Technocracy

1. Introduction

Technocracy is an underused concept, even amongst activists concerned with the politics of technology. Although it was popular in the 1960s to 1980s, it has largely fallen out of use; nowadays, the main arena in which we encounter it is in use of the word to describe bureaucrats who are 'temporarily' appointed to run governments, sometimes in situations where the political system is in crisis, for example in Greece and Iraq. In many cases, these technocrats are not even scientists or engineers, which points towards an important feature of technocracy: that it is about the use of complex systems of management, based upon expert, although not necessarily scientific, knowledge (although nowadays they are sure to involve the use of computers).

The first half of the twentieth century was the only period in which there was an open political movement advocating technocracy. In the USA and elsewhere there was a movement of scientists and engineers arguing that democracy and politics were ruining society and what was needed was to put the scientific management of society in their supposedly apolitical hands. It was such advocacy, and the generally increasing influence of scientists on policy making that led Winston Churchill to famously remark that scientists should be, 'on tap, not on top.' But even when scientists and engineers are not in positions of political power or in executive positions in corporations or the military, the influence of technocratic thinking, based upon the enormous prestige of science and technology, is all-pervading in modern societies; executive power is unnecessary. So dominant is technocratic thinking that it has become simple common sense in our society, particularly for middle class managers and professionals. As a result has become almost invisible to most people. Direct challenges to it are met not merely with condemnation (eg. as 'irrational' or 'Luddite') but with incredulity.

Thus, in speaking of technocracy, I am referring to a number of different things: (i) a set of concepts in which scientists and engineers are trained, which thereby shape the design of technologies and are expressed in them; (ii) the general culture and philosophy of modernity; (iii) a set of large-scale manifestations in society and politics, eg industrialism, bureaucracy; (iv) the hegemony of technical discourses over all other ways of thinking.

2. The Scientific Revolution and the origins of technocracy

The essence of technocracy is described succinctly by its founding father, the 17th century philosopher Francis Bacon: knowledge is power. It is a system of power over nature and people through technology and technical discourse. Of course, this translates into more power and influence for technologists. In his utopia, *New Atlantis*, Bacon proposes a formal political technocracy, in which society is ruled by a scientific institute.

With the Scientific Revolution of the 17th century, which Bacon developed the philosophical basis for, there developed a new set of ideas about nature and human beings' place in it and relation to it. Whereas previously nature had been seen as alive, with the Scientific Revolution and the work of the French philosopher Rene Descartes, nature was reconceptualised as a giant clockwork machine – clocks were the most sophisticated machines of the time, and were viewed as instruments of social order. The organic metaphor of nature was condemned as a pagan mystification; instead nature was seen as merely a set of resources to be exploited through technology, without any limits or restraints imposed by seeing the universe as as alive, or the earth as mother. The idea of domination of nature, seen as an unruly female, is very explicit in the writings of Bacon and the founders of the Royal Society.

We should remember that, although we now take the materialist, mechanical model of nature as scientific truth, in the 17th century there certainly was not sufficient understanding of nature or evidence to support it. At that point that model performed a very important political function. At that time ecological changes, some

resulting from the nascent capitalist system, were producing a fear of chaos in nature which in turn led to the rise of millennial Christian movements claiming that the apocalypse was near. The idea of the universe as predictable and rationally controllable, according to a series of fixed laws, served as reassurance amidst the social and political turmoil of the times, which included fundamental challenges to religious conceptual structures, and to the whole system of order in society based upon rule by a divinely appointed monarch, and social upheavals in the transition from feudalism to capitalism. The new worldview legitimated the authority of Man, who was seen as separate from nature, to control and manipulate it, in order to create order.

Within this framework, the efficient and smoothly-running machine was elevated to a cultural ideal, and the result is a machine-centred not a human-centred society. In technocratic society, everything is conceptualised as a machine and then supposed to work like a machine, from the largest-scale elements of state and market economy, down to the human body. The working out of this plan for order, the gradual elimination of disorder, difference, diversity, anomaly in all aspects of human life and society, was described by 20th century sociologists as 'rationalisation'.

The result is a regime of control of people and nature by things – machines and systems. Ultimately, since the performance of machines is often superior to that of humans, it simply requires the replacement of people by machines: the introduction of machines in production goods, the Industrial Revolution, that the Luddites were fighting, was not just dictated by capitalist economic arguments, but by the logic of technocracy. The continuance of this trend is obvious today, not just in robotisation of industry, but in the excitement about cyborgs, in which parts of the body will be replaced by stronger machine parts and the body and mind is to be integrated into larger digital systems – we will join the 'Internet of Things.' The hoped-for (by 'transhumanists) final destination of this logic is that we will finally become computers, as we upload the contents of our brains and our bodies will become redundant.

