



Fred Steward

The Politics of Technology

The pervasive and transforming role of technology in all spheres of life — at work, in the home and throughout the general environment — has emerged as a striking feature of advanced capitalist society. As well as making a positive contribution to material standards of life it has also been responsible for many negative consequences affecting the quality of life. This poses a profound political challenge for all who wish to see technological change fulfil human needs in a constructive manner and not result in social inequalities, dehumanisation of work and social life, damage to people's health, or degradation and destruction of the environment. The rise of popular concern about a wide range of issues reflecting these problems has revealed new political opportunities but has also exposed serious limitations in the present capacity of the Left to intervene effectively in this area.

The diversity of topics which involve the politics of technological change is immense. Nuclear weapons, pollution and waste, limitations on natural resources, energy policy and nuclear power, safety of drugs and other consumer products, health and safety at work, transport policy, food quality, the microelectronic 'chip' and genetic engineering are just some of the issues which have attracted attention in recent years. There are a host of organisations which have been involved with these questions including CND, Friends of the Earth, the Anti-Nuclear Campaign, the Consumers' Association, Transport 2000, British Society for Social Responsibility in Science, the Politics of Health Group, and, increasingly, some trade unions. A key role has also been played by investigative journalists and other popular writers on the impact of technology. Because

the range of these campaigns has been so wide they have often been perceived as separate and different 'single issue' activities or alternatively, from a more political viewpoint, simply subsumed within the general category of 'democratic movements'.

Yet the specific aims which are common to them — to control the effects of technological change or, more fundamentally, to influence politically the direction that technology takes — merit consideration in their own right. The failure to do this has led to a persistent fragmentation of the campaigning efforts around this theme, a neglect of the particular features of technological change and the absence of any coherent proposals for a new and democratic framework in which decisions on new technology could be made. A consequence has been an uneasy and undeveloped relationship between the movements concerned with the politics of technology and the political organisations of the

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working class. In addition the movements themselves have often neglected overlaps between their interests, illustrated, for example, by the lack of links for a long period between activities on civil nuclear power and those on nuclear weapons, or between concern on risks in the workplace and those to the environment outside. These piecemeal and *ad hoc* features reflect an inability of the Left to generate and integrate political intervention in this sphere.

This weakness has a number of origins. One is the general difficulty the Left has had

in coming to terms with movements which although critical of aspects of capitalism do not originate from well defined working class organisations and are marked by a diversity of ideological positions. Another is more specific and stems from an inadequate appreciation of the nature of technology in the postwar era. This resulted in great difficulties in understanding the political significance of a set of structural transformations in the process of technological change which occurred during and after the Second World War. These new features included the following.

1 A renewal of technological change

A wave of basic innovations originating in the late 1930s and during the 1940s in fields such as computers, chemicals and pharmaceuticals, nuclear power and air transport served as the foundation for technological renewal through the formation of new industries and the transformation of established ones. What had appeared as a technically stagnant economy in the 1930s was, with the experience of production in wartime, able to readjust to provide an effective framework for extensive technological change. Although this process was an uneven one with heaviest concentration in the chemical, electronics, aerospace and nuclear sectors and differed in scope among different nations the emergence of technical dynamism became a major feature of the postwar period.

2 The emergence of extensive product innovation

The technical activities of many industrial companies concentrated more effort on the development and marketing of new

products. This contrasted with the more traditional concern of improving the efficiency of the processes involved in established products. The emphasis on introducing new products has been accompanied by a range of issues concerning their relation to social needs and the impact of a constant manipulation of consumption. Built-in obsolescence, wasteful and unnecessary innovation emerged as issues of social concern. The dominance of narrow commercial considerations in product innovation has been accompanied by a neglect of other consequences. A study by Barry Commoner, the American ecologist, showed that many of the new synthetic products such as detergents and materials had a far greater environmental impact than the products that they replaced. Possible harmful effects on health of many consumer products were only

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slowly recognised, highlighted by the thalidomide disaster. In a different sense the far reaching effects on social life of television and the mass produced motor cars reflect the way in which such innovations permeated society at large.

3 The enhanced role of the state

The wartime involvement in military technology, especially the atomic bomb project, was a crucial turning point for state involvement in technological change. Its scale and technical success laid the basis for a massive expansion in the resources devoted to scientific research and technology in the postwar period. Although this was initially overwhelmingly concerned with military technology, which has always remained the major area of involvement, the state also began to play a major role in certain areas of civilian technology such as aerospace and nuclear power and to contribute on a smaller scale to research and development in most industrial sectors.

Government also became increasingly involved in the legal control over the effects of technological change especially concerning safety, health and the environment with the extension of regulations in these areas. The significance of the growth of state involvement in both the control and direction of technology has been a shift towards the political arena for decision-making on these issues.

