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THE ROOTS OF THE INFORMATION SOCIETY

IDEA

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People started getting together and exploring the idea that there was going to be a revolution in technology which was going to change society so drastically. Steve Wozniak (1986) [1].

Suddenly, success in just about any field has become impossible without information technology. In farming, manufacture, education, policing, medicine, entertainment, banking or whatever, IT is apparently set to change everything that human beings do in advanced societies. Steve Wozniak, of Apple computers fame, sees the real revolution as putting personal computers into the home. Others see it in direct broadcasting by satellite, automated work opening up new vistas for freed time, or in the potential for push-button democracy. While differing over details, though, many seem to agree that bringing together computing with telecommunications spells the start of a new age.

It appears that this is the only way forward: Initiation in the processes of information handling, transmission, storage and retrieval is the key to future prosperity and to qualitatively different ways of life. Failure to proceed in this direction carries dire consequences. Punishment for national lagards, according to a British National Economic Development Office report, will be relegation to 'Third World' status [2].

Not surprisingly, this 'one way forward' is greeted by others with some sense of foreboding. Cheerful book-titles such as *Silicon Civilization* and *The Mighty Micro* are answered in *Electronic Nightmare* and *Electronic Illusions* [3]. And fears of being sucked into a new transnational empire or being technologically dependent upon the USA or Japan are greater, for some smaller countries, than the threat of impending 'Third World' status. Nevertheless, for better or for worse, the arrival of the information society is felt to be imminent.

Are we at the threshold of a new kind of society? Discussions of the 'wired society' or of the 'wealth of information' certainly imply this [4]. Alvin Toffler's well-known 'third wave' concept is perhaps the clearest example [5]. The first 'wave' is agricultural, the second industrial, and the third, information society. Sociological debate has not yet crystallized around this single concept - the information society - but it is in sufficiently popular and social scientific use to make it the focus of this study. It finds a ready home in accounts of the 'social impact of new technology', is frequently referred to in policy studies, and is strongly related to other emerging concepts such as that of the 'information worker'. But should it be used as a basic means of characterizing 'society' today? [...]

Despite appearances, the idea of the information society is not entirely new. It has its roots in the literature of 'postindustrialism', a popular social science notion of the 1960s and 1970s which heralded the end of the industrial capitalist era and the arrival of a 'service' or 'leisure' society. Although postindustrialism has been subject to damaging criticism, its resilience is shown by the fact that it can be re-cycled as 'the information society'. This article starts by asking what the two concepts have in common, but also the points at which the information society goes beyond postindustrialism. There is more than 'recycling' here. I also set the scene [...] by proposing which analytical avenues are worth following, and what pitfalls must be avoided.

FROM POSTINDUSTRIALISM TO INFORMATION SOCIETY

The roots of the information society idea are intertwined in a complex manner. It is hard to disentangle the diverse strands of attempted social prediction, government policy, futuristic speculation and empirical social analysis. For instance, a Canadian government report, *Planning Now for the Information Society* [6] is clearly geared to identifying a national technology strategy in microelectronics. But it depends upon social scientific concepts such as the 'information economy', indulges briefly in quoted 'predictions' (for instance that by the year 2000 'smart' highways for semi-automated driving will enter development), and refers to empirical studies of the impact of microelectronics on, among other things, women's work.

One readily identifiable strand, on which hopeful accounts of the information society often rely, is the idea of postindustrialism, especially the version associated with Daniel Bell. This is the view that, just as agrarian society was replaced by industrial society as the dominant economic emphasis shifted from the land to manufacturing, so postindustrial society develops as a result of the economic tilt towards the provision of services. The increased part played by science in the productive process, the rise to prominence of professional, scientific and technical groups, plus the introduction of what is now called information technology, all bear witness to a new 'axial principle' at the core of the economy and society. This axial principle, 'the energising principle that is the logic for all the others', is the centrality of 'theoretical knowledge' [7].

Bell argues that the information society is developing in the context of postindustrialism. He forecasts the growth of a new social framework based on telecommunications which 'may be decisive for the way economic and social exchanges are conducted, the way knowledge is created and retrieved, and the character of work and occupations in which men [sic] are engaged'. The computer plays a pivotal role in this revolution' [8].

Bell also sketches other significant features of the information society. IT, by shortening labour time and diminishing the production worker, actually releases labour: 'the source of 'added value' in the national

product. Knowledge and information supplant labour and capital as the 'central variables' of the economy. He comments on the way that information is being treated as a commodity, with a price-tag on it, and how the 'possession' of information increasingly confers power on its owner. Unlike some postindustrialists, Bell recognizes some of the ambiguities involved in identifying a 'service sector' and proposes that economic sectors be divided into 'extractive, fabrication and information activities'. This way, he claims, one may monitor the penetration of information activities into more traditional areas of agriculture, manufacturing and services.

