

Other theorists, whose attachment to technological determinism may not be as complete as McLuhan's, are more circumspect. A weaker version of determinism might argue for a correlation between technological change and cultural transformation, or for a more complex engagement between the two. It may contend that a new media technology alters the 'communicative relationships' between individuals, allowing for a diversity of possible emphases within such new relationships (Bernadelli and Blasi, 1995: 10–11). Or that a new technology creates a 'precondition' for cultural change, which may then proceed in a number of different directions, depending on other circumstances. The technology is thus seen as one factor in a matrix of factors. The political ramifications of an unrestricted technological determinism ensure that many theorists are extremely cautious in their conclusions. Pierre Levy, for all his utopian flights regarding the potential of virtual technologies and digital networking, sounds such a note of critical caution. We must distinguish, he warns,

> . . . causal or determining actions from those that prepare the way for or make something possible. Technologies don't determine, they lay the groundwork (1998: 128).

Other influential writers on technology and culture have attempted to expose the political consequences of technological determinism, often with a sense of resignation. The 'liberal pessimist' tradition of criticism is intensely critical of the 'technological imperative', while acknowledging the grip of this imperative on contemporary culture. This tradition of critical writing takes its

cue from the earlier sociological theory of Max Weber, which lamented the imprisoning nature of rationalization in early twentieth-century society. The Frankfurt School of critical theory developed an influential critique of the 'culture industries' of contemporary societies. Theodor Adorno and Max Horkheimer, leading Frankfurt School theorists of the 1940s and 1950s, proposed a view of mass culture as an industrialized apparatus, in which science, technology, media and consumerism are elements of a heavily administered social system. A number of like-minded studies of technology appeared in the 1960s, all critical of the technological obsession which had suffused Western societies. Herbert Marcuse's *One Dimensional Man* (1964), Jacques Ellul's *The Technological Society* (published in English in 1964) and Lewis Mumford's *The Myth of the Machine* (1967) all pursued a critical agenda. None of them, however, was content with the notion of technology as neutral; they argued, rather, that technology had become a powerful regulating system in itself.

Ellul's *The Technological Society* typified this strain of critical pessimism, asserting that 'technique has become autonomous' (1964: 14). (Ellul uses 'technique' in the abstract sense of 'technology'.) For Ellul, technology has become the system in which we live: rationalized, all-encompassing and dehumanizing. Technique has produced 'Technical Man'. Technology is a self-running system to which humans have adapted themselves, without even being aware of it. 'In the modern world, the most dangerous form of determinism is the technological phenomenon' (p. xxxiii). Like the cybernetic systems deployed in automation, technique runs according to its own rules, and humans – the inventors of these techniques – have submitted to these very rules. Ellul's writing is both politically motivated and fatalistic: he analyses the extent of technological determinism but is overwhelmed by its sway over contemporary life.

Another recent commentator along similar lines is Neil Postman, who has described in pessimistic detail the cultural decline furthered by an irresistible technical apparatus. Postman contrasts electronic media unfavourably with the print culture of an earlier era in his book *Amusing Ourselves to Death* (1985). For Postman, the enormous volume of information unleashed by mass media has had negative consequences: the trivializing of political and ethical thought, the degradation of civil values. (In this respect, Postman is diametrically opposed to McLuhan.)

Other recent writers, however, are less pessimistic. The advent

of digital media technologies, and the spread of the Internet, have encouraged certain theorists to celebrate the potential of these technologies. The non-hierarchical, uncontrollable nature of the Internet, and the ease of access to much digital information, have been seen as enabling rather than restricting in their potential. Sadie Plant (1997), for example, argues that the intrinsic properties of digital media are favourable to those citizens traditionally marginalized in society. Regarding access to technology, this marginalization has historically included women. The structured political hierarchies of gender, race and class are much less oppressive in the emergent technosphere (we shall examine claims such as these in more detail in later chapters).

Andrew Feenberg, in his book *Critical Theory of Technology* (1991), continues the critical analysis of technological society, while resisting the fatalism of Ellul. On the one hand, Feenberg agrees that contemporary technology is so influential that it cannot be regarded as 'neutral': 'Modern technology is no more neutral than medieval cathedrals or the Great Wall of China; it embodies the values of a particular industrial civilization . . .' (1991: v). Yet rather than succumb to a generalized sense of 'the immanent drift of technology', Feenberg identifies the specific political character of technological systems:

> The values and interests of elites are installed in the very design of rational procedures and machines even before they are assigned a goal . . . technology is not destiny but a scene of struggle (p. 14).