4 The expansion and incorporation of scientific and technical expertise

The changes outlined have been accompanied by a large expansion in the numbers and an increased centrality in the role of scientific and technical experts within both production and the state. The majority of those with specialised knowledge of the consequences of technological change and of the different possible technical options are directly linked to these institutions. In addition there are important links with experts outside of government and industry through a network of advisory committees and consultancies which serve as a crucial interface for maintaining active contact. These channels play a vital role in the construction of consent around the approaches to technological change which are primarily determined within industry and the state. The result is the presentation of many decisions on technology, which have involved political and economic considerations as purely technical ones and hence not open to public criticism.

The Left and the changes in postwar technology

The combination of these changes with the resulting increased centrality of technological change, extensive state intervention and an enhanced political role for scientific and technical expertise confronted the Left with a set of radically new political problems. Yet the body of socialist ideas about technology on which to draw had been elaborated in a very different context and was not particularly useful in dealing with these new phenomena. Within Marxism the traditional preoccupation with the 'revolutionising of the means of production' by process innovation within competitive capitalism had not directly addressed the role of the state or of corporate directed product innovation. Theories which crudely reduced the conflict between social relations and the forces of production to a denial of the possibility of capitalism to harness and expand technology, illustrated by Palme Dutt's *Technique and Revolution* of 1934, served merely to hinder a real understanding of such a process when it was underway.

The only substantial body of ideas was that elaborated by J D Bernal and others in the 'social relations of science' movement of the 1930s and 1940s. This movement had involved many progressive scientists in activities concerning the social aspects of science and technology and in organisations such as the Association of Scientific Workers which pressed for greater attention by the state to science and technology. Its strength was that it did address the problems of

technology in a detailed and specific fashion and recognised the profound importance of science and technology as a political issue, an emphasis sadly lacking in the socialist movement in more recent years. It was also very successful in uniting for a time a wide range of political opinion, from reformist to revolutionary, around the notions of planning and controlling science and technology in the interests of the people.

Its limitations, however, were two fold. First, because it had arisen in the prewar conditions of the technical backwardness and neglect of science by the state and industry in Britain its major emphasis was on the need for a quantitative expansion of science and technology and for a much greater role to be played by the state. These tended to receive greater weight than the question of choice among different possible paths of technological change. Second, there was an overly optimistic view about the social role of experts if they were given a much enhanced status in the formation of technology policy. This tended to overlook the ideological and institutional limitations of scientific and technical expertise in the absence of new democratic relationships between experts and the working class.

It was, however, precisely in these areas of weakness that a Left intervention was now required in order to sustain such a political movement and extend its impact. Instead the movement fragmented with sections adopting a technocratic and managerial role in the new circumstances and others becoming marginalised. A contributory factor in this process was undoubtedly the exclusion, in the cold war atmosphere of the 1940s and 1950s, of the more radical critics from involvement with science and technology policy. In practice the position of the Left, with the exception of its opposition to military and nuclear weapons research, remained one where a commitment to a rather abstract notion of technological progress was a stronger feature than the development of broadly based action to try and shape the direction of technological change in accord with popular interests. This was accompanied by a grave neglect of the forms in which a democratic contestation over the choice of technological alternatives could be expressed.

The price of this was a persistent failure to make a distinctive socialist intervention on issues concerning technology which entered the political arena. The Labour government reforms of the mid-1960s under Harold Wilson's banner of the 'white heat of the technological revolution' which included the establishment of the Ministry of Technology went unchallenged by any clear democratic



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alternative. Rather than opening up decisions on technology to wider public involvement Labour's approach primarily meant a technocratic restructuring. When some of the decisions on major projects such as nuclear power and Concorde became controversial the Left either remained silent or became deeply divided on the issues involved. The prevailing outlook legitimated the often sectional and defensive responses of trade unionists working in the industries concerned. This disjointed approach to the politics of technology posed no threat to the perpetuation of the image of consensus and technical rationality on which government and industry relied.

There are two dimensions to the process of technological change which merit special consideration as far as more effective political intervention is concerned. One is the system of assessing and controlling the effects of technology often by legal regulations. The other is the system for directing technology through the sponsorship of research and development.

Controlling the effects of technology

A variety of laws and regulations have been introduced in the attempt to ameliorate some of the negative consequences of technological change particularly on health and the environment. Examples in recent years include the Medicines Act (1968), the Health and Safety at Work Act (1974), the Control of

Pollution Act (1974) and the Consumer Safety Act (1978). It is wrong to either dismiss such attempts at control as entirely meaningless or alternatively to welcome them uncritically as the solution to the problems they seek to resolve. In general such measures have only arisen in response to disasters of sufficient magnitude which have forced political attention on the issue. For example the Medicines Act arose in response to the thalidomide tragedy when the use of the drug led to the birth of deformed babies, and the control of major hazards from large chemical plants under the Health and Safety at Work Act only emerged following the devastating explosion at the Flixborough caprolactam plant which killed 28 people and caused £30m of damage. Because of this pattern the systems of control are fragmented and no comprehensive and anticipatory system for assessing the risks from technological change exists.