Bell underlines ways in which these areas are expanding in the wake of IT development. He foresees major social changes resulting from the establishment of new telecommunications infrastructures. Such huge changes will occur as the merging technologies of telephone, computer, facsimile, cable television and video discs lead to a vast reorganization in the modes of communication between persons; the transmission of data; the reduction, if not the elimination, of paper in transactions and exchanges; new modes of transmitting news, entertainment and knowledge [9] and so on. These in turn will intensify concern about population distribution, national planning, centralization, privacy and so on. For Bell, the 'fateful question', or, one might say, the consumerist question, is whether the promise will be realized that 'instrumental technology' will open 'the way to alternative modes of achieving individuality and variety within a vastly increased output of goods' [10].

Without doubt, Bell asks many of the right questions, and indicates worthwhile lines of inquiry. This is why his work deserves to be taken seriously. But it also demands serious critique because, as I shall show, Bell's attempt to find a thoroughgoing alternative to Marxian class analysis underestimates both the resilience of some familiar features of modern societies, and the extent to which new conflicts and struggles could arise within this 'information society'.

Those 'familiar features' include military, commercial and government power. No small significance lies in the fact that it was military requirements which gave birth to modern computers. The massive mainframe, ENIAC, built in 1946 in the electrical engineering department of the University of Pennsylvania, was intended to assist the aiming of guns, and was soon involved in calculations for the atomic bomb. Neither is it irrelevant to note that huge forces of international capitalist commerce are today locked in mortal combat to capture markets and conquer opposition within the lucrative high technology field. Nor is it an accident that governments are so active in promoting IT and purchasing its products. IT is a powerful tool for monitoring and supervising people's activities. In other words, one does not have to look far before this question comes to mind: Does IT bring about a new society without precedent, or does it rather help to intensify certain processes in today's society of which we are all too aware?

What of new 'conflicts and struggles'? Are we entering an era, not of Bell's rather smoothly harmonious information society, but of new social frictions and power alignments within a divided and contradictory 'information society'? Around the same time as Bell's work on postindustrialism was published a European contribution appeared which took account of the same social and economic trends: Alain Touraine's *La Société post-industrielle* [11].

Touraine's study took a quite different tack from Bell's. He challenged the bland postindustrial assumption that class struggle was a thing of the past, although he argued that many class images are too bound up with the 'era of capitalist industrialisation'. He invited readers to consider the 'fundamental importance of class situations, conflicts and movements in the programmed society'. In particular he had in mind a major cleavage between technocrats and a more disparate grouping whose livelihood and lifestyles are governed by them. Property ownership is less a bone of contention than the opposition brought about because 'the dominant classes dispose of knowledge and control information' [12].

So do changing technologies and shifts in educational qualification and skill lead to novel class alignments? [...] This question still concentrates upon the workplace and on production. The analyses of Touraine and others hint at wider movements of power. The use of IT within governments, education, the media and the domestic sphere as well as in the workplace means that more and more social relationships are mediated by machines. What does this imply for power? Mark Poster suggests that because 'new forms of social interaction based on electronic communications devices are replacing older types of social relations' [13], we should speak of a new mode of information'. He too is questioning the relevance today of some Marxian assumptions, but for very different reasons from Daniel Bell's.

SOCIAL FORECASTERS AND SOCIAL PLANNERS

The roots of the information society idea are found not only in sociology. Futurists and 'social impact of technology' commentators also contribute. They tend to share the belief that technology 'shapes' social relationships. One of the many cheerful social forecasts comes from Tom Stonier. 'Living in a postindustrial world', he avers, 'means that not only are we more affluent, more resourceful and less likely to go to war, but also more likely to democratise' [14]. Increasing prosperity is a common information society theme. By 'more resourceful', Stonier means that IT will enable us to overcome the environmental and ecological problems associated with industrialism. Again he touches on a common theme. James Martin, in *The Wired Society*, also stresses the 'non-polluting, non-destructive' quality of IT as a major point in its favour [15].

New communications technologies hold out the next promise – the demise of the 'slave' – (as slave disappeared in the industrial era, says Stonier [16]). Some even hold it out as a 'stage' beyond information society:

'communication society' [17]. Lastly, IT ushers in the world of computer democracy. More information availability, plus push-button referenda, open the door for the first time to genuinely responsive participatory government. This, along with the burden of administration being thoroughly automated, is the contented futurist's world of information society.

A short step away from the futurist's vision is the forecaster's proposal. Japan was the first country to produce such a proposal, in the shape of *The plan for information society: a national goal toward the year 2000*. [18]. Lacking natural energy resources, the Japanese were acutely aware of the fragility of their economy in the face of recession. Yoneji Masuda's work, *The information society as postindustrial society* [19] played a significant part in establishing a 'national plan'. He gives the idea of 'computopia' concrete shape, connecting futurist dreams – 'the goal . . . is a society that brings about a general flourishing state of human intellectual creativity, instead of affluent material consumption' [20] – with actual new towns in Japan and 'information society infrastructures' elsewhere.