This approach couples the political awareness of the 'social shaping of technology' criticism with the 'cultural critique of technology' established by earlier writers.

Such an approach was prefigured, to some extent, in the work of Lewis Mumford. His monumental lifelong study of technology and society (his *Technics and Civilization* was published in 1934) became progressively more critical of the direction taken by Western societies. His *Pentagon of Power*, published in 1970 as the second volume of *The Myth of the Machine,* makes some interesting distinctions regarding technologies and their sociocultural contexts. Mumford is scathing of the 'technological imperative': for him it is as binding, yet as arbitrary, as 'the most primitive taboo'. Supported by consumerism and a blind devotion to progress, this imperative demands that we 'surrender to these novelties unconditionally, just because they are offered, without respect to their

human consequences' (1970: 185–6). Yet while acknowledging, like Ellul, the pervasive power of 'megamachine' society, Mumford is more hopeful that political choice may be exercised in the quest for alternative versions of technological development. He discerns an alternative to the 'megatechnics' of the 'military–industrial–entertainment complex', that joining of corporate, government and bureaucratic interest. Mumford gives the name 'polytechnics' to that deployment of technology that is more conducive to a small-scale, pluralistic and decentralized power base.

This notion has been taken up by Langdon Winner, one of the most subtle theorists of technology, politics and culture. Winner is certainly dismissive of the naive form of technological determinism, yet in his book *The Whale and the Reactor* he also rejects the single-minded social determination theory, whose central premise he summarizes as: 'What matters is not technology itself, but the social or economic system in which it is embedded' (1986: 20). For Winner, this approach is deficient in that it eliminates altogether the characteristics of technical objects. It needs to be complemented by attention to those characteristics, which may in themselves have political ramifications. Winner points out that certain technologies necessitate political and cultural responses by their very structure: Haussmann's broad Parisian boulevards, designed to prevent revolutionary activity in narrow streets, require a different form of political activity, as do the huge plazas and ugly concrete buildings on American university campuses of the early 1970s, constructed to defuse student activism. These technological systems, and many others, were of course designed with these express intentions, yet they support Winner's initial premise that technologies are ways of building order in the world. Once the initial choices have been made, these technologies will continue to invoke certain responses; they become part of the 'order of things'.

Winner goes further, however, in wondering if certain technologies may be considered 'inherently political'. That is, are there some technologies that demand political and cultural responses in themselves, irrespective of social control or intention? Do 'intractable properties in the things themselves' lead to 'unavoidable social responses' (1986: 27)? Or does a governing body, social elite or institution need to insert such devices into a pre-existing social pattern, thus determining their use and effect?

Taking his cue from Mumford, Winner suggests the examples of nuclear energy as opposed to solar energy. The former, by its very nature, demands a highly centralized and regulated system

to implement it. The related technology of nuclear weaponry demands a rigid, authoritarian chain of command. Solar energy, by contrast, is 'decentralizing in both a technical and political sense'; it encourages communal and individual use on a small-scale, self-sufficient basis. Winner admits that this dichotomy is exceptional, based on extreme examples. But he proposes as a general principle that certain industrial technologies have required certain patterns of power and social organization to administer them. Railroads, construction and manufacture have been attended by specific 'aggregates of people and apparatus' – hierarchies and infrastructure. Winner suggests that if there were alternatives to these socio-political patterns, they were less effective in managing the technologies' potential, and hence not pursued.

Winner is certainly aware of the contentious nature of these claims. By no means is he an apologist for irresponsible progress or authoritarian control of technologies. He is simply concerned that in discussing the cultural context of technologies, we do not lose sight of the specific characteristics of those technologies themselves. In a way, his writing forms a synthesis between the technological determinism of McLuhan and the cultural materialism of Williams. It provides a sophisticated means of considering technologies' cultural and political impact.

From this perspective, it is difficult to maintain the notion that technologies are neutral, that it is simply the way they are used that matters. The common-sense aspect of such a viewpoint has often been used by theorists and activists critical of conservative decision-making in society. But it should not be forgotten that this 'common-sense' idea is employed by other political programmes as well.

