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THE POLITICS OF NEW TECHNOLOGY*

Frank Webster

'. . . the unfortunate thing is that at present the word "progress" and the word "Socialism" are linked inseparably in almost everyone's mind. . . the Socialist is always in favour of mechanisation, rationalisation, modernisation. . .'

George Orwell, *The Road to Wigan Pier*, (1937). Harmondsworth: Penguin, 1967, p. 176.

'. . . intellectuals must affirm outright, without qualification or hesitation progress is a lie. Only then will people be able to think, say, and act upon what they already know, without fear of isolation, ridicule, or repression. Responsible intellectuals. . . must struggle in their own realm to gain legitimacy for worker resistance to progress. They must change the terms of debate and extend the range of respectable discourse in order to insure that those who choose to resist need never act alone.'

David F. Noble, Present Tense Technology, Part Three, *Democracy* 4(3)1983:87.

Introduction

A recent article explains how one of the most militant workforces in the country, car workers at British Leyland's Longbridge plant, came to have its spirit of resistance broken. There are several reasons: the failure to mobilise members in response to the sacking of the union convenor late in 1979, the aggressive management tactics of Michael Edwardes, mass unemployment, the combativity of the Thatcher government. . . However, what the authors of this New *Society* piece single out as 'the real turning point' was the introduction of new technology which forced on the unions 'flexibility' by deskilling jobs, massively increasing output, and introducing an electronic information network called Machine Monitoring System that resulted in much greater surveillance of individual employees.'

The BL unions offered no significant opposition to the robots, computer numerical control systems and electronic supervision technologies that brought this into being because, say Scarbrough and Moran, 'new technology enjoys an important status as an inherently progressive force in society. Few if any trade unions. . . are willing to risk the accusation of being "Luddites" in relation to technology'. It was this 'mystique of technology' that the Longbridge management was able to exploit to overcome labour resistance to innovations that would seriously undermine

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the power of the shopfloor.

The unions scarcely stood a chance. So ensnared in the ideology of 'technological progress' were they that 'Even the shop stewards on the Works Committee—notable for their communist sympathies—sought to protect it (new technology) from the plant's industrial relations problems'. And what option did they have given the fact that the 'alternative plan' put forward by the stewards' combine in the 1970s 'had made massive investment in new production facilities the centrepiece of its approach'? Not surprisingly, 'when the investment actually materialised at the plant in 1980, the unions could hardly stand on their heads and oppose its introduction'.

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The Longbridge episode focuses a recurrent dilemma for the Left: how can it reconcile an attitude towards technology which regards it as inherently progressive with the fact that it is used and is being used as a weapon against labour? The urgency of finding a resolution to this puzzle can hardly be overstated since we are living through a period of particularly intense technological change. Computer communications technologies are the leading edge of this movement, but it also includes genetic engineering, nuclear power and biotechnology. Indeed, technological innovation is today a privileged means of effecting social, economic, and even political change and until the Left establishes a clear and confident technology policy it will be condemned to dithering, to wringing its hands at the results of technological adoption which favours the powerful while helpless to resist its implementation because it is approving of the 'progress' the technology itself represents.[2]

It is in response to this situation that this article sets out to:

- examine the Left's perception of technology and explain why it impairs resistance to changes that favour capital.
- argue that if the Left wants to influence changes decisively it needs to reconceive technology in a way that allows it to understand adequately the key role of technology in attempts to restructure relations so that capital might escape recession and, as important, to appreciate the influence social relations have had on the development of technologies currently being introduced.
- urge that the Left should thoroughly politicise technology and technological innovation, from the point of application back to origination, and in so doing to develop and implement socialist priorities and procedures to guide technological change.

The Left's perception of technology

The dominant assumption of the Left is that technology is neutral and consequently amenable to use or abuse depending on who exercises political power. Thus while capitalism might abuse technology in service of private interests and market injustices, the arrival of socialism will lead to positive use of technology for the community as a whole.

This attitude is evident in much Left thinking. It is present in the writing of Marx and Engels where they rage against capitalist misuse of machines to exploit working people, but foresee a time when these same technologies can be 'transformed from master demons into willing servants'.[3] It is prominent in the Labour Party which argues that a Thatcher government 'is the worst possible background for the adoption of new technology', though directed by Kinnock it 'could create a historic stage in the development of a socialist caring society'.[4] And it received perhaps its classic statement in Harold Wilson's 1963 'white heat' speech which, contrasting Tory and Labour policies, offered voters 'the choice between the blind imposition of technological advance, with all that means in terms of unemployment, and the conscious, planned, purposive use of scientific progress'.[5]

This emphasis on the malleability of technology co-exists with the equally widespread conviction that a certain amount of technology is a prerequisite of socialism. Drawing on Marx's view that socialism would be viable only after the 'struggle for necessity' (for food, shelter, clothing. . .) had been won, and endorsing his assertion that the capitalist stage of development preceded socialism not least because by 'revolutionising the instruments of production' it would secure a material basis for socialism, there is on the Left a presumption that some degree of technological uptake is essential to lay the foundations for a new order.

This outlook results in what might be called an inheritor approach to technologies pioneered by capitalism. There are no qualms about taking over capitalist technologies because technology is amenable to socialist application, though they are also a precondition for socialism since there cannot be any satisfactory politics while people are hungry, naked, or in general want.

These principles evoke a paradox which bedevils the Left: technology is supposed to be susceptible to political manipulation, yet it is, in a real if unspecified sense, prior to social and political relations, since without a technological infrastructure life is governed by a raw and ungenerous nature. The presumption here, at one and the same time, is that while technologies are determined for good or ill by social and political decisions, imperatives of technology adequate to satisfy basic needs determine social and political relations.

There are a number of consequences of this tradition of thought. A major one is that it leads to vacillation towards technological innovation.

It could scarcely be otherwise given the Left's conviction that technology of itself is aloof from politics. Moreover, since technology is also essential for laying the basis for socialism, socialists can hardly rebel against its introduction. They can thunder against its misapplications, but they cannot be against the technology itself because come socialism it will be used advantageously. This is surely the reason for the undercurrent of celebration of capitalism's dynamism that runs through ***The Communist Manifesto.***

An upshot is regular condemnation of 'mindless Luddites' by many on the Left when vigorous opposition is voiced towards technological innovation (it goes without saying that this is a favoured refrain of the Right)—*viz* Wilson's ***cri de coeur*** that 'there is no room for Luddites in the Socialist Party'[5] and, more recently, Jimmy Reid's denunciation of opposition to pit closures as 'Luddite' and thus 'thoroughly reactionary' since it fails to 'view modern technology as a liberating force'.[6] Equally common is a resigned feeling of 'inevitability' to changes spearheaded by technology though they are recognised by the Left as damaging to their cause. The overall result is that resistance to change favourable to capital is disarmed.'

A second consequence is that, if technology is essential for the socialist enterprise and if it can be inherited from capitalism, then to what extent are we to submit to the social relations, and the quality of those relations, that the technology imposes? This is a particularly acute question when set against the technologies associated with large-scale manufacture and bureaucratic organisation which characteristically result in workers feeling alienated, bored and demeaned. If one accepts the view that technologies are simply efficient means of guaranteeing output which yet impose themselves in particular divisions of labour and authority relations, then are we resigned just to accept them? If we do, and much of the reasoning of the Left leads one to this conclusion, then what is the attraction of socialism for ordinary workers and where have the socialist ideals of egalitarianism and an end to alienation gone?