Japan's Tama New Town, with its built-in network of co-axial cables, Canada's *Telitron* (videotex) programme, and Sweden's *Terese* project, which monitors regional development using new telecommunications, are cited as relevant examples of such infrastructures. They are significant to Masuda as portending 'a new type of human society' in the information society. For him, 'production of information values and not material values will become the driving force'. At the same time, *past* experiences within industrial society may be used as an 'historical analogical model of future society' [21].

This assumption, that the history of industrial society may be used as an analogy for what will happen in information society, brings us back to the core of the sociological question. Is it legitimate to claim that the steam engine (or more properly the clock) was to industrial society what the computer is to information society, so that one, the new technology shapes the resulting social and political relations, and two, a qualitatively different kind of society emerges?

Within the same sociological question lies the problem of exactly what are the social origins and social consequences of the diffusion of information technologies. Though their immediate genesis is important, the roots of the so-called information society are more properly sought in what James Beniger calls the 'control revolution', analysed at the turn of the century by theorists of bureaucracy such as Max Weber [22]. Putting new technologies in a longer historical context helps us understand non-technical aspects of their origins and relativizes claims that technologies themselves cause change.

On the other hand, even if one remains sceptical about the capacity of silicon chips and fibre optics to transform the world in quite the way envisaged by a Stonier or a Masuda, it is clear that IT is a major phenomenon with a broad potential social impact. It is a 'heartland' technology, one which enables the development of many arts, more

and more cheaply, and using components of shrinking size and expanding power [23].

Critical comments about futurism and social forecasting should not be understood as a denial either that some view of the good society ought to be connected with the social analysis of new technology, or that attempts to discern the direction of social-technological trends are worthwhile. On the contrary. The problem is rather the lack of realism, the items missing from accounts of the information society. Eyes focused on the tremendous technological potential of IT frequently fail to see that countervailing processes – loss of skills, privacy or personal contact, for instance unceremoniously puncture confident predictions.

In other words, social factors of several different kinds tend to be neglected. The nature of Japanese post-war reconstruction, and its reliance upon the experience of other advanced societies, has guided the direction of IT development there. In Britain, the 'Alvey' programme of IT research, weighted in favour of commerce rather than the universities, has served to give a distinct flavour to the sorts of work carried out. And so on. In fact, the further one moves from grand national IT plans and from futuristic forecasts of conditions prevailing within the 'informatizing' society, and the nearer one gets to actual social analysis in which technology is not perceived as a quasi-autonomous force acting upon society, the more questionable the information society concept appears.

THE INFORMATION SOCIETY AS PROBLEMATIC

So what are the prospects for the information society concept? The answer is not straightforward. For one thing, more than one image of the information society is available. The popular image of a social transformation along 'Third Wave' lines is not the same as the fuzziest image produced within more careful social analysis of societies coming to terms with a range of more and less profound political, economic and cultural effects of information technology. In his 'information society' essay Daniel Bell himself has become silent about the affluence and leisure he once associated with postindustrialism. Another complicating factor is that both popular and serious versions of the information society thesis either rely upon or provoke genuine questions of tremendous importance.

The idea of an information society is more than recycled postindustrialism. To be sure, the two concepts do share a number of common features, not to mention several common flaws. Popular versions of information society forecasting, often giddy with the astonishing progress of microelectronics since the late 1970s, are infused with the same technological determinism that informed much postindustrialism. While strong currents of critical social investigation cause some ripples, much present-day research focuses on social *adaptation* to IT, rather than how IT may be designed to suit people, which betrays the extent to which technologically determinist views have been accepted.

[...] Several analyses start by outlining important features of one or another aspect of the information society idea which are then sifted in order to retain what is significant or contrasted with alternative interpretations.

I choose this method because I see little point in summarily discarding the information society as the rotten fruit of futurist fancy or as ideology in the guise of social analysis. Rather, the information society should be granted the status of 'problematic'. According to Philip Abrams, a problematic is a 'rudimentary organization of a field of phenomena which yields problems for investigation' [24]. Without succumbing to the sociological simplism which sees the information society as a 'Third Wave' of evolutionary progress, it is nevertheless true to say that some of the most significant changes in late twentieth-century society are those inherent in, related to, or consequent upon IT. The information society concept points to that cluster of issues and its better exponents already use it in this sense.

As a problematic its components refer to changes in the workplace and employment and also the political, cultural and global aspects of the diffusion of IT. Whether the sum of these changes amounts to a shift beyond industrial capitalism, militarism or male dominance is highly questionable. Important continuities, such as the chronic persistence of inequalities and the growth of state power using IT, seem to suggest that changes may be more of degree than kind. In important respects many supposed changes highlighted by information society theorists originated well before information technology!

At the same time the category of information is undoubtedly becoming vitally important as an economic factor in its own right. The phenomenon of insider dealing on international stock markets is an obvious illustration. While it may not be supplanting property as a key to the social structure of modern societies, information is proving to be a crucially important element in our understanding of social relationships. Certainly at present it lacks adequate definition, let alone incorporation within a coherent theory of contemporary social change. Yet the new technologies which handle and process information simultaneously influence diverse but significant aspects of social, cultural and political reality.

