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THE INFORMATION SOCIETY AS MEGA-MACHINE

The Continuing Relevance of Lewis Mumford[1]

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Abstract

Too often the history of information and communication technologies (ICTs) is wrenched out of the history of technology and presented as something altogether separate and therefore different, rendering previous analyses irrelevant. However, there are sufficient analytical tools to hand without the continual invention of new paradigms to understand the current stage of technological advance. To support this contention, in this article, the continuing relevance of Lewis Mumford is explored. Mumford's discussion of the megalopolis and the emergence of the invisible city as its most developed state make a direct link with the networked information society, establishing a link between the information society and Mumford's analysis of the previous history of technology. At the centre of Mumford's discussion of this history is the dialectic interaction of authoritarian and democratic technics. Mumford's notion of technics stresses that technologies can not be divided from the social relations in which they appear. In the information society, this dialectical pair map onto the twin dynamics of enclosure and disclosure. The former dynamic represents the control of information through commodification and marketization, the latter the recognition of the empowering and emancipatory qualities of ICTs. Up until now, discussions of the information society have regarded only one or other dynamic as normal, whereas utilizing Mumford's insight, the contradictory character of the information society can be theorized without rendering the second dynamic abnormal. Thus, the article concludes that recourse to Mumford's ideas, to re-embed ICTs in the history of technology, allows a more nuanced and fruitful treatment of current developments in information society.

Keywords

authoritarian and democratic technics, History of technology, Information Society, Lewis Mumford

> The inventors of . . . computers are the pyramid builders of our own age: psychologically inflated by a similar myth of unqualified power, boasting through their science of their increasing omnipotence, if not omniscience, moved by obsessions and compulsions no less irrational than those of earlier absolute systems: particularly the notion that system itself must be expanded, at whatever eventual cost to life.
>
> (Mumford 1964: 5)

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INTRODUCTION

It has become a conventional wisdom that technological revolutions produce profound shifts in social relations. Relating to information technologies, this argument finds its most recent adherents in Charles Leadbeater (1999) and Bill Gates but, can trace its origins back to speculations regarding the impact of the telephone or even the printing press. Information and communication technologies (ICTs) and, their networking capacity (most readily manifest on the Internet) may be having considerable social, political and economic effects, but nevertheless there is an urgent need to re-integrate the information society and its technological apparatus into an understanding of the continuing history of technology which does not suppose contemporary developments are unprecedented. Too often the history of ICTs is wrenched out of the history of technology and presented as something altogether separate and therefore different, rendering previous analyses irrelevant. However, there are sufficient analytical tools to hand without the continual invention of new paradigms to understand the current stage of technological advance.[2] To support this contention, below I outline the continuing relevance of one particular analyst of technology: Lewis Mumford. After a brief overview of Mumford's work, I discuss some of his ideas regarding technology and suggest their relevance to the contemporary emergence of the information society.

WHO IS LEWIS MUMFORD?

Lewis Mumford was born in 1895 in Flushing, New York and died at home in Amenia, New York aged 95 having written over thirty books, countless articles and reviews. Mumford spent his youth in New York, walking around the city, watching construction and exploring the growing metropolis. Indeed as Goist points out, 'the city was the very stuff of his life' well before he became seriously interested in studying cities (Goist 1972: 380). Yet, the young Mumford was also interested in technology. His first published article, aged thirteen and prompting a royalty cheque for 25 cents, was in *Modern Electrics* on new breakthroughs in radio receivers, reflecting his own interest in building and experimenting with radios (Miller 1989: 34). After the end of the First World War, Mumford studied with Thorstein Veblen at the New School of Social Research, who became both a friend and one of his major influences. He also discovered the work of Patrick Geddes (the Scottish botanist and social philosopher) with whom he corresponded until Geddes death in 1931. It was Geddes influence that led Mumford to think about the role of cities in the history of mankind.

Mumford was interested in the human possibilities that sprang from man's

organization into cities, possibilities which he observed were often compromised. Therefore, he sought to establish a more humane approach to the development and planning of cities. To this end, for some years he wrote a column in the *New Yorker* which aimed to widen the debate on architecture and planning (specifically in New York but, also more generally). For Mumford, the key problem, revealed by man's organization into cities, was the impact of technology. Increasingly, he studied the historical role of technology, and explored its impact on social relations (and their impact on technology). While Mumford was not so much a historian as a synthesizer of disparate ideas and analyses, Jamison has claimed his book, *Technics and Civilization*:

> Created a new field of study: history of technology . . . Mumford succeeded in placing technological development in human context; after Technics and Civilisation, the debate about technology moved to a new level of constructive ambition and seriousness. It would never be quite the same again.
>
> (Jamison 1995)

Especially after the 1950s, Mumford's focus shifted almost completely to the issue of man's relation with technology and, the problem that technology seemed to be running 'out of control'. Mumford was not in any way a technological determinist but, despite some clear parallels between Mumford and the 'social-embeddedness-of-technololgy' approach, he did not merely hold an earlier version of this paradigm. Indeed, Lewis Mumford is a singular character and part of no 'school'. Though he did experience the earlier stages of the information 'revolution', he died on the eve of the information technological acceleration of the 1990s. Thus, the interpretation I develop below applies Mumford's ideas to a technological history he did not fully experience. However, the central argument of this article is that his approach remains relevant to this recent history.