A third consequence, related to the second, revolves around the popular socialist notion that a decrease in the working day is an assured route to socialism, and that this can be achieved by application of technology which allows at once increases in production and reductions in time spent at work. This is a theme well known to socialists, one found in the writings of Marx and Engels themselves, and most recently espoused by Andre Gorz.[8] It does allow the Left to retain the idea that technology, though developed by capitalism, is neutral, and to acknowledge that, whatever the social system, it imposes unpleasant conditions on workers. Its resolution is delightfully straightforward: apply still ***more*** technology so that what Gorz calls the 'sphere of autonomous activity', and others call leisure, can be massively extended.

However, what this must then encounter is the serious problem concern-

ing the extent to which technology per se—the technology which is essential for socialism though created by capitalism—can lead to socialism. And this is not a frivolous issue given the deluge of futurist comment projecting precisely this—material plenty without the need to work, a Leisure Society awash with goods and services that are abundantly available to everyone—'without the long-awaited revolution of the proletariat'.[9] Socialists, for long accepting as a truism that technology is crucial for socialism, without stipulating just how much it shapes social arrangements, cannot complain when conservatives steal their fire by discovering in new technology the possibility of 'socialism' without political change because the technology will effortlessly take us to the 'affluent redundancy' of an 'Athens without Slaves'. Neither can socialists respond with vigour to technological innovations in the here and now that enforce leisure on working people so long as they conceive of socialism as a technologically supported idleness.

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Present tense technologies

If ambivalence and hesitation are endemic to the Left's traditional perception of technology at a time when it can least afford to be indecisive because we are undergoing the most rapid technological transformation in history, what is a more adequate way of seeing? This should entail switching from conceiving of the abstraction TECHNOLOGY to stress that technologies exist in particular machines and objects that perform particular functions. It is important to move away from the unwordly perception of technology currently held because, paradoxically, it is by starting with a generic notion which is thought to be subject to use or abuse that, turning to the substantive, the Left finds itself encumbered by a theoretical legacy that makes it incapable of responding cogently and confidently to specific technologies. If we can focus attention on what David Noble calls 'present tense technologies',[10] we can shift from what is an unreal yet incapacitating debate towards an analysis of what technological changes practically represent and thereby towards a forthright programme of response.

The point is that no-one is or can be against TECHNOLOGY since TECHNOLOGY does not exist. Given the ubiquity of technologies—and virtually nothing we do in our lives, from the mundane (writing letters, shaving, telephoning) to the spectacular (flying across Europe), is performed without them—it may well be that an all-encompassing category is useful as a shorthand way of communicating, but it is an unfortunate by-product that the generality of the term TECHNOLOGY means that debates about its social meaning are frequently conducted at an unreal level. It is rather like using the term SOCIETY: no-one can be against

SOCIETY because this term is so diffuse; move down to particulars, however, to ***this*** social relation rather than ***that*** one, and very different conclusions may be drawn.

Technology and capitalist restructuring

Moving to the more concrete, we should acknowledge first of all that the primary rationale for technological change is to restructure British capitalism that it might better compete internationally. Amid a profound recession, the search is on to find an escape, and reorganisation of production processes, manufacture of new products, and revised market strategies are axiomatic to this endeavour. The thrust of capital's effort is to take on board new technologies of various sorts, cheapen and/or improve production and distribution, and thereby capture an increased share of foreign markets.

Technology is at the very forefront of this strategy of 'increasing competition' and 'restoring profitability' and it is a major reason why unions and their 'restrictive practices' must be broken since they represent at least potential obstacles to smooth and rapid adjustment. This is a message with which we are all familiar, one which Mrs Thatcher, backed by lavish propaganda campaigns in schools and media, voices in any and every speech which calls for 'rewarding entrepreneurs', 'hard work' and support for 'sunrise' industries which will supply the 'jobs of tomorrow'.[11]

Technology is, in short, at the heart of the Thatcherite political offensive,[12] and if the Left persists in appealing to its neutrality and holding to the 'progress' of advances in the 'productive forces', then assuredly it will be without a serious response to the assault.

But this is exactly what the Labour Party continues to do. Rejecting Thatcher's commitment to ***laissez-faire*** development of new technology (which in practice the Tories do not altogether abide by), Labour insists on the need for state planning of innovation. This does distinguish it from the Conservatives, yet it shares their impulse to introduce Information Technology in order to rejuvenate a market economy. Indeed, its criticism of Thatcher ***et al*** is that they are not proceeding with technical innovation quickly enough compared to our major competitors. Thus John Smith MP, shadow industry spokesman:

> **We've been taking a long hard look at the UK's industrial future and we've come to the clear conclusion that the key to industrial renewal is the rapid application of high technology. Our criticism is that it's not going fast enough.[13]**

This is also the reasoning that we find in the TUC which urges that Britain responds to the 'challenge' of IT by being 'in the vanguard of technological change', so as to grasp 'the unique and unparalled opportunity.' . . for Britain to improve its economic performance and also its competitiveness

in world markets'.[14]

The differences between the Labour and Conservative parties come down to the former's assertion that state orchestration is the best means of coping with the latest 'technological revolution' and its faith that a well-disposed state can distribute technology's bounty, which will be secured by making Britain's economy more competitive than that of other nations, to the less privileged.

These are by no means insignificant differences between the parties and there is not the least doubt that a Labour administration would be more appealing to socialists, but it is necessary to appreciate fully the implications of Labour's approach to technology. In its acceptance of IT as a means of 'industrial renewal' as fast as is possible it is acceding to the terms set by the international market. It scarcely makes a secret of the matter. Mr Callaghan said as much late in **1978** when he averred that it was time Britain 'woke up to microelectronics', because if it did not 'and other major industrial countries' did, then 'the prospect for us will be one of stagnation and decline'.[15] Since then, Callaghan's words have been repeated in one form or another by innumerable Labour representatives. The Tories are more curt, but the niessage is the same: 'Automate or Liquidate'.

Labour of course assumes that technological innovation is neutral, that there has been a 'discovery', and government should seize the opportunities presented. Following this logic, there can be no anxiety in steering technological changes on lines befitting the international market. Quite the contrary, Labour is enthusiastic to get on with the job, wanting to mobilise all state resources to hand that we can more effectively compete in the struggle for market share. And within all of this, it presumes, technology stands aloof, the preserve of politics being restricted to distributing the unprecedented wealth that follows from a revitalised 'Britain Inc.' thanks to rapid adjustment to the 'microelectronics revolution'.

But it is demonstrably the case that a technology policy guided by the principles of the market shapes the sort of technologies that are produced and applied. One consequence, for instance, is that many jobs are de-skilled and demeaned (and many others made redundant) because the principle underpinning the design and application of ***this*** technology rather than *that* one is 'how can we best the French, Japanese, Germans or Americans?' (and all these nations are operating on the self-same lines) and axiomatic considerations here are cheapening the costs of labour, controlling the labour process more effectively, and increasing the output of saleable goods and services. Another is that the technologies which get manufactured are those that are marketable rather than those that are socially needed (for example, in **1980** Thorn-EMI's chairman candidly opined that his company's 'decision to withdraw from medical electronics was [because] there appeared little likelihood of achieving profits in the

foreseeable future';[16] for another example, where was the mass market for personal computers before the torrent of 'IT awareness' commercials convinced anxious parents that they were an investment in the educational and employment prospects of their children?). Still another consequence is that funding for research and development from which emanate as yet unirnagined technologies is directed towards projects with commercial potential rather than communal application—witness the £350 million Alvey programme to pioneer 'fifth generation computers' which is explicitly tied to corporate goals.[17]

The outcome of Labour's presumption that conditions prevailing on the international market have no influence on the technology itself (the political variables being only the speed of uptake and distribution of the beneficence of growth) is that it is resigned to the 'inevitability' of accepting and indeed encouraging particular technologies whatever they might do to the workforce, unions or the number of unemployed. Given the fact that the advanced capitalist economies, entrapped in slump, 'are all looking to new technologies as the panacea'[18] for capital's woes, Labour's assumptions place it in an impossible situation. Compelled to manage technological innovation on terms set by the international market, yet operating in the name of socialism, it must find itself imposing and stimulating changes which militate against its core constituencies and political ideals.