Let me note two other features of the information society problematic. One is that social analysis must grapple with the ramifications of the *fusion* of the technologies which comprise IT. Conventional distinctions between communication and media studies, on the one hand, and studies of the social aspects of computing, on the other, are eroded. For example, implications of the decline in public service broadcasting now extend far beyond traditional concerns for broadcasting as such. In the USA, the dissemination of government data, once a public function, is under increasing pressure as private profit-seeking firms compete to sell repackaged data. Burgeoning communication between computers and the coming of the commercial database brings 'public service' questions into the heartland of computing.

The other noteworthy feature is that as social analysis exposes alternative options in the adoption of new technology that are in fact available to government, industry and the public, discussions of the strategy for shaping new technologies become more relevant. Do government-sponsored slogans such as 'automate or liquidate' represent genuine choices? Is it 'data' or 'persons' that ought to be protected by law? How does one decide what counts as an appropriate technology where microelectronics is concerned? Social analysis can serve to indicate the conditions under which ethical considerations and social hopes might be realized.

INFORMATION SOCIETY: THE MAJOR THEMES

The information society concept inherits several symptoms of the troubles that beset postindustrialism. The postindustrialists largely failed to justify the significance granted to trends such as the growth of theoretical knowledge and of services. A leisured society based on automated manufacture, a vast array of services and a culture of self-expression, political participation and an emphasis on the quality of life does not seem to have materialized – at least, not for the majority of the populations of the advanced societies.

Will this hereditary syndrome prove fatal for the information society? The answer depends upon careful investigation in the following areas.

INFORMATION WORKERS IN AN INFORMATION ECONOMY

It is clear from job advertisements at least that in the late 1980s one's chances of obtaining employment were enhanced by the possession of qualifications in microelectronics, computing, systems analysis, telecommunications, operational research, software design, fibre optics, expert systems and so on. But what does this proliferation of new job descriptions mean? Those that Tom Stonier refers to as 'information operatives' seem to appear in all manner of workplaces. The big questions are: who are these 'operatives', and what contribution do their activities make to the pattern of social relationship?

Central to much information society discourse is the contention that 'information workers' are rising to a majority within the labour forces of the advanced societies. As early as 1967, claims Marc Porat, 50 per cent of American workers were engaged in the 'information sector', and they received just over 50 per cent of total employee remuneration. But just who are these information workers? Unfortunately, because he does not actually explain what information is (he only defines it as 'data that have been organized and communicated') the categories are blurred. Judges and rent-collectors find themselves in this sector, but doctors, for instance, have an 'ambiguous occupation', straddling 'service' and 'information' sectors [25].

Few studies of 'information work' comment on its purpose, function, or content. In short, however, we cannot know who makes decisions,

on what basis, or with what effect. Masses of computer-generated information confer no power whatsoever on those who use it, whereas at certain points within organizations it may be crucial to the maintenance of power. As it happens, postindustrialism also glossed over questions of information, knowledge and power, especially with regard to the social significance of research and development (R&D). The sheer amount of R&D in any given society tells us little. We learn nothing about the social role of scientific and technical knowledge, the price put on it, and the power of those who manipulate it. The fact that R&D is often financed for political rather than social reasons, and developed for military rather than economic purposes, pulls the rug from beneath the (Bell-inspired) idea that universities are crucibles of power in the modern world [26]. The current squeeze on university funding and the politicizing of technology policy makes the idea laughable.

That said, changes are occurring in the occupational structure of the advanced societies. While the relabelling process noted in Krishan Kumar's critique of postindustrialism still occurs – though today it is programmers becoming software architects rather than plumbers becoming heating engineers – there is expansion at managerial, professional and technical levels. There is, moreover, a strong link between innovation and economic growth, hence the frequently expressed British worries about the lack of domestic R&D funding relative to other countries.

Two major questions are raised by the 'discovery' of information work and an information sector in the economy. First, are the apparently new categories of work and occupation leading to shifts in power? Is there an emerging information 'technocracy' which is wresting power from previously dominant classes? What opportunities for women are opened by the spread of IT? What is the likely effect of IT on industrial relations? When British Rail computerized its freight system, for instance, many 'middle managers' found their positions were simply redundant, and personnel in subordinate positions actually discovered they had new powers of control over the work process [27].

The other question is this: how accurate is the idea of an 'information sector', and is there an historical 'march through the sectors' [28] as agrarianism gives way to industrialism, and industrialism to information society? This point affects not only the advanced societies but also those to which the promise is alluringly held out that they may be able to jump straight from a non-industrial to an information society. Is this really possible, or does 'informatizing' depend upon an already 'advanced' situation? [..]

POLITICAL AND GLOBAL ASPECTS

Echoes of postindustrialism are again heard with respect to the political and global aspects of information society. A common feature of each is that opportunities for political choice and participation will increase. The difference, however, is that the means of implementing the is now visible, particularly in the possibilities of two-way, interactive electronic

networks. The extreme case is that of an 'instant referendum' in which voters views are canvassed via cable television which allows people to receive as well as transmit signals from their living rooms. More soberly, IT is seen as a means of enabling an electorate to be more informed, or for decision-making to be more decentralized [29].