Mumford's perspective on the history of technology was informed by his interests and political views but, as importantly by his emphasis on 'symbolic activities'. He resisted the commonplace material analysis of technological advances, an account linking a series of material technologies with little regard for their symbolic values or importance. Indeed, for Mumford the:

> Constant danger in interpreting human behaviour is to overvalue exact methods and measurable data, separated from their historical context: data often too complex for even verbal formulation; for the very things that the conscientious historian is tempted to leave out, because of their obscurity, their purely analogical suggestiveness, their subjective involvement, are needed to bring any richness into our judgements.
>
> (Mumford 1962: 202)

This is encapsulated in his dialectic of materialization and etherialization, the interaction of material or tangible elements of life with the subjective forces of abstract ideas or symbolic representations.[3] Like Hegel, Mumford saw historical progress as being the process of actualization of symbolic and ideational or abstract ideas. Yet, and here the difference with Hegel is important, once such actualization had been accomplished, the new material artefacts might themselves prompt an ideational change in a continuing (and continual) process. History was driven by a bi-directional, dialectic process of interaction between the material and the symbolic (Mumford 1971: 421–9). Therefore, the material artefacts which could be uncovered and investigated in the quest for a history of technology immediately skewered such a history towards an over-emphasis of the material aspects of technology relative to the ideational aspects.

Man's relation with technology is not as passive receiver of innovation but, as shaper of the cultural drivers of technological advance; man's ideas and symbolic concerns are major factors in the history of technology. Mumford therefore stressed the human agency in the history of technology. As early as 1924 he argued that the:

> Future of our civilisation depends upon our ability to select and control our heritage from the past, to alter our present attitudes and habits, and to project fresh forms into which our energies may be freely poured. . . . During the last century our situation has changed from that of creators of machinery to that of creatures of the machine system; it is perhaps time that we contrived new elements which will alter once more the profounder contours of our civilisation.
>
> (Mumford 1924: 195–6)

Also, ten years later, in the preface to *Technics and Civilization* he warned that:

> No matter how completely technics relies upon the objectives procedures of the sciences, it does not form an independent system, like the universe: it exists as an element in human culture and it promises well or ill as the social groups that exploit it promise well or ill . . . In order to reconquer the machine and subdue it to human purposes, one must first understand it and assimilate it. So far, we have embraced the machine without fully understanding it, or like the weaker romantics, we have rejected the machine without first seeing how much we could intelligently assimilate.
>
> (Mumford 1934: 6)

This danger of being controlled by technology rather than shaping it ourselves is no less evident now than it was then.

Thus, Mumford's approach 'has the great merit of treating technology as a system of social relations and of recognizing the *mutual* dependence of technological change and social change' (Lasch 1980: 24, emphasis added).

Recognizing his own part in society's contemporary dialectic, the critique of the uses of contemporary innovations is prominent in Mumford's discussion of the history of technology. However, he 'never forgot that modern culture has itself given rise to the critical traditions that most adequately explain the contemporary crisis and point the way to its resolution' (Lasch 1980: 28). Crucially, Mumford was not anti-modern, nor a cultural conservative but, rather believed in the ability of mankind to reshape the future despite the claims for the inevitability of the effects of technological progress.

Like Ruskin before him, Mumford regretted that technology, alongside the division of labour had 'separated intellectual and practical life, sacrificed values to technique, and given rise to a deadening professionalism' (Casillo 1992: 96). This led Mumford to call for a return to craft, not in the sense of a stand against technology but, rather, in the interests of serving human needs and 'organic' forms of community. Langdon Winner suggests that Mumford saw technology as a potentially liberating force, 'by which humanity will free itself from the snares of militarism, greed, power worship, lopsided epistemology and exploitative attitudes towards nature and fellow humans' (Winters 1987: 107). Though technology is the problem it is also the potential solution. For Mumford, technology is not an uncontrollable force but, rather is controlled by social forces: thus, the favouring of particular practices and uses is not only possible and practicable but is how technology has always been deployed and used. There is some ambiguity here:

> It is often unclear whether [Mumford] believe[s] industrial technology can be reconstructed to achieve [his] goals, or whether to reject it in favour of simpler craft technology. Does the social determination of technology concern alternatives *within* industrialism or merely the choice *between* industrial and craft technology?
>
> (Feenberg 1991: 125)[4]

Certainly, while I lean towards an appreciation of Mumford's perspective which suggests there is a choice *within* industrialism, it is difficult if not impossible to dissolve this ambiguity within his work. Yet, despite this ambiguity, Mumford's analysis remains apposite to contemporary discussion of the information society.

Mumford also regarded the notion of 'economic man' as absurd. It was, 'only in economics textbooks . . . the Economic Man and the Machine Age have ever maintained the purity of their ideal images' (Mumford 1934: 269). Having studied with Thorstein Veblen, Mumford economic perspective was influenced by Veblen's view that the ruling class are a 'tumour' on the body of society, which:

> Has resulted in the general devaluation of productive work in favour of conspicuous waste and leisure. Confusing money values with real wealth, capitalism sacrifices production and the instinct of workmanship to the pecuniary interests of businessmen and financiers.
>
> (Casillo 1992: 102)

However, unlike Veblen, Mumford was not only concerned with productivity and the powers of the technocracy but, also with the ability of human beings to benefit from certain technological developments. This led Mumford to an understanding of the history of technology that commenced not with the first machine, or even the first tool but, with language and the desire to modify the body in relation to its environment (dress, heat, physical fitness for hunting).