Technologies embody social values

Following from this, it is necessary to emphasise that technologies have not dropped out of the skies, though this is the implication of media portrayals of that weird and wonderful galaxy 'Silicon Valley'. They have been produced in social contexts where they have been subject to the values and priorities of particular groups which, in discernable ways, get embodied in these technologies. To make this sort of statement seems to upset people, many of them on the Left who, sensing the presence of 'philosophical relativism',[19] insist that this is to reduce technology to a figment of the mind. It is nothing of the sort. But it is to assert, against those who proclaim that technology is amenable to use or abuse, that things are not nearly so straightforward because, in a constituted technology, social values have been incorporated. This is certainly not to say that, in different circumstances, we cannot use the technologies created by capitalism. The fact of the matter is that, being in the world, we have to make use of what is available and few artifacts are so determining that they cannot be put to some alternative uses. It is simply to say that, because technologies are practical products of the social world, they are shaped by that world and this limits the malleability of any technology that might be inherited.

Let me give a few examples:

- Houses are artifices in which to live, find protection from the weather, rear one's children, and accommodate one's belongings. But can anyone believe that these are 'just places to live?' Can anyone who has ridden through a town on a bus or train, from the city centre through the suburbs and beyond, be unaware of the values that have been incorporated into the architecture of homes? And can anyone be unaware of the intrusion of class inequalities into this housing (size of buildings, garages, location, brickwork, gardens, proximity to work etc)? Reflecting on the values that are manifest here can socialists be blind to the enormous difficulties that 'inheritance' of such technologies presents for an egalitarian order? Come socialism who will get the palaces in Bishop's Avenue, Hampstead, and who will be living in the council houses of Neasden?
- Cars are one of the commonest technologies today: in the USA there were **122** million registered automobiles, one for every two persons, in **1980,** with **87%** of households owning a car and over half possessing two or more. They are a means of carrying people and things from one place to another, but they are much more than a 'technical' transport device since they incorporate a multitude of social values such as family size, use of and attitude towards finite natural resources (they are highly wasteful of energy), tolerance of injuries and fatalities and enormous expense imposed on health services (in **1981, 50,000** people were killed in car accidents in America), status and style (the Porsche, Mini, Mercedes. . .), modes of living and of work (home in the suburbs away from the place of work).

  Perhaps above all, the automobile'embodies a value which is opposed to provision of public transport and favours individual provision of the means of mobility. It is worth stressing that the boom in the private motor car on which so much of the economic success of the fifties and sixties relied, the coincidence of the dismantling of much of the railway network, and the hidden subsidy from the taxpayer for provision of roads, reflect a deep-seated aversion in our society to the creation and maintenance of a public transport system. And it should be added that this is a value reflected in a particular technology· despite the fact that it is extraordinarily hard to see anything but the necessity of owning a car in many parts of Britain nowadays because buses and trains are woefully inadequate in large part as a result of the development of the private motor car.

  No-one would claim that a change in social relations would overnight abolish the car. But it is equally absurd to pretend that the car is but a neutral technology which, if abused in the here and now (driven too fast, driven under the influence of alcohol, driven often unnecessarily), will be taken over unchanged in a different order. It will certainly be used, and used in some ways differently, but over

time it will also change technically as it is shaped by changed values and priorities.

- Much has been written in recent months about the Strategic Defence Initiative (commonly referred to as Star Wars), which aims to produce a system of computers and communications, co-ordinated with beam weapons, tied together by the most advanced space technologies. Costs are scarcely estimable, though early in 1985 President Reagan requested nearly $4 billion for initial programmes and $30 billion for the first five years funding, and full costs are put at many times that. The Strategic Defence Initiative is but the most dramatic instance of the trend towards 'electronic warfare'—everything from AWACS (airborne warning and control systems), battlefield communications, 'smart weapons', radar-seeking missiles, electronic countermeasures and counter-countermeasures, the militarisation of space, the launch, guidance and operation of nuclear weapons, to worldwide military communication networks—that characterises modem military and security affairs.

  As constituted these technologies incorporate values of distrust, paranoia, and aggression in their design as means of surveillance and destruction of people within and outside particular nations. No doubt there are some alternative uses to which might be put the plethora of Command, Control, Communications and Intelligence systems strung around the globe, but surely the hope and conviction of socialists is that in a different regime most if not all will be redundant, unusable reminders of a totally different and repugnant way of life.
- Numerous commentators, but most of all Harry Braverman and more recently David Noble,[20] have described ways in which the development of factory and office technologies have been shaped by an overriding distrust of the worker. Nowhere in the twentieth century have investors or engineers seriously considered creating machinery which might ennoble work. Throughout, the aim has been to maximise output while minimising the role of the worker who threatens, as a human being who is unpredictable, as an economic cost, and as someone with contrary interests, to interrupt that pursuit. This is a value that has been incorporated into much technical and technological organisation of modern industry (in the 'factory office', in assembly line manufacture) and consequences of its relegation of the quality of the employee's life have been that workers have had imposed on them routine, mindless, fragmented and soul-destroying tasks.

Information Technology

The coinage of the term Information Technology (IT) to indicate a trend

towards the convergence of telecommunications and computers has been accompanied by all manner of speculation about the things that it might do. Invariably commentators present us with a list of the 'choices' now on offer. Barry Jones gives a typical formulation:

> **Technology can be used to promote greater economic equity, more freedom of choice, and participatory democracy. Conversely, it can be used to intensify the worst aspects of a competitive society, to widen the gap between rich and poor, to make democratic goals irrelevant, and to institute a technocracy."**

This posing of choices thanks to IT follows from the insistence of reviewers, Left and Right, that 'being just like any other technology, IT is intrinsically neither good nor bad. Everything depends on how the country adapts itself to using information technology'[32] which 'really is neutral'.[33] From such a presupposition the language of choice is irresistible.

These presentations are impossible to reply to because they refer persistently to abstractions rather than to substantive technologies. The question whether one is for or against technology can only be answered in the affirmative in this formulation—who can oppose something which allows free choice? But a meaningful response can only be attained at the level of specific technologies; at the level of ***this*** technology performing ***this*** function for these ***ends*** because it is here that technologies exist. Moreover, continuously asserting at a rarefied height that IT provides choices here, there, and everywhere, paradoxically restricts real choice because it diverts attention from analyses of the realities of the introduction and development of information technologies which would enable meaningful decisions to be made.

Let us focus on a number of substantive contexts into which computer communications technologies are being introduced that profoundly influence their form and content.

(a) ***Corporate Requirements***

Above all other factors should be emphasised the large, predominantly transnational, corporations that are the major outlets for IT systems which account for the bulk of 'electronic office' technologies and computer networks. The advanced capitalist societies, domestically and internationally, are dominated by oligopolistic corporations that have particular and pressing informational needs to which a variety of IT responds. They require co-ordination and organisation over wide geographical boundaries and it is through new information and communication systems that these dispersed enterprises can be more effectively managed.