The idea that technologies are in themselves neutral is also used for conservative political ends. It is the argument presented by the gun lobby in resisting tighter gun ownership controls: 'Guns don't kill people, people kill people.' This political argument proposes that the gun technology itself is neutral; it is the way it is used – responsibly or irresponsibly – that counts. The counter-argument to this position is that the gun, by its very presence, alters a situation. A violent conflict may be dangerous but non-fatal without a gun involved; the addition of a gun drastically increases the possibility of fatality. The gun creates the precondition for extreme harm, achieved much more easily than with knives or other objects. As well, a potentially violent person armed with a gun is something quite different from a person armed with a knife, or an unarmed

violent person. With a gun, one can kill or harm from a distance, without the need to engage the other with one's own body. The act becomes disengaged from physical contact; violence becomes impersonal. The fundamental changes introduced by the gun technology would seem to refute the claim that the technology is in itself neutral.

## Knowing the world differently: poststructuralist thought

If technologies carry within them a certain kind of politics, they also seem to imply particular 'configurations' of our relations to the world at large. In other words, we know the world differently through different technologies, and different technologies themselves are in turn a response to knowing the world differently. Although this is obvious, the less obvious implication is that technology may dwell closer to the very heart of whatever we call the 'human' than we might like to admit. As technologies change, it becomes important to assess the challenges made, through technology, to basic definitions of the human. Some theorists have been recently led to write, for example, of the 'posthuman' as a contemporary exceeding of the human by entities thoroughly merged with machines.

Notions such as the posthuman have arisen out of a broader set of ideas that acknowledges the entire world as one of fundamental change, instability and variation. The label 'poststructuralism' has been given to a diverse set of theoretical approaches (emerging from the challenge to structuralist thought in the late 1960s) that refutes the existence of a universal underlying structure determining social or cultural behaviour. Poststructuralists are more likely to focus on the contradictory, dynamic elements of culture, emphasizing the unpredictability of language, culture or social systems. For these thinkers, there are no eternal values, and change no longer occurs between stable entities. Everything is change, and changes occur only between other changes.

The thinkers of interconnection and flux, and of the radical cultural breaks afforded by recent cultural developments, are not always those involved with 'high tech'. Rather they are linked in an attitude that favours leaving older attitudes and practices behind in order to enjoy what is good about a general dynamism. How do we enjoy dynamism normally? Central to this is the element of technique discussed in the introduction.

That technique is central to a consideration of technology and

culture is obvious. However, difficult questions soon arise. For example, although we know that machines imply techniques, there is the question of whether they can be used without them. On the other hand, there is the question of whether techniques exist unattached to specific technologies. If so, this implies a much broader scope for the technical. Then there is the question of thought, which could be considered just a series of techniques – such as mnemonics, the art of memory. If thought is only a series of techniques, this might imply that machines could think as well. Could we say that animals possess technique, or mountain ranges, or thunderstorms, or even technologies themselves? A full consideration of technique raises all these issues and more. For some critics then, the unravelling of eternal truths in favour of cultural practices suggests a manner of understanding culture – and indeed the world at large – as a series of forces to be dealt with technically, rather than a series of meanings to be attacked or defended. In this way, meanings become means.

We can follow some of the examples given by Michel Foucault, one of the most influential poststructuralist thinkers. One example (1988) is that the opposition set up between madness and civilization at a certain point in history has no essential basis in truth – a true madness or sanity. Neither madness nor sanity have any intrinsic meaning but are instead produced in the world by a series of technical operations by which we know the world, and each other, through the concepts and practices of madness and sanity. Foucault follows this by arguing that psychoanalysis and other forms of psychiatric regimes do not so much discover neuroses and psychotic behaviours as contribute to their production. These forms of production concerning mental disturbance are subsequently extended into general culture, in the form of notions of mental health, or intellectual performance in IQ tests, magazine self-help quizzes and so forth. Or, the techniques give birth to related technologies: of restraint, from hospitalization and medicinal developments up to contemporary pharmaceuticals or electroconvulsive therapy. In all this, practices and judgements to do with sanity, civilization and madness are the result of cultural and technical *forces*. This is not to say that madness and sanity do not exist. It is rather to comment on how and why they exist as they do. For Foucault, their existence is contingent and technical before it is anything else. Likewise, other supposed essential aspects of the human such as sexualities are produced at certain points of history as a series of techniques that form discourses and bodies in a certain fashion (Foucault 1978).