Those committed to ideals of democratic participation on both the right and the left of the political spectrum may advocate the harnessing of new technologies to such ends. Without adequate access to modern means of communication, any idea of a just political community is indeed a chimera. But a number of important questions are raised by this, not least how the necessary telecommunications infrastructure is to be set up. While France is establishing a national *telematique system* which could in principle serve such ends, Britain has experienced some difficulties persuading domestic subscribers to pay for a suitable cable television network, whereas in the USA only local experimental systems have been tried. In the absence of a coherent policy which is intended to ensure equal access of all to such a communications network it is difficult to imagine how dreams of electronic democracy could be translated into realities.

The prominent source of anxiety, however, is the threat of an Orwellian society. Does the widespread political and administrative use of extensive databases which allow for the easy storage, retrieval and transmission of personal information portend a future fraught with the dangers of electronic eavesdropping? On the one hand police, defence, social security and other personnel reassure the public that no innocent person need have any worries about improper prying into their private lives. On the other, cases of wrongful dismissal or arrest which are traced to erroneous computer files serve to fuel fears that in fact 'ordinary citizens' may well be at risk.

But are these computerized forms of surveillance an intrinsically new departure? Or do they rather represent an extension of state garnering of information on citizens which has been occurring for many decades? Is it merely the use of these databases by law-and-order agencies which creates potential perils for citizens? Or is a deeper process at work in which more generalized forces of social control achieve more power by computerization? And what exactly are the risks involved, against which 'data protection' laws and policies are directed? Is wrongful arrest the tip of an iceberg, the submerged portion of which conceals a fundamental issue of invaded privacy and impugned integrity?

This of course, is only one aspect of the state-and-IT connection. As I have already mentioned, the connections between government activity and economic-technological developments are numerous and significant. Whereas postindustrialist Bell insisted upon the relatively independent operation of economic and political spheres, this position is exceedingly hard to justify. It is quite clear that polity and economy are interdependent, and that the relationship between the two is far from simple.

Bringing the global situation into focus, however, other connections between the political and the economic become clear. The IT industry, as others, is dominated by giant transnational corporations – IBM, Exxon, Mitsubishi, AT&T, Philips, Siemens and so on – which often call the political tune. Many countries find their national sovereignty, not to mention the position of their workers, threatened by the activities of these 'stateless' economic interests. Such companies increasingly rely upon the free flow of data across national boundaries for financial reporting and management, marketing, distribution, R&D, and order processing.

Labour unions may debate the future of plants in vain if the crucial decisions are made on another continent. National governments may find their attempts to change direction thwarted, as when in 1985 Australian prime minister Bob Hawke tried to stop Australian bases being used to monitor MX missile tests. Dismayed financial and transnational corporate interests withdrew capital, putting pressure on the economy and thus the government [30]. It would appear that Walter Wriston (who seems not to treat this as a matter for regret) is right to claim that 'the ancient and basic concept of sovereignty which has been discussed since the time of Plato is being profoundly changed by information technology' [31].

Of course it is not only the national sovereignty of the larger and more powerful countries which is challenged by the power of transnational corporations. The phenomenon of 'deindustrialization', for example, often viewed in the northern hemisphere in terms of the shrinking proportion of the labour force involved in manufacturing, may be equally well understood as the partial relocation of workers to 'offshore' plants in the south. The information society is not inaccurately depicted as a global phenomenon. The current expansion and development of microelectronics-related industries require a world market.

There is no doubt that the technological potential for beneficial change – 'deserts that bloom' – is tremendous, and nothing in this book should be taken as denying or minimizing that fact. Tom Stonier, Alvin Toffler and Jacques Servan-Schrieber make a lot of this angle. Stonier reports great gains made in the Upper Volta village of Tangaye when a solar photovoltaic-powered grain mill and water pump were installed [32]. (This is an example of what he calls the 'second silicon revolution'.) Such advances, he states correctly, are dependent on technology and information transfer. That such changes will take place and that 'the postindustrial economy will produce the wealth of information to make it all happen' is rather more open to question.

At present, as a matter of fact, things are somewhat different. Despite dreams of poorer countries 'catching up' with richer ones, or 'leapfrogging' the industrial era, the situation is overwhelmingly not just one of interdependence, but of dependence. While the advanced societies produce silicon chips comprising hundreds of thousands of elements, in Africa only one person in eighteen has a radio. Far from narrowing the 'North-South' divide, the evidence suggests that 'IT helps to widen it. As

Juan Rada sagely observes: 'Technological fixes of whatever nature are nothing but a drop of water in the sea of reality' [33].

No treatment of the political and global aspects of IT can afford to ignore the connections between new technology and the continuing Cold War. Like earlier postindustrialists, Stonier's focus is on the 'wealth of information' that spells 'unprecedented affluence both at the private level and in the public sector' [34]. But as Krishan Kumar laconically notes, 'the science-based "welfare" state can be rapidly reclassified as the science-based "wartare" state, and with greater respect for the actual history of the last fifty years' [35].