They recognise the role of IT readily enough: witness Westinghouse Corporation (1983 revenue $9.5 billion) which says it straight, announcing that in 1981

An integrated worldwide strategic planning process was put in place, linking products and country planning efforts. A global communications center is being established to provide timely and detailed information for every part of the world. This centralization of planning and intelligence will give Westinghouse a competitive edge in the worldwide deployment of its resources.[24]

Or listen to Mr E. Bradley Jones, president of Republic Steel, who describes the emergence of 'geo-economics' as 'a way of saying that the trading nations of the world are stepping up their intermingling of resources, manpower, technology and capital', a process which blurs national boundaries and demands the movement of capital and information 'with growing ease and speed', calling for computer communications networks to facilitate the production of such things as the Ford Escort which is assembled in three countries from parts made in nine.''

It could be supposed that the 'discovery' of IT and its harmonious fit with the requirements of corporate capital are coincidental, but this would have great difficulty in accounting for the practical implementation of computer communications technologies in service of increasingly centralised yet simultaneously dispersed organisations. Without the likes of Citicorp's transnational banking and financial interests calling for 'a completely integrated market place capable of moving money and ideas to any place on the planet in a matter of seconds' there scarcely would be moves afoot to establish an Integrated Services Digital Network that would enable high speed switching of digital circuits between subscribers across nations. It would be folly to ignore the profound influence capital has had both on the designers and manufacturers of these technologies (which, in turn, having a keen eye on the most lucrative markets, have throughout oriented their products to the deepest purses) and on the creation of communications policies premised on market principles.[26]

Any assumption that available technologies just happen to accord with the needs of capital would be hard pressed to explain how they are being developed to facilitate what has been called the 'productive decentralization'[27] that is a feature of an emerging 'new international division of labour', by which is meant the decentralisation of production around the globe and inside individual countries by increasingly centralised corporate concerns that can monitor and instruct from distant locations small and isolated units (*e.g.* plant is located in the Far East or Caribbean and/or on the metropolitan fringes such as Southern Ireland and Scotland where labour is cheap and poorly organised).[28]

In addition, as data networks emerge they take on specific characteristics. Drawing together information about natural resources, financial conditions, political circumstances, labour supply and so on, the boom in data bases and on-line information services in recent years has overwhelmingly indicated the values of the international market. The rise and rise of

'information factories' from Reuters, TRW, Quotron, Dun and Bradstreet, ITT, IBM and Dow Jones and the predominantly economic and financial data they harvest and sell are traceable directly to the requirements of advanced capitalism. It is not only that the commodities these concerns trade in are specific to corporate interests (what would socialists want to know about the value of the yen in real time? what would socialists care about Wall Street fluctuations as they happen?), but also that they are priced way out of the range of socialists' pockets (for example, the services offered by Reuters to 400 or so brokers and bankers cost an estimated £1,250 subscription plus ***£600*** per month).

It is, in sum, the need of corporate capital to monitor and manage its affairs which requires particular types of computer communications technologies and this receives a willing answer from profit-hungry IT manufacturers and servicers. This is the only way to make sense of the world's leading telecommunications corporation which advertises that 'At AT&T it is gospel that business strategy dictates system design'. And it is from this set of social relations that emanate most problems associated with electronic funds transfer, transborder data flows, and questions of national sovereignty being undermined.[29]

(b) ***From Taylorism to Social Taylorism***

The character of present day technological innovation might be better understood by sketching pressures that have been exercised throughout the development of corporate capitalism. A striking feature of the twentieth century has been the search for better control of its operations by the corporation, an endeavour that has increased in ambition as the company has spatially advanced and penetrated deeper into the fabric of social life. It has resulted in the spread of more calculative, methodical and deliberate ways of conducting social and economic affairs, and it has led to life being more consciously and systematically regulated, more distinctly ***managed,*** than in the past.[30]

The major applications of this control originated and still are found in the sphere of work where F.W. Taylor's 'Scientific Management' instigated what business guru Peter Drucker sees as the real 'information revolution' because it recognised that careful observation and analysis of labour processes, followed by precise planning, could lead to more effective control of the workforce and leaps in productivity.

If Taylor commenced and put a name to what is recognisably modern management practice within the plant, and if his strategy placed a novel emphasis on information gathering and manipulation to effect it, then technology soon emerged as Taylorism's primary expression in the highly automated assembly lines and associated unskilled labour of Henry Ford's factories since the design of such forms of production made manifest Ford's knowledge of car manufacture and how to make it least reliant on

employees by building skills into the machinery and line.

The search for control was neither restricted to the factory nor, from a later date, the office where IT facilitiates the 'Fordism of white collar work'. Another important area has been documented by Chandler[31] where he traces the merger in America of mass production and mass distribution as corporations grew in scale and vertically integrated, thereby replacing the play of market forces in the area of distribution with control by the 'visible hand' of 'managerial capitalism' which became responsible for co-ordinating, overseeing and assessing manufacture and distribution under one management roof.

'Managerial capitalism' soon found pressing the impulse to control affairs beyond the workforce and the distribution of produce. It is not only that the application of calculation was unlikely to stop short of such a crucial stage as selling, but also that mass production of itself required mass consumption and continuity of production could not be assured if this was left entirely to customers' whims.[32] For these reasons, by the second decade of the century procedures were developed to rationalise selling. Spearheaded by the auto industry, modem marketing was pioneered to try to assure sales of cars, clothing, cigarettes, processed foods and the like.[33]

Important aspects of this marketing were installment selling, used-car trade-ins, annual models and eye-catching packaging (the imperatives of selling palpably influenced the technology),[34] and advertising and market research, the former to dissemble information, the latter to amass details of income, life-style, buying preferences etc. that could be scrutinised the better to manage consumers. There is a fascinating literature from the twenties and thirties advocating 'scientific' methods of research 'in discovering the public's wants and reactions to particular products',[35] the techniques of which enormously stimulated the development of 'the electric sorting and tabulating machines'[36] made by International Business Machines that were the forerunners of modern computers and IBM. Relatedly, advertising required mediums and quickly established dominance in radio and later television, with profound consequences for programming and the rapid spread of receivers,[37] as a means of 'entering the homes of the nation through doors and windows, no matter how tightly barred, and delivering its message audibly through the loudspeaker wherever placed'.[38] In turn, there came about an acute need for accurate ratings to measure television's and radio's reach as an important facet of market research.[39]

This application of Scientific Management first in the workshop, then to the expanding corporation, and finally to the consumer can appropriately be called Social Taylorism, the extension of Taylorism throughout society. It is certainly the case that the garnering of information, and planning by management on the basis of what is gathered together, has grown enormously this past fifty years.[40]