Technocracy is about power through knowledge: its great strength is that it sticks to what can be proven to work, over and over again, rather than relying upon systems of unprovable philosophical and religious dogmas that had dominated the Middle Ages. It works through the control of physical reality, the creation of an ordered material environment (eg. Urban planning), and by creating the conditions of what is possible and what makes sense. In most cases it does not rely on forcing you to do what it wants by threatening to send soldiers to kill you.

The three main elements of technocracy are technology, the dominance of scientific discourses and the scientific perfection of organisation. Earlier, even ancient societies were also capable of vast feats of organisation, what the writer Lewis Mumford called 'megamachines', such as vast armies and feats of construction like the pyramids. But technocracy has gone further than earlier societies in applying scientific method to organisation: the industrial factory system which transformed the material realities of human life over the past 200 years is both a feat of technology and organisation. As discussed in section 3.5 below, the 20th century saw increasing sophistication of organisation, powered by the science of cybernetics and relying on technology of computers. It's a measure of the sophistication and success of this system of social control that it is possible to allow free speech and democracy, rather than rigidly clamping down upon political dissidents as traditional societies have done.

The final key aspect of technocracy is the hegemony of scientific/technical discourses over all other ways of thinking, and the subjection of every aspect of life to scientific management (see section 3.4). This serves not only social control but the interests of capital. For example, under the rules of the world trade organisation, countries are not permitted to ban the import of certain goods (such as GMOs) simply for political, cultural or religious reasons: instead they must provide scientific evidence that the products are dangerous to the environment or to human health.

The continually advancing technological control of nature that has been defined in western societies as progress, and no-one can deny

that this has brought real benefits, but there have also been great costs, which are now pressing upon us. It is this process of domination of people through technology and administration that, together with capitalism, jointly defines what we call modernity.

3. Some aspects of technocracy

3.1 The control of nature

It is important to understand that the regime of control of nature that has existed over the past 400 years is qualitatively different from anything that existed previously in human history. It is of course true that all human societies have sought to control nature for their own benefit, and according to many philosophers including Marx, this is more or less the definition of what makes humans different from animals. The transition from hunter-gathering to farming is a major example of human control of nature, and one that shows that there is nothing inherently wrong with human beings manipulating nature for their own purposes. However, prior to the 17th century, human manipulation of nature was always restrained by cultural and religious ideas of relationship, interdependence and respect, that moderated its impact and ensured that it was conducted with some sort of ecological wisdom. What emerged in the scientific revolution was an ideology justifying the manipulation and exploitation of nature without any limits or restraints and with a concept of nature as a hostile force that must be dominated.

A major problem with the technocratic manipulation of nature as it has been practised for the last 400 years has been the lack of a sophisticated scientific understanding of nature to underpin it, for most of that period. Technologists and engineers have relied upon crude mechanistic models and upon reductionism: the idea that natural systems can be completely understood by studying the properties and interactions of their constituent parts. In biology, this has taken the form of crude genetic determinism which has led to socio-biology and evolutionary psychology. The overall result of such simplistic models, especially when combined with the capitalist drive to exploit nature for profit has been a kind of domineering brutality with respect to nature,

and a refusal to understand that natural evolution has produced systems that deserve respect and gentle handling. It was not until the mid 20th century that efforts to develop a more holistic and more scientifically sophisticated approach resulted in the ecological/green movement. Moreover, when those natural systems are embedded within human societies (eg agriculture, the human body) the complexities become even greater and the manipulations often produce many unexpected and disastrous consequences.

The popular critique of such approaches, particularly with respect to human reproductive technologies, often sneered at by scientists, expressed in terms of 'playing God' actually very accurately describes what is wrong with the technocratic approach to nature. We assume God-like powers but lack the wisdom to use that power safely or for the general good.

Many of the most obvious examples of this attitude towards nature occur within the model of industrial agriculture. This has included:

- The large-scale reshaping of landscapes over huge areas, including massive deforestation
- Mono-cultures that create massive pest problems and low biodiversity
- The use of pesticides to simply suppress the pests caused by the system
- The factory-farming of animals without any attention to their behavioural needs and
- breeding without regard for their physiological integrity, including cloning to create uniform and predictable 'high performance'

Other obvious examples of manipulation of nature without respect to limits include the creation of massive dams and other huge infrastructure projects which often have disastrous effects both upon nature and human societies.