Technology commences with man's own mental activities directed toward changing things. Indeed as Mumford points out, while technological history has been fixated on the fashioning of tools:

> The invention of language – a culmination of man's more elementary forms of expressing and transmitting meaning – was incomparably more important to further human development than the chipping of a mountain of hand-axes. . . . For only when knowledge and practice could be stored in symbolic forms and passed on by word of mouth from generation to generation was it possible to keep each fresh cultural acquisition from dissolving with the passing moment or the dying of a generation. Then, and then only, did the domestication of plants and animals become possible.
>
> (Mumford 1966a: 308)

The effort to develop the ability to speak, to develop this technology of communication, enabled the dissemination and storage of experience which could then be improved and built upon. Only then could material technologies be developed through the collectivization of experience and the organization of effort.

This reintegration of the ideational leads Mumford to stress throughout his work that neither human culture nor technology can be understood without the other. But it must be stressed that Lewis Mumford was not anti-technology, as Arthur Molella notes, he actually 'savoured technological processes for their own sake as unique manifestations of human ingenuity' (Morley 1989: 123). Nevertheless:

> Although he acknowledges the importance of material conditions in society and culture, Mumford asserts the relative autonomy of man's 'idolum' or Weltanschauung and so rejects as inorganic (hence mechanistic) the vulgar Marxist view that ideas, values and aesthetic symbols merely reflect or conceal material factors.
>
> (Casillo 1992: 92)

This organicism is a major element in the way Mumford views the relations between man and machine. In one sense, Mumford's organicism is a Darwinism modified by the influence of Peter Kropotkin (Casillo 1992: 95; Ward 1986: 13–14). Though familiar with the work of Karl Marx through his contacts with New York socialist groups in the years before the First World War, Mumford himself did not adopt a Marxian perspective on technology. As Miller points out, 'his desire for a more humane economic system emerged from Plato, Ruskin, Morris, Tolstoy and Kropotkin, not from Marx and Engels' (Miller 1989: 99). In Mumford's view:

> Kropotkin realized that the new means of rapid transit and communication, coupled with the transmission of electric power in a network, rather than a one-dimensional line, made the small community on a par in essential technical facilities with the over congested city. By the same token, rural occupations once isolated and below the economic and cultural level of the city could have the advantages of scientific intelligence, group organisation and animated activities, originally a big city monopoly; and with this the hard and fast division between urban and rural, between industrial worker and farm worker, would break down too . . . With the small unit as a basis, he saw the opportunity for a more responsible and responsive local life, with greater scope for the human agents who were neglected and frustrated by mass organisations.
>
> (Mumford 1975 [1961]: 585–6)

In his interpretation of Kropotkin's *Mutual Aid* the relevance of Mumford's view of technology for the global information society is clear, if the city's advantages are further extended through the internet and ICTs. The widening of accessibility to the advantages of the city allow the more organic, smaller human communities which Mumford regards as being more 'democratic' to develop similar human advances as have been bought at too high a price in the city.

Despite his appeal to 'democratic' technics, Lewis Mumford has not infrequently been criticized for a form of right wing, implicitly conservative, communitarianism. This is partly a result of his pre-1940s work on cities and planning which exhibited a preference for technocratic, centralized bureaucratic control (not an uncommon view in the 1930s). However by the 1960s, when his interest had turned almost exclusively to the problem of technology, he rejected the sorts of Utopian visions which had influenced him in the pre-war period, seeing them as essentially totalitarian. In any case his Utopian vision had always been somewhat compromised: even in his *The Story of Utopias* (written in 1922), ironically 'Mumford finds utopias wanting because they are out of contact with the everyday world of real men and women' (Goist 1972: 383). In later life he retained his organicism but, linked it to a devaluation of the role of machinery in the health and development of the organic community (Casillo 1992: 113).

However, the advance of technology may constrict the available choices open to the individual and, thus, deny the possibility of reinvigorating the individual's links with nature. Man's environment is increasingly, for the older Mumford, a technologically constructed megalopolis. Thus, he saw:

> The task of a cultural critic was not merely to identify problems, but to provide constructive ideas for bringing the machine under human control, and even more, using machinery to enrich human life. It had become clear [even in the early 1930s] that the machine needed a conscious programme for its guidance; and it was this that Mumford aimed to provide, by so doing pioneering the social study – and constructive assessment – of science and technology.
>
> (Jamison 1995)

It is this stream of Mumford's thought, the constructive engagement with contemporary technology through the application of an understanding of its complex history that I explore below.

LEWIS MUMFORD AND TECHNICS

Lewis Mumford preferred to discuss 'technics' rather than technology. This term encapsulates for Mumford the importance of man's interaction with technology: technologies should be located within their social relations, their context, before assessing their social value and effect. Mumford suggested that these technics could be broadly regarded as either authoritarian or democratic.[5] This distinction does not necessarily map onto *specific* technologies but, historically, the usage and development of technology fits into one or other of these tendencies. At the centre of his treatment of technics is the recognition that both:

> Have recurrently existed side by side: one authoritarian, the other democratic, the first system-centred, immensely powerful, but inherently unstable, the other man-centred, relatively weak, but resourceful and durable.
>
> (Mumford 1964: 2)

In this dialectic, centralizing authority tries to control the use and outputs of technology but, is unable to completely micro-manage the society in which it exists. A space for resistance remains available, where technologies may emancipate and empower individuals *against* the authoritarian power. It is this possibility that supports and reproduces democratic technics.