Applied to the 'information revolution' through which we are allegedly living, it persists in an emphasis on applying new technologies to sell more effectively. Now, with the greater range and versatility of video, cable and satellite television, advertising and audience monitoring are rendered still more sophisticated. Far-sighted managements are turning to these new media to promote their cause further, to burrow themselves still deeper into the texture of society. According to the J. Walter Thompson Company, cable TV offers 'new or improved advertising opportunities':[41] for example, test marketing, direct response advertising, placing of advertising within specialist channels, home shopping services, sponsored programming, 'informercials'. What the new media allow is more advertising, more specific and targeted advertising to particular groups. And it also offers closer than ever monitoring of the audience. Thus AGB, Britain's biggest market researcher, which amongst other things meters television viewing for BARB (Broadcasters Audience Research Board), 'is already envisaging the day when the street interview, even telephone questioning, will be a thing of the past. Through its Cable and Viewdata company, it has a national sample of 550 homes, which it quizzes through special viewdata sets. Apart from instant judgment on commercials, it can stretch into other media fields, like the respondents' magazine readership'.[42] The same company's ***Peoplemeter*** has recently been introduced into the United States as a means of more precisely monitoring TV viewing (meters can show when a TV is switched on, ***Peoplemeter*** aims to discover whether viewers are actually watching).[43]

As an example of this strategy to control consumers, let us look at one of the world's major advertising agencies, Saatchi and Saatchi (S&S). The business of S&S is to develop and perfect the techniques of selling required by corporate capital. To this end it is 'continually examining the results of research to bring [it] closer to the heart of what makes consumers tick—their wants, needs, desires, aspirations'.[44] S&S is devoted to 'market research, attitude and image surveys, and new product testing' and to strengthen its observational capabilities it has just bought Yankelovitch, Skelly and White, a firm of social research analysts headed by an acclaimed statistician and social forecaster.[45]

S&S monitors people with a particular client in mind, transnational corporations, the needs of which are leading to 'pan-regional and world marketing emerging at the heart of business strategy'. Recognising their dominance of the world economy and drawn by their billion dollar advertising expenditure, S&S believes that in future 'research will be conducted to look for similarities between countries, not to seek out differences', that ***global marketing*** will require advertisers to find a formula for commercials 'so deep in its appeal that it can transcend national borders previously thought inviolate'.

Though global, this remit demands still more exact surveying of con-

sumers, a capacity to recognise that 'there are probably more social differences between Midtown Manhattan and the Bronx, two sectors of the same city, than between Midtown Manhattan and the 7th Arrondissement of Paris'. What will be required is 'analysis of all demographic, cultural and media trends', so marketers 'can survey the world battlefield for their brands, observe the deployment of their forces, and plan their international advertising and marketing in a coherent and logical way'. S&S thus offers clients the prospect that people will be known on a world scale, so that what they will be allowed to know can be most effectively managed.

S&S is all in favour of new technologies provided they are founded on commercial principles. Thus it argues that the BBC's licence should be limited and funds collected from private benefactors, and it is bullish about cable's prospects 'as an advertising medium [because of] its ability to attract audiences through selective programming aimed at more clearly defined groups than the mass audience of the major networks. Multinational advertisers with a specific target audience in each country will be able to reach their target segment through a cable channel concentrating on their specific interest'.

All this, yet S&S aspires to be more than an advertisingagency. Realising that 'as multinational corporations grow in size and complexity so the marketing, organisation and strategic problems which face them become more closely linked', it has consolidated by moving into management consultancy (advisory work in strategic planning, employee recruitment and training etc.) and marketing services (sales promotion, public relations, corporate image etc.), intent on supplying, in the words of the **Financial Times,** 'everything a company may need for its internal—and external—communications'.[46]

This suggests that the spread of Scientific Management goes beyond coordination of the dispersed corporation, more intensive marketing of products and observation of customers, all requiring IT to allow the gathering, assessment and dissemination of information. Further changes in corporations, above and beyond growth, concentration and spatial relocation, have impelled them, as part of the planning procedures essential to the retention and advancement of their position, to enter into what can only be described as the Scientific Management of political life itself.

Michael Useem[47] finds reason for this in a shift from 'managerial' to 'institutional' capitalism, by which he means that the economy is dominated nowadays not only by large corporations, but also that these are more interconnected than ever before. A result is a 'consciousness of a generalized corporate outlook' (p. 5) guided by an 'inner circle' of corporate leaders that has led to the 'political mobilization of business' (p. 150) over the past decade or so.

In this way capitalism has become more cohesive and better equipped

to have its views represented in politics and has taken steps to ensure that this influence is systematised and regularised. In the days of the modern state, with widespread political regulation and considerable significance applying to governmental decisions, advanced capitalism has acknowledged the need—and with institutional capitalism has developed the basis—for effective and consistent political representation. Information and IT are key requirements of effecting this political mobilisation of business.

One dimension is the spate of corporate and advocacy advertising that has emerged in the commercial media and another is the boom in sponsorship which will be increasingly important as a means of subsidising communications technologies. These are attempts to continue the unrestricted activity of business by image manipulation, but they pale when compared to the more directly political representation of corporations. On the one hand, this is evident in their recognition that 'better communications' within and without the organisation are a means of getting their own way—and the mushrooming of PR companies, the cultivation of media contacts, executive grooming for TV appearances, in-house video productions and the like express this. On the other hand, it is apparent in corporate involvement in politics itself. The unrelenting growth of the business lobby and full-time lobbyists within Westminster, with their indices of 'opinion leaders', computerised files on MPs and their colleagues, constant stream of press releases and targeted leaflets is testament to this. But still more significant is the intense support for and influence on pro-business parties themselves. Corporate conviction that politics must be better managed than before has been expressed not only in substantial support for and donations to conservative political parties, subsidy of pro-business 'think tanks', and more vigorous participation in politics by the CBI. It has also been witnessed in the development within the polity itself of business procedures.

One can point to the ways in which S&S by its forays into the elections of 1979 and 1983 has bridged a traditional gap between politics and business by applying its expertise as a 'communicator' gained in selling products to selling politicians. American politics are the epitome of this process of week in week out polling of the electorate, and computer analysis of patterns and past practices, so that candidates can be better 'packaged',[48] but S&S are an index of the way politics here has been changing to become a matter of 'selling' ideas and 'delivering' votes, a sign that Scientific Management has entered politics itself.

S&S's campaign tactics and strategy are well known: the careful calculation of people's attitudes and the moulding of candidates around issues so identified, the daily polls, the targeting of posters, elocution lessons for Mrs Thatcher, meticulous selection of clothing and grooming of hair, prearrangement of 'photo-opportunities' and media 'events'. . . A corollary of this advertising mentality in politics is the excessive concern for secrecy

that characterises the Thatcher government.[49] Another is the diminution of politics as a 'public sphere': the avoidance of serious political debate and exchange of ideas and principles and their replacement with slogans, image manipulation and news management.

It is important to stress that it is this consolidation and extension of Taylorism that drives the 'information revolution'. This is especially so because people are easily wrong-footed by talk of 'choice' in a 'new era' heralded by innovative technologies. If we place the power, interests and motives of corporate capitalism at the centre of developments and applications we depict a very different scenario—and appropriate reaction to—the 'Knowledge Society' which futurists, Left and Right, suggest is a radical break with the past.

Arguing that a crucial context for take-up of information technology now and in the past is the search for increased corporate control, and that this impinges on the technologies themselves, is an important factor in retaining and sustaining hostility towards capitalist changes that are so often announced as 'technical progress'. One way of illustrating this is to point out that a good many of these technologies without corporate capitalism are worthless. Who on the Left could find use for S&S's data bases and market profiles; for the customised software housed in the headquarters of transnational corporations; for the **11,000** hours of TV soaps rumoured to be held in a vault in Texas awaiting the establishment of cable in Britain? Are socialists not disturbed by the accumulation of creditworthiness files on buyers which results from the spread of plastic cards (Access, Barclaycard, Visa) and is a major motive for Marks and Spencer's recent incursion into this area since it gives 'invaluable feedback and data concerning individual customers, their needs and their purchasing power'[50] and will better allow future marketing efforts?