Foucault's theory is based upon the circulation of techniques as culture. As these techniques shift we know the world – and, we could say, are known by it – differently. For Foucault all knowledge is therefore technical knowledge. Knowledge does not innocently contemplate the world from a distance. Knowledge is instead a series of techniques that participate in, and to some extent organize, a series of forces in the world. This is especially true of abstract knowledge, which is unique only in that it allows a certain portability to the force with which knowledge expresses itself. For example, the abstract concept of the panopticon as developed by Jeremy Bentham – a form of incarceration in which prisoners are disciplined through technologies of surveillance – is portable in that it can be instantiated in a range of institutions and technical practices, from prisons to schools to the monitoring of individual use of the Internet. Foucault pointed to the urgent necessity of a constant re-evaluation of various techniques as a way of the individual being able to respond to the culture in which he or she is immersed, in a kind of 'art of the self'. This takes the way in which the world is given to one – and one is given to the world – and recombines the techniques involved according to one's own needs. In this environment culture can be creative, not in that it consists only in what happens in the arts, but in that it may consist of 'a proliferation of inventions in limited spaces' (De Certeau 1998: viii). The more complexities that move through a small space, the more possibilities there are for invention – in the realm of the everyday especially.

Certainly these ideas have their critics. For the prominent German theorist Jürgen Habermas, for example, these may not be the right questions. He opposes what he called the 'technocratic consciousness' (1996: 53–65) – which he finds in thinkers such as Foucault – to something outside of it. He suggests if we take the technical as the basis for ethics or politics there is the danger of seeming to solve problems without the need for public discussion. This masks the real problem for him, which is precisely one of communication and democratic participation in the life of the society. He proposes the nurturing of what he calls 'communicative action' as a counter to this.

## Going with the flow – 'machinic' thought

Yet there is perhaps not such a division between technology and communication as Habermas suggests. Neither is culture perhaps

so threatened by the technical as both Foucault and Habermas propose in their different ways. Another perception of the technical would be one perhaps of its adaptability. Much of contemporary cultural life is indeed about adapting our thinking, our perceptions, our techniques and our technologies to accelerating, and more and more interactive, flows. These flows include the movement of planes, trains and automobiles, but they are more generally about what they facilitate. This would include the flow of goods and information around the world in globalization and transnational capital, and the flow of cultures and languages around the world in massive migration and tourism. These flows would also include the urban flows in which each day many individuals travel further from home than many in previous centuries may have travelled in their entire lives.

These ideas can also apply to the *relations between* technologies, animals, humans, and the world, in what we could call the broader 'machinic' way of thinking about the world. This is a manner of thinking most clearly described by Gilles Deleuze and Felix Guattari (1987). What we would normally conceive as specific and isolated technologies are participants in a broader natural and cultural flow in a 'machinic' dimension. This machinic dimension will be a major theme in this book, both as a way of understanding the integration of technology into everyday life, and of accessing some of the more surprising examples of the relations between culture and technology. The latter can, for example, be found in the work of some contemporary artists. Jane Edden's art works often fuse the natural and the technological in startling ways: her *Lemon Field* installation (Figure 1.1) uses 100 lemons as 'batteries' to power mechanical insects. Nigel Helyer's *Silent Forest* installation (Figure 1.2) constructs a 'forest of media technologies', producing a thoroughly technologized naturescape.

In general, technologies are as much relations between cultural and physical forces as they are objects, if not more. This means that technologies can be studied not only in terms of their specific form, but also in terms of their function and their various contexts. What does this mean in practice? Here technologies that look quite similar can in fact function quite differently. Think of a car and a tank – they have quite different functions. Think of the television and the computer monitor, the audiotape and the video cassette, the music compact disc and the CD-ROM (often these two functions are on the same disk these days). Some of these look exactly the same but they often express quite different cultural and natural

**Figure 1.1** Jane Edden, *Lemon Field*, 2001

forces. They function quite differently because of the way that they connect to the rest of the world. To sum this up, sometimes it is more important to think of the actual function of a technology – materially and culturally – than its form.

Perhaps one of the reasons that contemporary life seems so determined by technology is not as fundamentally technological as it might seem. It is rather that our thought and culture have finally aligned themselves with flow, become even obsessed by it – in other words, our thought and culture now align themselves with that which technology does best. How do you make people flow? You invent traffic or escalators. How do you fly? You work the flows of air turbulence over a wing. How do you win wars? You work with logistical flows. Most of the technologies developed in the

**Figure 1.2** Nigel Helyer, *Silent Forest*, 1996

twentieth century were developed in response to the increasingly complex problems of flows – from air turbulence to the fluctuations of the stock market.