Mumford's understanding of democracy is centred on the interaction of small groups, allowing 'communal self government, free communication as between equals [and] unimpeded access to the common store of knowledge' (Mumford 1964: 1). Institutional arrangements which locate authority at the apex of an

organization, and centralized direction of activities, are therefore seen as threats. However, he accepted that large scale societal organization was required to produce some major social benefits. To forestall the move to complete authoritarianism, the whole system should be cut back to, 'a point at which it will permit human alternatives, human interventions, and human destinations for entirely different purposes than those of the system itself' (Mumford 1964: 8). There is a distinction between 'labour-saving' technologies that free individuals for more fruitful tasks, and technologies that merely reinforce (or even expand), 'drudgery, enlisting human energy in collective enterprises on a gigantic scale . . . that gratify the power-hunger of the mighty but do little to improve the material conditions of everyday life' (Lasch 1980: 23). Authoritarian technics in the last two centuries have enabled the logic of control through the 'mega-machine' to move beyond mass-enterprises and enter everyday working lives. This argued Mumford, was the true 'industrial revolution', not the introduction of mechanization and automation but, rather, the division between planning and production, between conception and execution. The industrial revolution was in essence a revolution in the social relations of knowledge. Thus, if democratic technics can be reasserted, instead of:

> Liberation *from* work being the chief contribution of mechanisation and automation . . . liberation for work – for educative, mind-forming work, self-rewarding even on the lowest psychological level – may become the most salutary contribution of a life centred technology. (Mumford 1966a: 316)

Yet such a desire is compromized by the continuing dominance of authoritarian technics.

Authoritarian Technics

For Mumford, authoritarian technics first emerged during the period of pyramid building in Egypt. Collecting together vast mega-machines (of organic components – men, women and children) to do their bidding, utilizing the new skills of communication/writing, mathematics and bureaucratic or organized control, the God Kings constructed structures that were beyond the capabilities of previous technics. In a sense, the ability to organize society to specific ends marks the dawn of 'civilization' in Mumford's eyes, even if such civilization brings with it the problem of authority and domination. To build the pyramids, technics of this scale relied on centralized political control, 'ruthless physical coercion, forced labour and slavery' to bring into existence 'machines that were capable of exerting thousands of horsepower centuries before horses were harnessed or

wheels invented' (Mumford 1964: 3). The unleashing of such potential came at a high psychological and physical cost to most of the individuals involved. For Mumford this is the recurring problem in the history of technology.

Authoritarian technics met little resistance in the first instance because they produced an 'economy of controlled abundance', allowing a vast expansion in the efficiency of agriculture and, the ability to support large urban populations, as well as releasing an increasingly influential elite of bureaucrats, scientists, religious and military functionaries from physical labour of any sort. The first wave of authoritarian technics (reaching its apogee for Mumford, with the Roman Empire) could only support the emergence of new technologies in urban centres. Mumford argues that these first authoritarian technics finally proved too 'irrational' to continue indefinitely, dependent on the centre retaining control: once communication failed and authority was no longer regarded as legitimate, the mega-machine collapsed. Since:

> Authoritarian technics first took form in an age when metals were scarce and human raw material, captured in war, was easily convertible into machines, its directors never bothered to invent inorganic substitutes.
>
> (Mumford 1964: 4)

Thus, as the supply of slave and forced labour declined with the absorption rather than defeat of populations and the problems of controlling a vast empire, so the logic of authoritarian technics and its social reality drifted apart. This allowed a more democratic technics to reassert itself during the Middle Ages, only to be once again constrained by the rise of the nation-state, the mega-machine *par excellence*.

For Mumford the Enlightenment and the scientific revolution led to a view that technological development and scientific progress would produce an increasingly democratic society.

> But what we have interpreted as the new freedom now turns out to be a much more sophisticated version of the old slavery: for the rise of political democracy during the last few centuries has been increasingly nullified by the successful resurrection of a centralised authoritarian technics . . . At the very moment Western nations threw off the ancient regime of absolute government, operating under a once-divine king, they were restoring this same system in a far more effective form in their technology, reintroducing coercions of a military character no less strict in the organisation of a factory than in that of the new drilled uniformed army.
>
> (Mumford 1964: 4)

The powerful have constructed a system in which their power over technology underlines their claims for omnipotence. Thus, Mumford argues in an age of

authoritarian technology there is no longer a 'visible personality, an all-powerful king' a sovereign location of power, rather it is the system itself that is now authority (Nitzan 1998: 204). And the perception of the system as providing the limits to action (and possibility) rather than an actual (locatable) ruler, helps authority defuse most of the resistance from democratic technics. This is not to argue there are not individuals or groups with power in society but, that such power is partly masked by the technological system's 'needs'.

In a striking precursor to critical writing regarding the globalization of liberalism, and its structuring of information society, Mumford asserts the authority of technics is defined through its logic, the promotion of efficiency:

> Under the pretext of saving labour, the ultimate end of this technics is to displace life, or rather, to transfer the attributes of life to the machine and the mechanical collective, allowing only so much of the organism to remain as may be controlled and manipulated.
>
> (Mumford 1964: 6)

What allows this system to reproduce its position is the ability to provide for the majority an abundance of material goods without historical precedent. However, this is only possible where non-systemic wants are not articulated, where only deliverable demands are acceptable and, it is here that a crack in the authoritarian facade opens. For Mumford it is the historical process of self discovery, the ability of man to change, that always undermines the ability of authoritarian technics to retain control without constant (and contested) reproduction.