A retort might be that these are aspects of IT's applications, that they represent the 'software' which is socially skewed, but that the 'hardware' is what the Left can inherit because it is both valuable and malleable. There is of course some truth in this view, and I would not want to suggest that technology should be approached in manichaean terms of useful/useless, but it is important to grasp that values do intrude into the hardware itself. For example, the technologies that Taylorism has pioneered in factories and the work patterns they impose surely cannot be acceptable to socialists. Neither can the 'growth at all costs' (to people, the environment) mentality that they express be endorsed. Again, it is striking that so much IT for the home is an enhancement of the television monitor, itself developed, as Raymond Williams has observed,[51] as the 'box in the corner' to accord with the 'mobile privatisation' of modern family life. Video cassette recorders, TV games, home computers, satellite broadcasting and cable services all consolidate what has been an enormous commercial success, the television, and in so doing they perpetuate the

move towards privatisation that is characteristic of consumer capitalism and, indeed, express materially the plans of corporate designers. As a recent *Campaign* feature put it, new technologies for the home represent a shift to 'Fortress Britain', a further withdrawal into the domestic sphere, equipping it with quantities of durables and pulling up the drawbridge on the world outside[52] (though communications facilities will enable the centralised observation of these isolated dwellings). While there are very important debates to be conducted about whether this hardware is to be programmed commercially or from public funds, there is another issue, less openly acknowledged, which questions whether the styles of life embodied in the technologies are to be encouraged by socialists. Would not socialists want to defy a technological trend which compartmentalises each family unit? Would we want to encourage the working from home via computer terminals which is on the horizon for many people, especially women? Would we not wish to reconstitute technologies that reflect and encourage more communal values?

(c) *The Priorities* of *the IT industry*

Kevin Robins and myself have described elsewhere the IT industry,[53] so here I can state briefly that it is a fast-growing business, dominated by an oligopoly of multi-billion dollar transnationals at the head of which are IBM and AT&T, that is rapidly changing amidst intensive competition over markets, standards and product innovation between these giants which increasingly offer proprietary ranges of complementary and compatible technologies. Though their focus is mainly on computer communications systems for the office, the IT industry is so vast and is so rapidly integrating and converging that very many enormous corporate bodies in media, telecommunications, electronics, computing and information supply are entering the arena to struggle for mastery over the emerging 'information grid'.

These IT corporations work on a number of assumptions. One is that they are answerable to no-one but their shareholders (and not much to the bulk of these) whose priority is profit maximisation. In pursuit of this goal all the major companies have identified business users as the most likely to offer a satisfactory return on investment. Fulfilling a policy of servicing the most lucrative markets in order to achieve the best possible profit has significantly influenced the technologies that have emerged. To believe that computer communications for business users, far and away the most sought after market, are neutral developments is untenable given the prioritisation of this area by the manufacturers and their clients.

The reality is that these are systems developed to 'serve the inter-corporate needs for which they were designed'.[54] Computer terminals in banks and travel agencies, communications networks linking company sites, data processing centres and the like have been pioneered, produced

and marketed for identifiable social needs, those of commercial enterprises, and it is surely reasonable to suggest that a different constituency and different manufacturers might produce different technologies. It is only by closing our minds to the possibility of alternative technologies that we can assume as uncontentious the results of the stress of IT corporations on the 'electronic grid' within and between offices and thereby resign ourselves to displacement of staff, increased machine pacing of work, and concentrated power of the already powerful.

(d) *IT* for the *Military* and Police

Military and police agencies have a keen interest in information. IT offers them the opportunity of handling more information more effectively, and they are big spending organisations (military procurement expenditure in Britain was about £8 billion in 1984–85). In light of this, there should be no surprise that IT manufacturers all have substantial commitments to produce equipment and software to meet the needs of these organs of the state. Though precise figures are hard to come by, NEDO recently declared that 'the UK electronics industry's single biggest customer is the Ministry of Defence'[57] and there is widespread agreement among analysts that military sales on average account for about 20% of corporate revenue in the business.[56] At the higher levels companies such as British Aerospace get around half their income from the Ministry of Defence, but no IT corporation of significance got less than £25 million from the Ministry in 1981-82 and Ferranti, GEC and Plessey occupied the top category of 'over £100 million'.[57] More pertinent, 70% of these contracts are non-competitively allocated and are often at the cutting edge of technological advance, making them especially attractive to IT corporations. A recent report that the Commons Public Accounts Committee has 'no way of knowing what proportion of the £5,000 million spent by the Ministry of Defence on non-competitive contracts is being paid out in legitimate expenditure and how much is spent on inflated bills with items disguised to boost profits' (Guardian, 13 May, 1985) does nothing to diminish that attraction. Indeed, the military demand provides a constantly renewed energy for ever more sophisticated computer communications technologies—any system is outdated before it is completed—and thereby a reliable outlet for IT manufacturers.[58]

The outcome is the creation of mind-boggling military technologies[59] and an apparently inexorable growth of increasingly integrated police computer networks and data banks, local, regional and national.[60] Readers will not require a rehearsal of the dangers these technologies carry in international affairs and at home, dangers of confrontation and warfare and erosion of civil liberties. The least that one can say is that much of the IT for the military and police is devoted to surveillance of the 'enemy' within and without (spy satellites, telephone interception, 'bugs', con-

struction of dossiers on 'subversives' and so on), and that, amid the economic crisis, social upheaval and restructuring through which we are living, a strategy of strong state/free market[6]' leads easily to opposition to government policies being equated with subversion.

What could socialists want with these technologies? With their illiberal values of spying and prying these surely cannot be seen as worthy of inheritance. It has been suggested that at least some elements of police data networks are worth saving, for example files on missing persons and stolen vehicles. I could concede this were the systems publicly accountable, but with two provisoes. The first is that to talk in this way is to overlook the motive for and context of their introduction which places to the fore the policing function as one of containing social unrest in often highly charged political and industrial circumstances (thus during the miners' strike entries on the Police National Computer's Stolen and Suspect Vehicle Index jumped 50% as police logged miners' cars used for picketing). The second, related, is that the idea that technology can be salvaged underestimates how much the design of these systems, especially the software which is the biggest expense, is customised in ways that make it difficult to put to other purposes.

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The Politicisation of Technology

What this discussion amounts to is that the Left should stop asking what TECHNOLOGY can do and concentrate instead on what particular technologies are doing and why they are doing it. We should focus on technologies in the here and now so we may show how they can serve powerful interests and how their origin and application are shaped by those interests. A stress on 'present tense technologies' is a prerequisite for strengthening the resolve of those who often have good reason to oppose 'progress', yet are shaken in their actions by insistence on technology's neutrality and beneficence. This idea seems wilfully blind to the fact that many of the Left's problems emanate from and/or are exacerbated by technological innovations that displace employees, boost the speed of work, deskill labour, increase the national and international dominance of corporate capital, threaten global stability still more than it is already threatened, heighten surveillance and facilitate the dissemination of ideas and values from and favourable to the powerful. We on the Left should try to change our own and others terms of reference about technology, we should insist on a different type of debate, that those weakened by its applications can resist without feeling that they are cranks.