For example, the Japanese 'Fifth Generation' computer project, which aims to introduce the world to ordinary language-recognizing 'artificial intelligence' during the 1990s, is ostensibly civil and commercial. But American responses relate to military supremacy. As Feigenbaum and McCorduck put it, 'the Defense Department needs the ability to shape technology to conform to its needs in military systems. A Fujitsu or a Hitachi marches to a different drummer from a Rockwell or a Lockheed. Our defense industry must obtain and retain a strong position in the new advanced computer technologies' [36]. It goes without saying that these are not the kinds of 'needs' which those concerned for a 'welfare state' – or world welfare – have in mind.

AN INFORMATION CULTURE?

The notion of a 'fifth generation' of computers raises another set of questions besides those of military prowess. Unlike previous technological artifacts which typically have augmented human energy with improved sources of power, those spawned by IT augment – and, according to some, transcend – the human capacity to think and to reason. Needless to say, some references to machine intelligence are no more sophisticated than those associated with Hal, the 'thinking' computer from the film *2001, A Space Odyssey*. Others, however, are pointers to a series of profound cultural issues whose analysis could have far-reaching implications.

It must be said, though, that while debate over the workplace and employment aspects of IT is widespread, and awareness of the political and global dimensions is beginning to make itself felt, the cultural questions have not as yet received the attention they deserve. In what follows, therefore, I can do no more than set the scene.

Once again, Bell's thoughts on postindustrial culture make a suitable starting point. For him, 'a new kind of modernity' has been created by the 'revolutions in transportation and communication that have banded together the world society into one great *Oikoumene*'. It represents a break with the past, thus replacing continuity with variety, tradition with syncretism. Its agent is technology, which by 'introducing a new metric and enlarging our control over nature' has transformed our social relationships and our ways of looking at the world' [37].

Bell maintains that technology has been the 'chief engine of raised living standards and reduced inequalities, created a 'new class' of engineers and technicians who plan work-tasks rather than actually performing them, brought about a new functional and quantitative way of thinking, created new economic dependencies and new social interactions', and altered aesthetic perceptions of time and space. While he believes that cultural issues are of the utmost importance, he partially disconnects analysis of them from political or social life. Each sphere has a different 'axial principle'; that of contemporary culture being the desire for fulfilment and enhancement of the self [39].

Of course, when writing of postindustrialism (in the 1960s) Bell could have had little clear idea of the rapidity with which the technologies of computing and telecommunications would move to centre stage (hence his later work on the information society). But other theorists have taken further these kinds of ideas about the relation of IT to culture. Where Bell limited himself to comments about concepts of speed or the view from the air unknown to pre-moderns, writers such as David Bolter have argued that the computer itself is the harbinger of novel cultural transformations including a new human sense of self [39].

Bolter's argument is as follows. Just as the clock is the key symbol of the industrial era, as Lewis Mumford rightly held, so the computer is becoming the key symbol of the present. It is a 'defining technology' which by its impact on certain basic relationships – of knowledge to technical power, and mankind to the world of nature – occupies 'a special place in our cultural landscape' [40]. Thus humans begin to think of themselves as 'information processors' and nature as information to be processed' [41].

Sceptical eyebrows may well be raised about such speculations. Are not those who define themselves as information processors likely to be only a tiny minority of a given population? By what process does the computer become a defining technology? Bolter's thesis is well worth attending to, though not, I shall argue, for the reasons he gives.

Three issues concerning the 'culture of information' should be addressed. First, questions about computing and telecommunications; the fact of technological 'convergence' is a significant one. While Bell's idea of the 'overflowing of all the world's traditions of art, music and literature into a new, universal container, accessible to all and obligatory upon all' [42] is somewhat inflated, it does flag an important phenomenon. A form of cultural 'synchronization' is indeed taking place, as new communications carrying essentially similar messages encircle the globe [43]. Who controls these messages, and what is their content? Does the ownership of the means of (increasingly computerized) communication lead to the cultural dominance of certain elite groups and societies over others?

Secondly, is the 'defining technology' idea an appropriate means of social and cultural analysis? Are the emergent 'technological information and communication' indeed shaping the social and cultural experience of

those societies affected by them? Do the new technologies not confer on those with access to them considerable power to control not only the processes of production, about which Marx was concerned, but also those of leisure and consumption? Is there more than passing significance in the rise of 'hackers' and computer gamblers, who get totally absorbed in their machines, or in the ways that computers may 'converse' with each other about human destinies (I am thinking of credit-worthiness or welfare-eligibility)? [44]

Thirdly, consideration of the so-called culture of information is incomplete without reference to its religious and ideological aspects. Do human beings remake themselves in the image of their technology? If so, then there are obvious implications for philosophical debates about the unique place of human beings in the cosmos. Furthermore, there is scope for critique along 'religious' lines, as evidenced by the denunciation of IT as 'silicon idolatry' [45]. It also brings us back, finally, to the over-riding question of this study: does IT usher us into a new kind of society? And at this point a further query is highlighted: what is the social *meaning* of the 'information society'? Is it better understood as a kind of myth' or 'utopia' than the social 'forecast' it is more frequently taken to be?