How then does technology fit into all these flows? It is perhaps in thinking about such questions that we rethink the world once again. Here we come to one of the main themes of this book, which is that technological change is both continuous and discontinuous. Technology indeed introduces dramatic changes, but even these changes are not totally removed from what has come before. The computer as a specific idea is at least 300 years old. The effects of plumbing lay the ground for the domestic transformation of kitchens and bathrooms, leading to the developments of kitchen appliances and huge shifts in interior design and urban design. Not

the least of these has been the very possibility of satisfactory living in large urban concentrations – something that many technologies both depend upon and make possible – such as the telephone system. Some technologies, like the Walkman, only subsequently become necessary in such an urban space.

As a further contribution to this urban consolidation, with all its benefits and problems, consider the rise of food processing (in cans, for example). Or consider other forms of hygiene development such as the medicalization of the house, the rise of the hospital, urban security technologies. This leads not only to the possibility of the city, but the conquest of the world by the city. The rise of the city as a kind of technology in itself into which humans are inserted leads to some surprisingly machinic claims about humans. In 1937, an ad for a laxative proclaimed that in the modern metropolis where 'high speed living' and 'unfavourable eating and working conditions' make unhealthy demands on the human body . . . The bowel, like a modern railway, must have a regular schedule of operation' (Lupton and Miller 1992: 512).

Technologies do not then, of course, arise magically from out of nowhere, but where do they come from? Here we shall suggest – following Deleuze and Guattari and other thinkers – that technologies, like rivers and streams or developments in the arts, also flow. Like rivers and streams, they are produced by particular contexts and change as these contexts change. Like rivers and streams, they flow into each other, accumulate in larger rivers or split into deltas. Some are like creeks that emerge from hidden underground sources and sink back into them quite quickly. In this light one can look at particular technologies as singularities – in some ways like weather formations – relations of forces that arise from a particular context and flow into one another within that context. Think, for example, of the manner in which the car, the field gun, the terrain of the battlefield and the specific problems of a particular war come together in the development of the tank in the First World War. This is subsequently transformed into other faster tanks, the mobile missile launcher and so on. Or, think of the meeting of photography and the Gatling gun in the cinema (moving still images quickly through a mechanism in the way that a machine gun moves bullets). Think of the subsequent meeting of the cinema and long-distance communications technologies – in the telephone or the radio – which come together in the television, which then enters into a new set of variations – video, digital TV, cable television and the computer interface.

In all these flows singularities form, and although we sometimes focus on these singularities, it is also important to note the flows themselves as primary. There are constant mutations and new developments in these flows but only because they are flowing. When one thinks this through some of the connections become particularly interesting. To take a particularly striking example, Guattari asks, were not the world's

> . . . monastic machines, which passed down memories from antiquity to the present day . . . the computer programs, the 'macroprocessors' of the middle ages? (1992: 18).

In all this, what is natural and what is artifice? Do the 'natural' and the 'artificial' converge, or, to put this another way, which leads which in technological development?

Deleuze and Guattari (1987: 409) point out that the artisan (or craftsperson who makes swords, locomotives) – and here we can include the new technologist or even the cultural theorist – is involved with following these flows as much as developing them. In this 'following', as with carving some wood, to take a very simple example, there is quite an exchange between what we might normally consider 'natural' and what we might normally consider 'artificial'. At this point it may not make any sense to talk about a division between the two. Deleuze and Guattari point out that even the artisan who appears to work with wood in one location must follow it in other ways. For example, through buying it from someone who logs it, transports it, stores it and so on.

There is a whole network of 'following' surrounding the work with the wood, and we can see that activities such as commerce are a development of this process of following. Artisans, for example, pay people to do some of their 'following' for them. One can link this to the use of wood in the contemporary world that leads to the decimation of forests, the various conflicts of cultures involved, the need to provide employment to whole towns dependent upon logging, and some of the linked effects such as those upon climate and species biodiversity. This shows how complex the flow of movement matter can be. It also shows that an ethical approach to technology/culture issues might be a question of how one follows the flow of forces rather than a question of finding deeper meanings or trying to oppose nature to culture. We shall consider the ramifications of Deleuze and Guattari's 'machinic' thought at various other points in this book.