Such regulation that has been introduced is itself the product of intensive political conflict often conducted at a detailed technical level in which the capacity of different interests to argue their case with the aid of expertise is extremely important. Industrial associations are often far better equipped in this respect than groups representing workers or consumers. In addition the laws often contain very general provisions such as the requirement for safety 'as far as is reasonably practicable' under the

Health and Safety at Work Act or the forbidding of substances which are considered to be 'injurious to health' under the Food and Drugs Acts. Considerable discretionary power is given to government departments in their interpretation and implementation of these provisions. This often involves specialist bodies such as inspectorates located within government such as the Factory Inspectorate, or advisory committees of outside experts like the Committee on the Safety of Medicines. The operation of these bodies is usually closed to the public eye and the decisions are presented whenever possible as an expert consensus. Yet the process in which they are engaged is often marked by conflict which may arise from genuine scientific uncertainty about the problem being considered or from the need to consider matters which involve some judgement about what is economically possible or whether a technology is socially necessary or desirable. Again the access of different groups and their capacity to influence such political processes is often unbalanced and limited.

A fundamental limitation on the effectiveness of such legal controls is that they do not act directly upon the sources of innovation and seek to apply criteria concerning health and environmental impacts only after the process of origination of new technology has occurred. Those affected by technological change need therefore to influence not just

the system of control but the *system of technological innovation itself*.

Directing technology by sponsoring research and development

Within industry decisions on research programmes have traditionally been perceived as a purely managerial prerogative. Scientists and technicians working within industry thus tend to become constituted as a bloc with management around a definition of technological goals resting on narrow corporate criteria of profitability. The general lack of counterpressures on these goals from trade unions through the collective bargaining process leaves this alliance untroubled.

The exclusion of any role for representatives of workers and consumers in industrial research policy is paralleled within the state research sponsorship system. Government is now the source of the majority of funds spent on research and development in Britain although the bulk of this money is ultimately spent within business enterprises. The majority of government research and development spending is in the military sector and is an area of policy shrouded in secrecy. Spending in the civilian sphere, however, is also decided on in a pretty secretive fashion and the persistent failure to develop an integrated and co-ordinated approach to research policy by the state leaves much of the key decision-making to be made within the seclusion of different government departments. As a consequence parliamentary scrutiny let alone more direct forms of democratic involvement remains severely limited.

During the 1970s, following the recommendations of the Rothschild report, those areas of applied research sponsored by the Research Councils, through which greater influence was exercised by scientists from outside the state and production, have also been shifted under the direct control of government departments. The Department of Industry established a series of Research

Requirements Boards, to assist in the determination of projects to be funded, on which a major role was given to personnel from outside government. These were drawn almost exclusively from industrial management and the academic world though belatedly a minor provision for trade union representatives was made.

Overall, the determination of priorities for investment in research remains an activity conducted well away from public view and in which representation of those directly affected by the consequences of the resulting technological innovation is marginal.

New challenges

During the late 1960s and the 1970s the prevailing systems for the control and direction of technology have been confronted with a range of political challenges which have begun to undermine the consensus on which they rested. The growth of scientific interest in the possible harmful effects of technological change, which accompanied the rise of the environmental and consumer movements, revealed a host of unanticipated problems. The disturbing fact that knowledge about the indirect and long term consequences of new technology was riddled with uncertainty, and prompted irreconcilable conflict between experts spilled into public awareness. The result has been a decline in confidence in official expert opinion and a greater willingness to challenge it. The polarisation of opinions about nuclear power is a good illustration of this and the decision to hold a public inquiry into the proposal for a reprocessing plant at Windscale at which the conflicts were to be aired was an acknowledgement of this change. The growth of trade union activity on health and safety at work and the relationships established with sympathetic scientists through the BSSRS Hazards Groups in many British cities also indicated a greater willingness to challenge the views of establishment experts. Some unions, in

particular ASTMS, have also adopted a new style of activity in this area by employing researchers, producing campaigning documents on carcinogens in the workplace and intervening in a more organised and forceful fashion in government committees. This represents a marked departure from the traditional acquiescence in the cosy consensual style of such bodies. Springing from some of these activities has also been the beginnings of a contestation of research priorities themselves. Again the movement on nuclear power is a good example where pressure was successfully brought to bear on the Department of Energy to devote more resources to investigating the technical possibilities of alternative energy sources such as water, wind and solar power.