Two current extreme manifestations of the technocratic manipulation of nature are synthetic biology and geoengineering, which attempt to manipulate nature at the smallest and largest extremes of scale. Synthetic

biology is an extreme form of genetic engineering which sets itself the task of not merely altering existing organisms, but synthesising life from scratch in the laboratory. The pronouncements of synthetic biologists are full of impatience at the messy construction of organisms that have evolved naturally. Instead, synthetic biologists claim that they will construct life according to rational engineering principles of efficiency in order to create more manageable organisms with higher performance.

Geoengineering is the idea of manipulating the planet's climate system by various methods in order to combat climate change. Possible methods include various ways of increasing the reflection of sunlight by the earth's atmosphere, or manipulating the oceans to absorb more carbon dioxide. Geoengineering is part of a tendency by scientists to view the entire planet as just one more system to be manipulated. The idea of the 'Anthropocene' is intended as a justification of global manipulation and is accompanied by technocratic language such as 'Earth System Governance.' As recent research has shown, this is taking an increasingly authoritarian turn, with policy-makers already beginning to argue that the difficulties of getting international agreement for such manipulations may require 'putting democracy on hold.'

Synthetic biology and geoengineering perfectly illustrate the flaws and dangers of the technocratic mode of manipulation of nature. As noted above, it is not that human manipulation of nature is inherently wrong but a lot depends upon the cultural and philosophical ideas which guide manipulation. The arrogant and domineering attitude towards nature has been bolstered and reinforced by the astounding successes of science and technology over the last four hundred years, and so we have reached the point at which it seems to scientists perfectly reasonable that they should undertake the complete reconstruction of nature. But at the same time, the consequences of two hundred years of industrial capitalism have become so severe that it is necessary to fundamentally reassess the technocratic worldview.

A major part of the problems caused by large-scale manipulation of nature is the overconfidence of technologists and engineers. Boosted by past successes, they pursue their ambitions to control nature at greater and greater scale. Perhaps the most dangerous current example of this is the nuclear power/ nuclear weapons complex, a global system using the most dangerous and toxic materials known to humanity. Although it seems so to scientists, how can it be reasonable to use materials which will not be safe for 250,000 years and for which there is no adequate solution for their storage? Like geoengineering, nuclear power raises serious questions about the rationality of that reason which engineers and scientists say guide their actions.

3.2 Technocracy and people

When applied to humans, technocratic intervention seeks to control the human body, in order to achieve order and large-scale social control. Obvious examples include eugenics, which aims to eliminate 'burdens' on the efficient functioning of society, such as disabled people and disruptive elements, such as criminals and the mentally ill, whilst pharmaceuticals provide more refined methods to restore productive functioning. Large scale interventions in reproduction such as population control programmes, which may or may not be coercive, provide demographic control, which is vital for managing any society. More subtle examples in the field of psychology include behaviourism, which in the mid 20th century provided hope of controlling human behaviour, through straightforward stimuli, rewards and punishments and IQ testing, which was introduced partly for eugenic purposes, but also in order to provide a simple measurement, by which people could be fitted efficiently into large scale hierarchical systems – initially the US army, but increasingly into structured education systems which led to careers in corporations, the professions and state administrative systems.

An iconic example from the early to mid 20th century which illustrates the creation of order through disciplining and control of the human body was the practice of mass physical exercising, in which large numbers of people, lined up in a precise grid, performed 'physical jerks' in unison, in order to produce 'healthy minds in healthy bodies'. A current, more high-tech example, illustrating the same tendency is

the 'Quantitative Self Movement', in which, with the aim of maximising their physical performance, people continuously measure the physical parameters of their bodies, using various sensors and measuring devices.

3.3 The technofix mentality

A major problem with technocracy is the way that technocrats conceive all problems as being amenable to and best dealt with through technical solutions. Because their focus is on technical issues and issues of organisation they tend to be like the proverbial person whose only tool is a hammer: every problem looks to them like a nail. In reality, almost all social and environmental problems are due primarily to complex social interaction between human beings, generally involving oppression. Frustrated by these complexities and by the need to address them by making political commitments, scientists perpetually try to cut the Gordian knot.