Democratic Technics

Mumford stresses such overarching authoritarian technics are not necessarily a reality but a possibility, one which can only be guarded against by valuing and supporting democratic technics. Furthermore, the bribe of abundance and material wealth which authoritarian technics offers in return for a narrowing of human potential and a decline in psychological health can be rejected. If democracy itself is to be supported and guarded, then technology must not been seen only as a tool which automatically brings with it empowerment or enslavement. Technological deployment and effects reflect the social relations in which they appear and, perhaps, most importantly *no* technology is beyond systemic incorporation into authoritarian technics. It is imperative for Mumford that the human scale of life be central to democracy, society must revolve around humans not the system (Mumford 1964: 8). Thus, technology, in itself neither authoritarian nor democratic, must be *positively* integrated into a democratic technics.

In contrast to authoritarian technics, democratic technics are small scale and 'even when employing machines, remain under the active direction of the craftsman', responding to their needs and wants (Mumford 1964: 3). Human scale technologies have modest demands (which is to say localized power needs, locally available skills, low organizational requirements) and can be adapted to local conditions. Despite the authoritarian technics of contemporary society, there remains the potential for localized and democratic technics to retain a level of autonomy and, thus the ability for local creativity to be exercized. Mumford forcefully argues that society needs to look beyond abundance of material goods and, examine the needs of individuals. This will require a shift in:

> The seat of authority from the mechanical collective to the human personality and the autonomous group, favouring variety and ecological complexity, instead of stressing uniformity and standardisation, above all, reducing the insensate drive to extend the system itself, instead of containing it within definite human limits and thus releasing man himself for other purposes.
>
> (Mumford 1964: 8)

Democratic technics free the individual from the burden of continual employment, allowing the development of non-system oriented behaviour. Mumford proposes the emancipation of the creative individual: democratic technics allow work that is dependent upon 'special skill, knowledge, aesthetic sense'. Large scale enterprise may continue but there needs to be a space for individual expression through artisanal activities within the localized community.

Mumford also argues that in the past democratic technics have supported a situation where:

> The only occupation that demanded a life-time's attention was that of becoming a full human being, able to perform his biological role and to take his share in the social life of the community . . . Every part of work was life work.
>
> (Mumford 1966b: 238)

The development of self can continue under democratic technics, even if selfhood is stifled by the demands of authoritarian technics. Indeed the notion that democratic technics should abolish all work is far from Mumford's mind: 'work which is not confined to the muscles, but incorporates all of the functions of the mind, is not a curse but a blessing' (Mumford 1966b: 242). Though democratic technics potentially exist they need to be positively constructed. Thus, if 'the fashionable technocratic prescriptions for extending the present system of control to the whole organic world are not acceptable to rational men, they need not be accepted' (Mumford 1971: 430). Resistance to the mega-machine, against authoritarian technics, is possible.

Indeed, as Mumford suggests:

> Nothing could be more damaging to the myth of the machine, and to the dehumanized social order it has brought into existence, than a steady withdrawal of interest, a slowing down of tempo, a stoppage of senseless routines and mindless acts.
>
> (Mumford 1971: 433)

Therefore, most importantly for the debates regarding the information society, authoritarian and democratic technics are not defined by their technologies but by their use. Thus, technologies do not have a natural character, they do not automatically support or destroy democracy but, rather, help reproduce social structures and systems. Consequently, democratic technics and authoritarian technics do not replace one another, rather they exist side-by-side, in competition, ebbing and flowing but never finally erased. Withdrawal from areas of the economy such as the minority but symbolic 'downshifting' within the middle-class and, the resistance to capitalism utilizing its own technologies, such as recent 'reclaim the streets' protests organized through chat-rooms and news-groups on the 'net', seem to fit Mumford's notion of the reassertion of democratic technics quite well.

MEGALOPOLIS AND INFORMATION SOCIETY

In the interwar period, Lewis Mumford was best known as an advocate of regional planning and its impact on the well-being of city dwellers. One aspect of Mumford's work on cities is of some relevance to the emergence of an information society: the problems which arise from the spreading megalopolis. From village, to the polis, to the metropolis, Mumford saw urban history as a centrifugal force enlarging the city. The Megalopolis is the final stage of urban development before the collapse into necropolis, the hollowed-out city of the dead.[6] Like the information society, the megalopolis has wrenched itself free of its material surroundings to encompass a growing territory through its communication networks. While the centre holds, the metropolis' control and influence is progressively widened by communication. In the information society, the megalopolis has transcended geographical limitations to become the global city.

At the centre of Mumford's positive view of the city was the enhanced possibility of varied and constructive human interaction. Like writers before him, he also valued the freedom from traditional social hierarchies that the relative anonymity of the city offered. The city functions not only as an information exchange between regions (individuals are drawn to the centre to interact), it is also a social magnet which attracts and spurs innovations in social and cultural

practices which benefit from and, spread through, the constant social interactions the city engenders by the proximity of different groups and functions. As importantly, the access to a large population enables specialisation and more selective service provision. The city allows a division of labour which can enhance the life of its inhabitants by making new services and products available, ones which could never have been supported by smaller settlements. However, under an authoritarian technics the division of labour also leads to the progressive deskilling and intellectual impoverishment of the workforce, unless it is balanced by the retention of democratic technics in one form or another.