Parallel with these developments have been the consequences for technological activity of the deteriorating state of the British economy. The harsher climate in which decisions on technology are being made has had a number of effects. As far as state support for large scale and expensive technological projects is concerned, it has resulted in pressure for the criteria on which such decisions are taken to be made much more explicit. Within industry it has sensitised the trade union movement to the effects on employment of the policies for technological innovation adopted by individual companies. This has stimulated a number of trade union initiatives. The most familiar and far reaching is the Lucas Aerospace shop stewards alternative plan for a series of socially useful products for their company, to save jobs and to shift technological change in a more desirable direction. The rise of microelectronics has prompted a number of unions to develop policies for the introduction of such technology in different industries and this too represents a major development for the labour movement's capacity to intervene in the politics of technology and challenge managerial prerogatives in this sphere.



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Alliances

These various developments hint at the potential for constructing a new alliance of scientists and technologists, the variety of movements active on the politics of technology, and the labour movement, to challenge existing policies for technology within production and the state. Yet the realisation of this potential requires a broader political framework within which they can be drawn together. Such a framework must avoid the hostility to any notion of a society based on the development of modern industry and technology which is characteristic of certain viewpoints such as the 'no-growth', 'small is beautiful' or 'self-sufficiency' schools of thought. Conversely it has to make a decisive break with subservience to the priorities and patterns of technology established within the current capitalist framework. The Alternative Economic Strategy could fulfil this role but only if it devotes serious attention to the issues of the control and direction of technology. This is currently lacking and is a major weakness.

Any Left strategy for technology must address three key questions. What form should a democratic transformation of technological decision making take? What are the criteria on which decisions on new technology should be based? What forms of action and organisation are appropriate for realising these goals?

Democratic transformation

Ultimately the aim is a conscious and co-ordinated policy for technological change which overcomes the existing fragmentation among government departments and industrial enterprises and in which new democratic structures at national, local and enterprise level assess and choose among alternative technical options. A closer relationship between the control of the effects, and the direction of technology⁷ is also required. In the shorter term specific changes include:

Access to information. For greater availability and dissemination of information about decisions on technology and the removal of legal constraints restricting public access to knowledge about the activities of regulatory and sponsoring bodies.

Representation. Introduction and extension of the principle of representation of groups affected by technology on government bodies involved in the control and direction of technology. Although some of the existing advisory bodies are representative (eg, the tripartite structure of Health and Safety Commission committees) this needs to be extended generally.

Resources. Involvement in the political



Political intervention on the control and direction of technology is a key area

process can only be effective if the different social groups affected by technological change have access to expertise and the necessary resources to undertake their own assessments of particular technologies. In 1973 Tony Benn argued that government should make financial resources available to trade unions, residents groups etc, to carry out their own technology assessments and such a proposal needs to be implemented.

Criteria

It is essential to assert the importance of a wide range of social criteria to be used in assessing the desirability of new technology in contrast to the current preoccupation with either narrow economic criteria or the military needs of the state. In relation to economic criteria two positions must be avoided. One rejects entirely the relevance of conventional economic criteria, a position characteristic of sections of the 'alternative technology' movement with a very individualistic, small scale, self sufficiency approach. The other is an acceptance of the view that the main criterion should be the effect on Britain's international competitiveness with its main rivals, a position which some trade unions come very close to. The first is simply Utopian while the second is an unacceptable narrowness of vision.

A range of criteria that would need to be given much greater emphasis includes:

Civil over military. A shift from military to civil emphasis has traditionally been an important part of the Left's position and remains fundamental. Resources devoted to military technology are wasteful as far as general production is concerned and destructive and abhorrent in nature.

Environment and resources. The importance of developing technologies which are ecologically sound, non-polluting and

resource conserving.

Health. Avoiding technology which is hazardous to people's health.

Social needs. Aiming to fulfil important urgent needs and avoiding fostering consumption for its own sake or developing technology for an elite.

Labour process and work satisfaction. Considering the impact of new processes on skill and satisfaction of labour.

Civil liberties and democratic control. Assessing the impact of new technology on civil liberties and whether it poses security risks which might hinder democratic control.

These are some of the issues which have been raised by the movements critical of contemporary technology and to which one would expect a socialist strategy to give greater weight.

Action and organisation

The movements and activities that have begun to open up technology as a political issue need to be fostered and encouraged. The trade union movement should establish technology as a normal part of the collective bargaining process. Closer relationships between the various campaigns and the labour movement can result in the elaboration of common perspectives. Access to new sections of the scientific and technical community can be achieved with the help, for example, of the scientific trade unions. The network of links developed in this process can serve to constitute the basis not only of more effective co-operation and activity in the short term but also of a more fundamental long term shift in the social relations of scientific experts and in the perspectives for social change of the Left. Political intervention on the control and direction of technology is a key area for the construction of a broad democratic alliance in practice.