CRITIQUE OF THE INFORMATION SOCIETY

For the sake of clarity, and oversimplifying, let me make some distinctions. There are two kinds of information society thesis, each of which makes two kinds of claims. The view popularized in many media and policy accounts stresses the major social changes for the better that follow in the wake of IT. This popular version may well be buttressed by the 'findings of social science'. The other use of the information society concept is more cautious and open-ended. Here it is a 'problematic' rather than a descriptive term. The two images of information society overlap.

The claims made are both analytical and evaluative, and the two kinds of claim are interrelated. Thus both kinds of information society thesis try to anticipate the *sorts of social change* which can be expected as IT is diffused through different economic, political and cultural spheres. And both also provide at least strong clues as to whether such social changes are *desirable*. His book draws together evidence from a wide range of sources in an attempt to assess both the analytical and evaluative claims of each information society thesis.

The information society idea has both utopian and ideological aspects. To put things in focus I comment on some of the dangers associated with using the information society concept, that is, its ideological aspects. Three are prominent.

Firstly, it obscures vested interests that are involved in IT and that in fact do much to shape its overall direction. The concept yields no clues as to who wields power. Repeatedly, for instance, the popular rhetoric assures us that 'everyone has their own information' or 'the real revolution is personal computing'. But information is not steadily diffused in a

general way through all social echelons. As Cees Hamelink points out, some information is specialist and thus restricted to a few [46]. Intellectual and managerial skills are required to exploit information economically, and these are unevenly distributed in society. Advanced hardware and software for information processing are expensive, and therefore the few who can afford them are scarcely challenged by others using inferior machines.

Such inequalities are felt globally between north and south in the theatre of transnational corporations and military interests, and locally, whether with the word-processor operator's lack of control over her work or the suspected criminal's difficulty in gaining access to information held about him. 'Information power' is only a reality when access exists to the means of collecting, storing, retrieving and communicating the information.

Secondly, the inequalities and conflicts discernible on the surface are often related to underlying contradictions. These too may be disguised by the information society concept. Within capitalism, private gain is constantly set against efforts to 'socialize' production. In the late twentieth century, the latent potential for trade in information – for this entity to become a commodity – is being realized. While many undoubtedly gain from this process, others lose. Public libraries and public service broadcasting are both time-honoured concepts whose 'public' status is under threat as information has a price put on it. Likewise, new integrated services digital networks (ISDNs) mean more efficient information services, but higher costs for ordinary telephone subscribers.

Another discordant element, which may not qualify as a 'contradiction' in the same sense, is the collusion of military with microelectronic interests in the modern world. The same technologies whose avowed purposes (and actual achievement in many cases) are to reduce drudgery, increase efficiency, conserve resources and promote mutual communication are also dedicated to hostile, destructive and lethal ends. Regardless of any justifications which may legitimately be presented for expanding electronically a nation's 'defence' capabilities, most discussions of the information society conceal in the background the huge military impetus to IT research and development.

Thirdly, the arrival of the information society appears as an entirely natural event, the outcome of progressive tendencies within Western industrial societies. It may be 'revolutionary' in its consequences, such that it represents a new era in human history. But it is simultaneously the obvious and logical way forward. Witness the postures struck against any who dare question the ways in which IT is implemented! The chairman of the British Manpower Services Commission provided a clear illustration in a 1986 speech which recommended 'embracing wholeheartedly the new technologies'. He complained that 'We still have latter-day Luddites around in all parts of our society. They threaten our future, and the attitudes they reflect must go' [47].

Very extravagant claims are often made: IT – 'Athei without the slaves' and so on – which suggest that the aura surrounding new

technology is not merely that of the 'gee-whizz' variety. Perhaps, as Jacques Ellul and others have suggested [48], new technologies are invested with a 'sacred' quality. The awe and veneration once accorded to the gods who supposedly controlled human destinies now belong to the machine. This dimension – which Michael Shallis refers to as 'silicon idolatry' – would tend to reinforce views of the information society as the obvious scenario.

Against the backdrop of the well-established Western belief in social progress via unlimited economic accumulation, the information society does indeed appear as a natural development. Information technology is its sacred guarantor. But granting it this 'natural' status forecloses debate over and action towards any alternatives to that dominant tendency. As such, it invites critique.

By arguing that the information society has significant ideological aspects I do not for a moment want to suggest that it is some kind of 'dominant ideology', accepted by the 'masses' of any given population [49]. On the contrary, there is plenty of evidence of coolness, fear and resignation towards, as well as sober and realistic acceptance of, the new technologies. Likewise it should be stressed that using the term 'ideological' does not mean that there is a deliberate conspiracy to 'deceive the general public' by using the information society slogan. If the above analysis is correct, however, the *effect* of using it is to disguise the reality of powerful interests and beliefs at work within it.