This division within the megalopolis is also one between 'town and county' inasmuch as Mumford sees the rural village, the non-metropolitan communities, as reservoirs of renewal from which the centre can draw new talent, and humanity in times of need, or after the destruction (collapse) of the metropolis (Mumford 1975 [1961]: 636). However, as cities grow larger these positive elements of their character become compromised until:

> Instead of producing the maximum amount of freedom and spontaneity, this scattering of the metropolitan population over the remoter parts of the countryside confines its working members for ever-longer periods to a mobile cell, travelling ever-longer distances to the place of work or to achieve even a few of the social and interpersonal relations that the city once provided at one's elbow.
>
> (Mumford 1968 [1962]: 131)

The movement of the population into commuter towns and suburbs undermines the value of the crowded city, while reinforcing its tendency to alienation and atomization. The city was always a mixed blessing but the megalopolis retains the problems while dissipating the advantages.

In a key passage, Mumford argues that the megalopolis (as anti-city):

> Combines two contradictory and almost irreconcilable aspects of modern civilisation: an expanding economy that calls for the constant employment of the machine (motorcar, radio, television, telephone, automated factory, and assembly line) to secure both full production and a minimal counterfeit of normal social life; and as a necessary offset to these demands, an effort to escape from over regulated routines, the impoverished personal choices, the monotonous prospects of this regime by daily withdrawal to a private rural asylum, where bureaucratic compulsions give way to exurban relaxation and permissiveness, in a purely family environment as much unlike the metropolis as possible. Thus the anti-city produces an illusory image of freedom at the very moment all the screws of organization are being tightened.
>
> (Mumford 1968 [1962]: 132)

The megalopolis allows the further intensification of 'productive' activities in the metropolis by providing a form of respite from its pressures at the centre. The

megalopolis allows the diffusion of the functions of the centre while retaining the metropolitan (which is to say centralized) control of these functions. Additionally, the arrival of instantaneous communication has allowed (and encouraged) further concentration of bureaucratic power. The centre controls and directs distant economic activities but also influences and recasts distant cultures and practices in its image (Mumford 1975 [1961]: 608). In this megalopolis, the distinction between the city and its immediate environs disappears, there is expansion at the edges and previously separate settlements, towns or in extreme cases neighbouring cities are swallowed up. The megalopolis swallows all around it and merges with its surroundings, no longer clearly discernible but slowly and surely destroying diversity. More importantly, for my purposes here, the megalopolis in its etherial form is the information society itself.

Though the megalopolis may be hellish, it may also, if allied to democratic technics, allow the advantages of the city to be enjoyed more widely. Mumford suggests that communication technologies and the organization of social activities in the megalopolis may produce an 'invisible city' (Mumford 1975 [1961]: 641ff). The emergence of this communication mediated invisible city may allow a further division of labour between it and the visible city, allowing a space for relations that thrive on physical proximity in the visible city, while services and practices previously only maintained in the visible city can be spread through the invisible city. The functions of the city, previously limited to the metropolitan centre are distributed through a 'functional grid', the framework of the invisible city. Positively, this grid and its associated networks:

> Permit units of different size, not merely to participate, but to offer their unique advantages to the whole . . . [one location] can be an effective part of the whole, making demands, communicating desires, influencing decisions without being swallowed up by the bigger organisation.
>
> (Mumford 1975 [1961]: 644)

However, 'the new grid, in all its forms, industrial, cultural, urban, lends itself to both good and bad uses' (Mumford 1975 [1961]: 642). And the negative elements of the megalopolis or invisible city are hardly trivial.

Writing just before the Second World War, Mumford had argued that conflicts would result from the centralization of economic organisation in the megalopolis, a centralisation with little regard for territorial borders. Such conflicts would lead ultimately to war, or at the least a vast military-industrial complex (to use Eisenhower's term) which continually used the threat of instability to gather resources to itself (Mumford 1940: 272–3). Indeed, Eisenhower's farewell address, from where the term derives itself can be read as a warning of the

need for vigilence in the face of an authoritarian technic.[7] Additionally, within the megalopolis everything is subject to the market, including such cultural activities as education and the arts. In this sense, the megalopolis represents the intensification of capitalism, which as I have argued elsewhere (May 1998) is one of the key elements of the information society.

While the metropolitan centre retains the organs of culture concentrated in the previous stage and, as such, sees less favourable developments tempered, in the vast sprawl of the megalopolis the increasing domination through the functional grid can lead to an impoverishment of existence. In the megalopolis:

> Secret knowledge has put an end to effective criticism and democratic control; the emancipation from manual labour has brought about a new kind of enslavement: abject dependence upon the machine. The monstrous gods of the ancient world have all reappeared, hugely magnified, demanding total human sacrifice . . . [and] whole nations stand ready, supinely, to throw their children into [their] fiery furnace.
>
> (Mumford 1975 [1961]: 651–2)

Yet, despite this possibility, Mumford's reading of technological history helped him locate a possibility of deliverance from this situation. The development of a democratic technics within the functional grid, to balance the centralizing tendency of the authoritarian technics at the centre of the megalopolis, could redress this imbalance and allow the retention of humanity and a healthy variance in culture across the system.