But how should we effect this? Astraightforward and grandiose response is that a socialist policy for technology would not be so different from a socialist policy towards the economy, welfare or class, in that it would

seek to apply socialist criteria of egalitarianism, community and support for the working class. Nonetheless, it would differ radically from previous and present socialist policies by applying socialist principles to technology instead of treating technology as an autonomous and a social phenomenon which gives off 'wealth' that can be distributed in a variety of ways. In other words, a socialist technology policy would insist that socialism does *not* stop at the door of a room occupied by experts who in time create manifold 'goodies' which are then passed to the outsiders. Socialism enters that door, does its utmost to make known to the widest possible public what is going on inside, and tries to impose its priorities on the technologists and their produce.

Suggesting this, we are able to see that a problem for the Left is that it is forced to respond to technologies already constituted. While it is important to lay bare the interests represented in these completed technologies, the Left should also be arguing that the processes by which modern technologies are created, research and development projects, require politicisation and debate so that priorities established before the production of technologies are open to scrutiny and influence. At the moment the controllers of R&D funds, those who decide to back one idea rather than another and thereby set the agenda for consideration of tomorrow's technologies today, are of two kinds, corporate capital and state agencies. The sums they invest are prodigious: for example, between **1977–82** IBM spent **$8** billion on R&D, ITT spent $5 billion from **1978–83,** and Bell Labs (of AT&T) in **1982** alone spent **$2** billion on its **25,000** research staff, while in Britain the Ministry of Defence in **1983** disposed of half of all the government's R&D funds (and the state provided **50%** of all the nation's R&D spending).

No-one can be under the illusion that these projects, at the point of origination of technologies, are not influenced by particular values and beliefs. Just a glance at the heated debates within companies and government departments over research priorities gives the lie to that. A task of the Left is to enter the debate about technological innovation at this early stage. There is certainly room for it now in the area of state expenditure, given that so much of it is channelled through publicly owned, though scarcely accountable, institutions such as universities and colleges. Doubtless such a proposal would be met with outraged cries that academic freedom and the scientific enterprise are threatened, but a socialist strategy on these lines would be doing nothing other than make explicit what has happened for over a century and what the present government is undertaking with special vigour since it feels that the inadequate response of higher education to capital has contributed to its demise. If, taking a leaf out of Thatcher's book, the Left can move towards imposing its criteria for technologies at the point of initiation and origination, to present at this stage its notions of need, quality of work, and modes of leisure, then

it will have moved far from the inheritor approach to received technologies, towards one which regards them as expressive of social relations.[42]

Such advocacy is concerned, of course, with a socialist policy for technology which is long term. A much more pressing question is what to do with the technologies that are here now and with which any socialist enterprise must come to terms. Socialism will not start with a clean sheet and it will be compelled to use technologies already in place. Still more to the point, socialists have to make clear their policies on technologies now being applied, so it is important to outline the contours of a socialist technology policy that is relevant to present conditions.

This is territory that the Left has not yet charted—and a priority should be to commence this task—and I can only suggest a few landmarks, but, perhaps most prominently, socialists should mark their willingness to support resistance to technologies, introduced in the name of 'progress' because they increase 'productivity' and 'efficiency' at the expense of 'competitors', which make redundant, deskill or increase the pace of work for employees. Socialists should unhesitatingly back the victims of technological changes wrought by capital and they must refuse the temptation to qualify their support by whispering, for example, that 'though we support printers in their struggle against media corporations which are endeavouring to reduce their numbers, nowadays they are an anachronism—under socialism we'll be using the most advanced printing technologies ourselves and they don't require printers, but we'll give compensation enough to allow the dispossessed to enjoy a life of leisure'.

It is this sort of reasoning, which subscribes to an underlying, apolitical, process of technological progress, that gravely weakens efforts to combat the increased control of capital being effected in the here and now. The only acceptable socialist policy should be support for the opponents of technologies which do them down and an insistence that the socialist endeavour will extend to a radical revision of technological adaptation and the production of technologies themselves.

A related principle should be a willingness to refuse technologies that are inimical to socialist ideals. Most socialists appear to regard rejection of new machines as some sort of blasphemy, at best a yearning for a mythical yesterday, and at worst an assault on rationality itself. But what is wrong with refusing the products of electronic warfare? Is it irresponsible to reject the generation of energy by nuclear fission? And is it madness to suggest that Britain has far too many motor cars and the ambition to have one (or more!) in every house is materially wasteful, antisocial, and damaging of the countryside? Is it absurd to say that Concorde—beautiful engineering though it undoubtedly is—is a waste of resources, material and human, and should long since have been abandoned? And is it foolish to claim that high-rise accommodation for families is unacceptable to socialists, and the only sensible socialist policy is to urge the demolition

of such buildings?

A socialist technology policy would not banish current technologies just because they have been created by capitalism. To argue that socialists should beware the fiction that technology is neutral is not the same as endorsing the nonsense that capitalist technologies can be rejected out of hand. What it should insist upon, however, is a suspicion of capitalist technologies, a preparedness to change or even to reject them, and an insistence that the criteria for their adoption will be socialist priorities rather than technical wizardry.

More positively, a socialist policy towards technology would feel an impulse to adopt an ecocentric outlook which is intensely suspicious of the technocratic mind that urges unlimited 'growth' and the 'technical fix' as solution to problems.[63] A high priority for socialist technologies would surely be that they are not ecologically or socially damaging: that they conserve energy and wherever possible favour using renewable resources such as wind, sun and wave rather than coal and oil; that they are non-polluting of the environment; that they encourage the craft elements of labour rather than provoke an intense division of labour in the name of efficiency of output. . .

It is very likely that such measures will be less 'efficient' than current technologies, but socialists should be able to resist too rapid an acquiescence to the pressure for 'more' at least cost. One major way of doing this is to discuss and thoroughly debate what socialist needs are and how they are to be ranked. Here it is important to remind ourselves that, in a capitalist society, need is determined by the saleability of an object and provided on the basis of ability to pay. Socialists would obviously want to change this, but they are still left with the imperative of deciding upon what would be needed by a socialist society.

It seems rare for the Left to consider need as a problem for socialism. Concerned overwhelmingly as they are with deprivation and injustice, socialists have an impulse to shout out for radical redistribution of what is available and the creation of still more to be shared in the future. It is the same perception which regards committed ecologists with suspicion: too often these appear to be people who, already having well-paid and secure jobs, good homes and affluent lifestyles, want to restrict what working class people have and aspire to have. Against this, however, it has to be conceded by socialists that the ecologists' emphasis that in contemporary Britain almost the whole population lives in a condition of 'post-scarcity', living in ways far beyond elemental needs of food, clothing and housing, is valid. Acknowledgement of this demands that we socialists ask ourselves and one another what is needed by socialism.

Socialists should insist that high on their list of needs are not only finished goods (carpets, fridges and the like), but also the quality of work experience and social interaction, a clean environment, and aesthetic

pleasure, and meeting these needs might well be at the expense of an accountant's measure of efficiency. The establishment of socialist priorities here would throw up no end of difficulties of, for example, matching rewarding work with required level of output, but at the least it should allow us to jettison the futurist (dis)utopia of robotised production leaving people to indulge in purposeless idleness in an electronic Cockaigne.

In deciding upon socialist needs the question must be posed: does fulfilment of them cause injustices or create impediments to the socialist enterprise? For example, would satisfaction of requirements for certain foods or beverages have a deleterious effect on the economies of the Third World? If it does, then the damage caused must be put into the balance to help gauge the weight of particular needs, and it may be that, in the light of such considerations, socialists would decide that certain needs cannot be met.