A general characteristic of these technofixes is a supposed depoliticisation, and a general narrative of benevolence, in which the scientists involved genuinely believe. But because of the reductionist misconception of the source of the problem, these solutions generally create as many or greater problems than that which they were intended to solve. They also tend to advance the control of individuals and society at large through technical interventions, and, of course, because they occur within a capitalist social context, serve the interests of corporations by giving them new products (drugs, seeds, chemicals, etc) to sell.

An example of the problems caused by the technofix mentality is the Green Revolution of the 1960s, in which scientists at the newly established International Agricultural Research Centres perceived that traditional agricultural practices in India and other Asian countries were inefficient, producing poor crop yields that were the cause of famine crises, which were leading to social unrest and political radicalisation. The funders of the research centres in Washington were at that time concerned about the spread of communism in Asia and so commissioned the scientists to fix the problem by producing new high yielding varieties of crops. This was primarily achieved by breeding dwarf varieties in which the yield of seed was higher because the plant put less energy into growth of the stem. These new varieties of wheat and rice were also chosen to respond well to chemical fertilisers and to need increased irrigation. Thus, the scientists produced a technical fix for a problem that was primarily caused by unjust economic and political systems, especially the lack of access to land of huge peasant populations in those countries. The consequence of this technofix, which certainly succeeded in raising overall yields, were multiple environmental and social problems: lowering of water tables and pesticide/fertiliser pollution; shortages of straw; indebtedness (due to the need to purchase seeds, fertilisers, etc), leading to suicide epidemics and further concentration of land in the hands of larger farmers; exodus of impoverished peasants to urban shanty towns, leading, in the Punjab, to the rise of Sikh nationalism and terrorism. In her book, Vandana Shiva aptly describes all this as the 'Violence of the Green Revolution.'

Of course, this story is a classic example of the problems of the Western technology-led model of third world development, and is repeated today in the argument that GM crops are needed to feed the world. Other current examples include the development of biofuels to combat fossil fuel dependency and, of course, geoengineering to directly remedy the problems of climate change rather than deal with the deep economic and political problems that have produced this. Unfortunately, the environmental movement, because it tends to focus on the effects of industrialism rather than look at the social and political causes of environmental problems, tends to be susceptible to the technofix mentality and often embraces technocratic 'solutions' such as biofuels and even massive industrial windfarms.

In the sphere of social problems such as mental health epidemics, crime, addiction and anti-social behaviour, the typical technocratic solution is targeted at the individual, rather than at the social causes of these problems. Thus people are subjected to psychiatric drugs and surgical interventions, whilst psychologists constantly propose the identification of potential 'problem children' at earlier and earlier ages, and eventually by genetic testing.

3.4 Rule by experts

In the early 20th century, technocracy was closely associated with progressive and socialist movements which aimed to moderate the chaos and exploitation of free market capitalism through state bureaucracies and generally increased intervention in society. Thus the emergence of the welfare state, while obviously providing great benefits to ordinary people was also part of the technocratic model of social administration. The dark side of the new bureaucratic society was portrayed by writers like Franz Kafka: the assignment of huge powers over people's lives to opaque and incomprehensible systems and faceless bureaucrats obsessed with rules, not people.

Although the political technocracy movement never achieved its goals, technocracy, in the form of the shaping of both government policies and the details of everyday life by technical experts has flourished ever since. There are experts to tell you what to eat, how to have sex and bring up your children, urban planners to rationally design your neighbourhood and town, etc.

Meanwhile, the decisions about introductions of new technologies and the directions of basic scientific research, decisions which have massive, even dominant effects upon the overall economic and social development of society remain predominantly in the hands of scientific experts and bureaucrats. In the heyday of political technocracy a sign over the entrance to the 1933 Chicago World Fair expressed the technocratic attitude: 'Science Discovers, Technology Executes, Man Conforms'. Thus we are subjected to a series of technological and economic revolutions about which there has been very little or no public debate, and not surprisingly, popular movements of resistance to the imposition of new technologies, such as the anti-GM food movement, arise. There is a sense in which the branding of such movements as Luddite is correct, although not in the way that the technocrats of the 1950s reinvented the word to mean people opposed to all technologies. General Ludd's Triumph, one of the songs of the Nottinghamshire Luddites, expresses the anti-technocratic spirit of Luddism, saying, 'That foul imposition alone was the cause that produced these unhappy effects.'