## Virilio and the technologies of speed

Another theorist who will appear in various contexts in this book is Paul Virilio. Virilio is a distinctive thinker who is difficult to categorize: he is, among other things, an urbanist, a Christian, a political theorist and a historian of the military. Virilio shares the pessimism of earlier critical theorists, while his writing could be called poststructuralist in its fragmentary and nonlinear form. He is an interesting thinker for the purposes of this book, as his work is a continuous engagement with the effects of technology on culture; indeed, he sometimes describes himself as an 'art critic of technology' (Madsen 1995: 78).

Lewis Mumford claimed that the clock was 'the key-machine of the modern industrial age', and that the clock remains, in all its phases of development, 'the outstanding fact and the typical symbolism of the machine' (1934: 14). Much of Virilio's writing is concerned with the technologies of speed, which exert a major impact on our sense of time, of space, even of our consciousness. For Virilio, there was nothing confused or complex about the twentieth century. It was 'as brutal as a fist in the face' and was pervaded by 'the horror brought about by technologies that have become autonomous' in a final rush to escape what he calls terminal velocity. Behind all this is a desire to increase speed, which lies behind all politics, all wealth (1986). In short, he asserts that we are losing our sense of space as we more and more push the speed at which things move.

Virilio thinks that the effect of this rush to terminal velocity is that space – the space of the city, of the environment, of the body – is being sacrificed to time. Moreover, having destroyed space, even time begins to implode as everything, particularly communications, accelerates to the speed of light. Space is imploding as we more and more empty it out in order to move communications, weapons and images at the speed of light (1991a, b). Space begins to be swallowed up when weapons systems (and the systems that follow them) reach absolute speed – the speed of a missile that cannot be comprehended. Or the speed of information networks. Space – and our sense of space – is hollowed out by these speeds, and vision at the speed of light becomes little more than a blur. We have absolute vision as we dash around the world as fast as we can carry our signals, or ourselves, but as with a blinding light, we cannot actually 'see' anything. The result is that there is a 'pollution of distances' (Madsen 1995: 80) in the new information net-

works. This is the 'accident' of the Internet (Virilio 1997). This is the meaning of his resonant phrase 'the aesthetics of disappearance': we have invented machines whose systems are so fast and so complex that they operate beyond human capacity. We program our own disappearance.

Virilio explores the last moments of the struggle between metabolic speed and the technological speed into which we seem to be disappearing. We treat the body as if it was something to 'accelerate' constantly. It is increasingly given rhythms that are imposed technologically (the rhythms of work, of the edit on the screen, of the video clip, of dance music). One instance of this is the alteration of bodily rhythms occasioned by industrial technology, even the use of electric light. An example familiar to modern travellers is jet lag, in which the body is moved through time zones in a disruptive manner. Virilio coins terms to describe the saturation of contemporary culture with technological speed: we live, he says, in a 'dromosphere', or speed-space. The same applies to the mind. Consciousness itself becomes subject to 'cognitive ergonomics' (Madsen 1995: 80), where the realm of metaphysics and of memory are given over to machines. Our consciousness is 'taken by speed', as our media technologies flash information at us in ever faster and shorter bites: a 'picnolepsy', or set of frequent breaks (1983: 30). We have been conditioned to see the world as a series of interruptions, much like the montage of the cinema.

One of Virilio's political projects is to try and recapture some of this time – to 'politicize speed' (1983: 30). This is what he refers to as 'chrono-politics'. The industrial strike, for example, is a 'break' in the machine time of industry. Another of his political projects is to draw attention to what he calls the 'accident'. For Virilio, we do not see that every technology has both its positive and negative sides (this is not initially meant morally). The latter are what he calls generally the 'accident'. These are built into every technology. We have nuclear testing in the Pacific Ocean and elsewhere that fractures coral atolls, and so on. We have crashes, derailments, drug-induced psychoses or crossed telephone lines. One can think of many of these 'accidents'. In fact, Virilio constantly calls for a museum of accidents to remind us about them.

The accident is not just an incidental aside to the main game here, although this is the way that we like to think of it. It is as intrinsically a part of the technology as everything else. Indeed many technologies, one could say, are based upon it – particularly information technologies, which are constantly lauded for the way

in which you never quite know what is going to happen – whom you will connect up with on the net, where the Web will take you next. The accidents are built into the system. Risk management, for example, has developed as a profession to oversee such systems. Virilio notes that the accident of the new technologies in particular is that we are now 'killing "present" time' (1997: 10) in a further disruption of a more natural relation to time. The accident is like the unconscious of the technology – that which drives it but which we try to repress. Virilio's work is a vivid reminder that no technology – no matter how 'smart' or sophisticated – is perfect or free of accidents.

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