The megalopolis in its form of the invisible city is the clearest precursor to the information society within Mumford's work. Though the terminology is different, there is a clear correlation with the opportunities and problems of the information society. The information society, it is supposed, allows access from anywhere (or at least anywhere within the network) to the cultural, informational and political assets that are distributed throughout the system. The information society as megalopolis has no formal centre but enables immediate contact with any of its component parts (recall the origins of the Internet in the amorphous command and control structure of the US military's ARPANET, designed to have no fixed structure of communication, to allow information to flow even if elements were 'knocked out'). As with the megalopolis, the information society is both empowering and limiting of human experience. Though intellectual resources are now available, there is also a centralization of power, an increased capacity for control and surveillance. The metropole retains its power while progressively swallowing up other areas of human activity and giving an impression of individual empowerment.

LEWIS MUMFORD AND THE TWIN DYNAMICS OF THE INFORMATION SOCIETY

Lewis Mumford was neither the first (nor the last) to recognize the socially constructed nature of technology usage. There has been a long and distinguished history of criticism of the role of technology in the impoverishment of psychological existence, perhaps best typified by the tradition of Luddism (Robins and Webster 1999: 39–62). Mumford presents these criticisms within an account of technological development that proposes a recurring pattern, not isolated moments of upheaval. Thus, while Mumford died on the eve of the acceleration of the information revolution, his analysis of competing (and co-existing) technics is still useful for thinking about the global information society. Furthermore, his view of technics as not being exclusively manifest in material artefacts fits well with information society's concentration on the use and deployment of knowledge and information. For Mumford, the use of knowledge, even in the complex manner claimed for the new era is actually a recurrent and continuing factor in technological history.

Mumford's analysis supports the recognition of the continuity of technological practices in the information society and, a continuity with the expansion of the city. It allows the identification of a spatial continuity between the process of city-building and the emergence of a virtual political economic space; the 'invisible city' existing electronically. Mumford's view of technological advance firmly locates the information society in the ongoing history of technics. In this sense, Mumford's (implicit) view on the information society stresses the continuity with previous organizational moves within capitalism and, as such, shows a similarity with a more critical stream of work on the recent history of information society (Robins and Webster 1999; Beniger 1986). This perspective on the information society looks back at the 'second industrial revolution', the emergence of mass-production, scientific management and other aspects of modern capitalism to stress recent developments' link with previous 'advances' in both manufacturing and services.

Lewis Mumford's conception of the history of technology suggests the interconnected nature of authoritarian and democratic technics. The balance between them might shift depending on particular social relations but neither was the only tendency within technological change. This insight seems to me to directly relevant to debates around the emergence of the information society. Thus, while the terms may have changed, the aspects of technological development that Mumford used to construct his idea of technics have not disappeared. The notion of authoritarian and democratic technics runs parallel to the distinction that divides opinion regarding the information society: whether its

dynamic is 'disclosing' or 'enclosing'. On each side of this argument one dynamic is regarded as normal while the other is regarded as a temporary aberration which will wither as the information society continues to develop. This bifurcation of normal/abnormal results in the reproduction of partial perspectives on the information society. Utilizing Mumford's work, such a separation can be dissolved but, first let me summarize the current, and widespread division of opinion over the issue of information society's underlying dynamic.

Authoritarian/Enclosing Tendencies

One broad group of commentators focus on an enclosing dynamic and regard the information revolution (the technological backdrop to information society) as involving an intensification of property relations. The ability to render knowledge and information as intellectual property rights (IPRs) suggests the information society represents an expansion of modern capitalism, not its replacement (Bettig 1997; Kundnani 1998). This perspective criticizes claims for a new period of social organization made on the basis that the raw materials which are the subject of economic activity (along with the organizational structures of such activities) having been profoundly altered by the rise and expansion of informational economics. However, the ability of economic actors to treat new forms of products and services as (intellectual) property suggests continuity not disjuncture. The underlying character of capitalism has always been the relation between property holders and those who only have their labour to bring to the market (May 1998). The information society is merely business as usual. These critics of information society have concentrated on the expansion of the private rights accorded to information and knowledge owners (Boyle 1996; May 2000). Information or knowledge may have an existence outside the private owned realm but this is increasingly a residual category, only recognized when all conceivable private rights have been established. Thus, this line of criticism concentrates on the balance between private rights and public goods in the information society, suggesting there has been an over compensation on behalf of private rights holders, to the detriment of the public realm. The enclosing dynamic disturbs previously legitimate settlements regarding private and public rights.

Any 'democratic' possibilities within the information society are overstated when seen from this perspective. For Julian Stallabrass, it:

> Is not a matter of doubting the capabilities of the technology, which has already been developed and is becoming cheaper all the time. One should be deeply sceptical, however, about who will control the information, how much it will cost, and to whom it will be sold. Technological revolutions of the past parade their many broken utopian promises.
>
> (Stallabrass 1995: 10)

The democratic potential of information empowerment is merely that, *potential*. In the real world of modern capitalism such developments are marginal leaving the real dynamic of enclosure to continue unabated. In the most extreme arguments from this standpoint, ICTs have rendered man's control of his own environment and creativity the subject of a totalized technology. George Spencer argues human beings will increasingly become irrelevant to the processes of production of goods and delivery of services. The class of individuals unable to be part of society because they lack any saleable skills will expand because this revolution unlike earlier technological developments, 'will not create a demand for new forms of labour, for it will perform an increasing proportion of all activities itself' (Spencer 1996: 75). Given capitalism's logic, no organization will retain human labour once cheap and quick computing can duplicate the task. The enhancement of control will render the system more efficient, though immiserizing large segments of the population.