This relation between socialist needs and the means of satisfying them is a vexed one with which technology is intimately linked. Under capitalism the meeting of market-defined needs characteristically breeds alienation for the worker who is compelled to endure machine-paced and unskilled labour. Any socialism worth its salt would reject both these ends and means, but it could still be forced to face difficulties of reconciling its socialist goals and the means of meeting them. For instance, if one accepts that household refuse must be collected (it could be possible to arrange for individual disposal via a sewage-type system or even incineration), it is reasonable to argue that this task is inherently unpleasant (dirty, with dangers of infection). Therefore, runs a familiar anti-socialist refrain, alienating work (and inequality) is assured by the technical imperative of removing garbage. This does not have to be the case. For the limited number of jobs that are deemed essential and unpleasant, a socialist society would surely want to do two things. First, it would set to in order to produce technologies that make the task less onerous; second, it would propose to introduce a form of 'communal service' by which each citizen is obliged, for a period of their lives, to undertake such duties.

Finally, socialists might wish to break with technologies that lead to users being overdependent, by favouring the production of machines which, if less exotic, can be repaired with minimal training. This advocacy is to point to the ways in which many modern technologies, even those performing rudimentary tasks (for example, coffee grinders, typewriters, lawn mowers, food mixers), defy home repair because they are consciously designed that way (examples are legion, ranging from automobiles to televisions, and everyone is familiar nowadays with proprietary warnings not to attempt one's own repair). **A** socialist technology policy, deliberately aimed at giving maximum authority to the individual and minimising reliance on experts, would surely urge that this 'technological illiteracy' is combated by developing machines that are easily repaired

when things go wrong.

There are other priorities socialists might wish to establish as criteria for the acceptance and guidance of technology—technologies that reflect communal rather than private living (e.g. public rather than private transit systems), technologies that encourage decentralisation rather than concentration of power. . .—and my comments are only a start. They are, however, a necessary stage in the development of a socialist policy which is genuinely applicable to technology.

NOTES

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   See K. Robins and F. Webster, 'Luddism: New Technology and the Critique of Political Economy', in L. Levidow and B. Young (eds.), ***Science, Technology and the Labour Process, vol. 2,*** Free Association Books, 1985, pp. 9–48.
8. A. Gorz, ***Farewell to the Working Class: An Essay on Post-Industrial Socialism,*** Pluto Press, 1982.
9. C. Evans, ***The Mighty Micro: The Impact of the Computer Revolution,*** Gollancz, 1980, p. 208.
10. David Noble's important essay, 'Present Tense Technology', appeared in three parts in the journal ***Democracy*** during 1983 (Part 1 in vol. 4<1>:8-24; Part 2 in 4<2>:70–82; Part 3 in 4<3>:71–93. It is to appear as a book, ***Present Tense Technology,*** San Pedro, California: Singlejack Publications.
11. See for example Mrs Thatcher's speech at the opening ceremony of the ***Information Technology '82 Conference,*** Barbican Centre, 8 December 1982. Press Office: 10 Downing Street, December, 1982.
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13. J. Smith interviewed in ***Computing,*** April 18, 1985, p. 18.
14. TUC, ***Employment and Technology,*** September, 1979; TUC, ***Congress,*** 1979.
15. J. Callaghan, ***Prime Minister Announces Major Programme of Support for Microelectronics,*** Press Office: 10 Downing Street, 6 December, 1978.
16. Thorn-EMI, ***Report and Accounts,*** 1980, p. 4.

17. *A Programme for Advanced Information Technology: The Report of the Alvey Committee,* Department of Industry, HMSO, September, 1982.
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26. Citicorp is quoted in *Financial Times,* 10 May, 1982. The standard work on the relation between corporate capital and telecommunications policy is D. Schiller, *Telematics and Government,* New Jersey: Ablex, 1982. Illustrative of this relation is Citicorp's offer to business customers that they can 'communicate with Citibank offices around the world through *our own private financial telecommunications network',* (emphasis added) (in a Citicorp advertisement published in *Financial Times,* 17 January 1985); L. Else, 'Oil Majors show natural reserve in DP exploration', *Computing the Magazine,* 14 March, 1985, pp. 12-13 describes the leading role of oil giants Shell and BP in the Information Technology Users' Standards Association (ITUSA), a policy of which is to exert pressure on governments to produce IT standards 'in an acceptable and timely form'.
27. P. Mattera, Off *the Books: The Rise of the Underground Economy,* Pluto Press, 1985, Ch. 7.
28. See F. Webster and K. Robins, *Information Technology: A Luddite Analysis,* New Jersey: Ablex, 1986, Part Three.
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43. J. Fierman, 'Television Ratings: The British are Coming', *Fortune*, *1* April, *1985*, p. *53*.
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48. See R. Perry, *The Programming of the President: The Hidden Power of the Computer in World Politics Today*, Aurum Press, *1984;* J.C. Spear, *Presidents and the Press: The Nixon Legacy*, Cambridge MA: The MIT Press, *1984;* K.H. Jamieson, *Packaging the Presidency: A History and Criticism of Presidential Campaign Advertising*, New York: Oxford University Press, *1984;* J. McGinniss, *The Selling of the President*, Harmondsworth: Penguin, *1970*.
49. See M. Cockerell, *et al.*, *Sources Close to the Prime Minister: Inside the Hidden World of the News Manipulators*, Macmillan, *1984*.
50. *Observer*, *25* November, *1984;* cf. D. Burnham, *The Rise of the Computer State*, Weidenfeld and Nicolson, *1983*.
51. R. Williams, *Television: Technology and Cultural Form*, Fontana, *1974*.
52. 'Fortress Britain': The Sudden Death of the Big Night Out', *Campaign*, *2* September, *1983*, p. *23;* compare Nippon Electronic's promise to 'make home a comfort haven', a 'treasured sanctuary', where 'boredom is unheard of' thanks to 'remote-control video recorders, giant 60-inch video screens. . . air conditioners that gauge the temperature automatically, stereos that remember your favourite music, appliances that do more so you do less, even home security systems to safeguard these valuables. Eventually even computers will be part of this scenario, controlling your environment and freeing your time further for other leisure pursuits', *NEC's Universe*, Tokyo: NEC, *1982*, p. 5.

53. See Webster and Robins, 1986, Ch. 7 (note 28).
54. Tobin Foundation, ***Structural Issues in Global Communications,*** Washington DC: Tobin Foundation, 1982.
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56. M. Brzoska, 'Economic Problems of Arms Production in Western Europe—Diagnosis and Alternatives', in H. Tuomi and R. Vayrynen (eds.), ***Militarization and Arms Production,*** Croom Helm, 1983.
57. ***Statement of the Defence Estimates,*** Cmnd. 8951–1, 1983, p. 38.
58. See M. Kaldor, ***The Baroque Arsenal,*** London: André Deutsch, 1981.
59. A useful overview is given by Frank Barnaby, 'Microelectronics in War' in G. Friedrichs and A. Schaff (eds.), ***Microelectronics and Society: for better or for worse,*** Oxford: Pergamon Press, 1982, pp. 243–272.
60. See D. Campbell, 'Society Under Surveillance', in P. Hain (ed.), ***Policing the Police, Vol.*** 2, Calder, 1980, pp. 63–150. Two illustrative instances of this trend are: a Metropolitan Police recruitment advertisement which says members 'can rely on a very sophisticated computer-based information network which copes with much of the hard work behind the scenes', ***(Observer,*** 28 January, 1985), and ***Computing,*** (14 February, 1985) which tells readers that 'while the creation of a national police force looks unlikely. . . the skeleton of a national police information network is already in place'.
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