3.5 Technocracy and capitalism

Technocracy emerged in the 17th century, well before anything we would recognise as free market industrial capitalism. Although technocracy is often thought to be 'just part of capitalism' or subordinate to it, this is a mistake. Technocracy emerged from Renaissance and Reformation debates about the nature of reality, the structure of the universe and of nature, ie from a series of philosophical ideas about the nature of physical reality that simply cannot be reduced to the economic and legal (property rights) concepts of capitalism. The scientists and philosophers of the Scientific Revolution were engaged in a different and distinct problematic to that of capitalism, although the concepts that emerged from the Scientific Revolution were, of necessity, consistent with those of the developing capitalist society.

In our view it is most helpful to keep the two concepts separate and to recognise that modernity is a product of both technocracy and capitalism and of the interaction between them. That interaction is not one of capitalist master and scientific/technocratic slave. Technocracy profoundly shapes the development of capitalism, whilst in turn being shaped by it, for example, these ideas emerged 100 years or more before Adam Smith and strongly influenced him. But the interaction is not always conflict-free and sometimes technocratic excesses can harm the development of capitalism. An example would be the bureaucratic Keynesian regime that existed between 1945 and 1975, which led to a crisis of profits in capitalism and was succeeded by the return of an aggressive anti-bureaucratic neoliberalism that has dominated the world economy ever since. Technocracy also flourished in perhaps purer forms in communist countries in which the entire economy was subjected to planning and engineers became central to state administrations. To this day, the majority of the members of the Chinese politburo are engineers.

The development of technocracy has continued to fundamentally influence the

development of capitalism. The most important example of this was, of course, the Industrial Revolution. This massive reshaping of society was driven by a series of technical innovations and the introduction of new forms of organisation of work (the factory system). At the beginning of the 20ᵗʰ century, in response to the social chaos of laissez-faire industrial capitalism (including the threat of communism), a new wave of technocratic solutions emerged, as the central concept of technocracy shifted from machine to system. These included the beginning of increased bureaucratic state intervention throughout society and Frederick Taylor's 'Scientific Management.'

Through minute observations of workers' skills, Taylor succeeded in embodying their skills in the new machines of the Fordist production line, thereby deskilling and disciplining labour. Taylor's motto 'In the past the man was first, in the future, the system will be first,' is a perfect example of how technocratic concepts of efficiency, control and order serve the interests of capital.

The Fordist/modernist hierarchical system of order and rationalisation extended throughout society for most of the 20ᵗʰ century. But as more sophisticated cybernetic concepts of systems management developed in the 1950s, the Fordist model was felt to be too restrictive; this was one cause of the revolts of the 1960s and later, on a conceptual level, the pseudo-revolt of 'postmodernism'. By the 1980s the development of computers enabled the management of global scale systems, such as transnational corporations, and allowed a relaxation of the rigid Fordist system in some industries, although Taylorist systems persist, eg in the fast-food industry. The new 'post-Fordist' settlement is best viewed as 'hyper-Fordism' – a more flexible, but more sophisticated exploitative system, in which the rigidity and boredom of the 9 to 5 job has now become a thing to be longed for as productive labour and consumption become 24/7.

As 'innovation' has become the key concept of government policy, information technologies have over the last thirty years created a golden age of technocracy, culminating in a technocrat's dream of state and corporate surveillance. In politics technocratic/managerialist governments like New Labour have aimed to make class conflict a thing of the past.

4. Conclusion

The reason why technology has caused such problems in our society is because they are developed within the overall system of technocratic capitalism. Scientists and engineers are trained in technocratic thinking and, together with the imperatives of the capitalist system, this shapes the technologies they develop in ways that mean that there are bound to be problems. It is futile to keep trying to address those problems one by one, reactively, whilst failing to understand their cause.

To be critical of technocratic excesses and to see the way that technocracy shapes industrial megatechnologies as well as our cultural values and common sense, does not imply any rejection of technology - although we will need to abandon the simplistic ideological identification of technological control over nature with progress. We need a critical movement for democratic control over technology.

The problem is not technology, but technocracy. As writers like EF Schumacher, Ivan Illich, Mike Cooley and Lewis Mumford have pointed out, there has always been another, more democratic human-centred, tradition in technology which embodies a different relationship to nature and an emphasis on community; workers' plans like the Lucas Plan of the 1970s and the Million Climate Jobs Campaign have been the left's contribution to this tradition.

We need a movement that understands the importance of corporate, military and state control of technology and puts struggles over technology at the heart of radical politics. The anti-technocratic vision is not just about technology; because technocracy is the pervasive culture of modernity, it is a broad social and political vision. In my view the best example of a such movement, which addressed both capitalism and technology is Luddism. At this moment in history, the need for such a movement is critical.

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