On the other hand, it is clear that notions like the information society have become a working 'reality' for many. Educational institutions meekly fall in line with pleas for closer ties with industry. Businesses do computerize, some most successfully, some soon discovering they are encumbered with digital white elephants. As Jennifer Slack admits, 'We are buying computers to have fun and to "keep up". And our children who do not learn to operate computers are "falling behind". And information is being developed to be bought and sold and protected like any other kind of commodity. And it does make a certain amount of good sense to try to get by in that world.' [50] The point is not to deny that it is happening, but rather to examine how it is orchestrated and by whom, to what purpose, and with what methods and effects.

BEYOND LIBERAL AND LUDDITE CRITIQUE

Just as there are different images of the information society, so critique comes from different angles. What might be called 'liberal' critiques, while refusing to be seduced by the siren songs of high-tech hype, still assume that 'things could go either way'. They issue warnings about the anti-social potential of some IT applications, but maintain that as long as people are alert to them, effective choices can be made to ensure that IT development will be appropriate and socially beneficial. For them, the information society is the outcome of an informed democratic process.

The Luddite would assert quickly that the liberal seems to have swallowed the idea of technological neutrality. The new technologies

already express particular values and priorities. Far from choices being relatively free, they are in fact tightly constrained by dominant interest groups, above all by the power of capital. As for being 'informed', this is a sick joke. By insisting on the neutrality of technology, those dominant interests ensure that its 'real' effects and biases are effectively obscured. Thus the exposure of those dominant interests is of prime importance, before any choices can be made.

In so far as it stresses the importance of choice, and therefore of value, priorities and democratic participation, the liberal critique makes a valid contribution. Such an emphasis is a vital antidote to any technological determinism that forecasts that future society will be shaped by new technologies or that ignores social factors in technical change. On the other hand, the Luddite is correct to temper this by drawing attention to the ways in which choice is limited, often severely and systematically, by social, political and economic definition. But the negative image of Luddism is hard to live down. Luddism can be as pessimistic as the popular information society pundits are optimistic [51]. Their future may be similarly foreclosed.

The kind of critique to which this work aspires catches both the sense of potential for socially appropriate development of IT without pretending that it can occur without considerable struggle on several fronts, and the sober realism of the Luddite, without succumbing to sheer negativism or pessimism I do not hide the fact that some alternatives with which I have sympathy – such as partnership between women and men from the design stage onwards, or innovations originating from users needs rather than mere commercial potential – represents a radical departure from present practice. By placing them in the context of a normative and critical social analysis, however, I hope to show both the enormity of the obstacles to be overcome, and possible routes to their realization.

The yawning credibility gap between futuristic forecasts and fantasies and the hard realities of government, transnational and military involvement in IT demands a sense of urgency within the information society problematic. It also points up a vital role for serious social analysis within the policy-making process, analysis which is not simply shut up within either optimistic or pessimistic scenarios.

NOTES

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- 12 Touraine, *The Postindustrial Society*, pp. 28, 61.
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- 20 *Ibid* p. 3.
- 21 *Ibid* p. 29.
- 22 James Beniger (1986) *The Control Revolution: Technological and Economic Origins of the Information Society*, Cambridge MA and London, Harvard University Press. Unfortunately Beniger does little to locate this 'control revolution' within a theory of social power relations.
- 23 This is discussed with particular reference to telecommunications in William H. Dutton, Jay G. Blumler and Kenneth L. Kraemer (eds) (1987) *Wired Cities: Shaping the Future of Communications*, Boston, G. K. Hall.
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 - 28 This phrase comes from Ian Miles and Jonathan Gershuny (1986) 'The social economics of information technology' in Marjorie Ferguson (ed.) *New Communications Technologies and the Public Interest*, London and Beverly Hills, Sage.
 - 29 See, for instance, Ben Barber (1984) *Strong Democracy*, Berkeley CA, University of California Press.
 - 30 This example comes from Herbert Schiller (1986) 'The erosion of national sovereignty' in Michael Traber (ed.) *The Myth of the Information Revolution*, London and Beverly Hills, Sage, p.28.
 - 31 Quoted in Schiller 'Erosion of national sovereignty', p. 23.
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 - 37 Bell, *Coming of Postindustrial Society*, p. 188.
 - 38 *Ibid.*, pp. 114-15.
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 - 41 *Ibid.*, p. 13
 - 42 Bell, *Coming of Postindustrial Society*, p.188.
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 - 45 See Michael Shallis (1984) *The Silicon Idol*, Oxford, Oxford University Press.
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- 46 Cees Hamelink (1986) 'Is there life after the information revolution?' in Traber, *The Myth of the Information Revolution*.
 - 47 Bryan Nicholson's speech, recorded in *The Guardian*, 16 September 1986.
 - 48 Jacques Ellul (1976) *The new demons* London: Mowbray or Shallis *The Silicon Idol*.
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 - 50 Jennifer Daryl Slack (1984) 'The information revolution as ideology' *Media Culture and Society*, (6)p.250.
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