In this extreme manifestation the enclosing position views the future as akin to *Bladerunner*. Resistance may be possible but it is not part of the systemic logic, it is abnormal. Or as Bettig suggests, though:

> It is possible to find sites of resistance in cyberspace, the corporate forces bringing the information superhighway on line, following the logic of capital, undermine the liberatory potential in the technology.
>
> (Bettig 1997: 154)

Any potential for democracy is undermined and compromized by the powerful and comprehensive enclosing dynamic. The information society as intensified capitalism renders knowledge and information increasingly as commodities and, continually encloses the public realm through marketization and the search for new products and services. Those who regard the potential of cyberspace as empowering, without positive and extensive effort to make ICTs fit their hopes, are mistaken if the enclosing dynamic defines the information society's developmental path. These fears fit well with the characterization of authoritarian technics in Mumford's work and, represent the centralizing and controlling tendencies of the megalopolis. However, while these concerns are legitimate, they are as Mumford suggests only one side of technological development.

Democratic/Disclosing

Arrayed against the those who regard the information society as exhibiting a harsh enclosing dynamic are those who regard the information revolution as leading to expansive human empowerment. This competing perception suggests the

information society exhibits a disclosing dynamic. Despite the opprobrium heaped on this position, it still garners considerable coverage (and indeed dominates discussion) outside the academy. For many internet democrats, the information society will be a 'Jeffersonian democracy', allowing the individual to prosper without undue interference from the 'authorities' (Barbrook and Cameron 1996). In some ways, with its regard for private property, a Jeffersonian information society might be better thought of as part of the enclosing dynamic. Yet 'democrats' like John Perry Barlow recognize that property in information resources is increasingly difficult to sustain and represents the type of control the information society is undermining. The disclosing dynamic is normalized and the enclosing tendencies represented as a threat or abnormality which either will or can be overcome: 'information wants to be free'. Information society, therefore will be built upon inter-personal relations rather than through property relations (Barlow 1996). Self-acting, self-owning individuals will be equipped to enact social relations and engage with each other.

Information society, as democracy allows individuals to express themselves outside mass parties, outside class identities, it allows a new individuality. This is the result of the vast expansion in the information resources available for individuals to make such choices. Gone is the control of information by the expert, rather we can all access the information we need without the mediation of others. Furthermore:

> The good news is that information is leaky, that sharing is the natural mode of scientific discovery and technological innovation. The new information environment seems bound to undermine the knowledge monopolies which totalitarian governments convert into monopolies of power.
>
> (Cleveland 1985: 70–1)

Information will dissolve the threads of power. Harlan Cleveland like others, argues that the flows of information will make hierarchies increasingly difficult to maintain even in formal democracies. Politics will be more concerned with people than geography, issues will become the mainstay of political interaction. In Manuel Castells' much cited trilogy, *The Information Age* he suggests politics is coalescing around symbolic issues (the environment, human rights) which are driven by the disclosure of abuses previously obscured (Castells 1997: 309ff). In Mumford's terms a democratic technics, allowing 'communal self government, free communication between equals and unimpeded access to the common store of knowledge' is emerging through ICTs' ability to make such flows a reality where previously they might have been obstructed by the structures of industrial society.

In its most extreme manifestation this position, the disclosing perspective, has a great deal in common with radical liberalism: restating conventional liberal views. Nicholas Negroponte asserts that the:

> Harmonizing effect of being digital is already apparent as previously partitioned disciplines and enterprises find themselves collaborating not competing. A previously missing common language emerges, allowing people to understand across boundaries . . . but more than anything my optimism comes from the empowering nature of being digital.
>
> (Negroponte 1996: 230–1)

Conflicts will be resolved through knowledge, education and conversation. Again emphasizing the Jeffersonian swing of the democratic/disclosing dynamic, Negroponte worries that for the Internet the 'only hazard is government in the form of politicians who want to control it' (Negroponte 1996: 234). Again, the conflicting dynamic (here of enclosure) is presented as abnormal and a danger which is at odds with the defining (and 'real') character of the information society. Mumford's human scale technics, where the tools serve individual's interest rather than the system's is implicit within such assertions. The information society in this view will allow knowledge-based power to flow down to communities and individuals rather than being centralized in government.

THE CONTINUING RELEVANCE OF LEWIS MUMFORD

Arguments regarding the character of the emerging information society can therefore be broadly divided into an enclosing and a disclosing position. While each recognizes aspects of the other, these secondary tendencies are treated as abnormal and problematic. Thus, for the enclosing dynamic, society is continuing a dynamic of commodification, the rendering of everything as property, and though aspects of the information society seem currently to be allowing contrary developments, such instances are merely transitory or marginal. Here, information society is characterized by enclosure and while this may be accepted or criticized, the systemic logic will defeat those abnormal practices which currently act to disclose information. Conversely, the disclosing position regards the dynamic towards enclosure as being merely a temporary hold-over from previous forms of social organization. Enclosure will become outmoded and impossible allowing the real dynamic of the information society (disclosure) to triumph. Enclosure is seen as abnormal and often presented as a threat from old power bases, a threat that needs to be resisted but will be defeated in time because it runs contrary to the real dynamic of the information society.

Lewis Mumford's important insight is that actually these two dynamics are not contradictory: both are continuing elements of the history of technology and its social milieu. The move to control and enclosure (authoritarian technics in its systemic mode) exists alongside the tendency to disclosure (the possibility of democratic technics). For Mumford the history of technology has been a process of interaction and conflict between democratic and authoritarian technics. These technics have not been the result of specific technologies but are the product of the social, political and economic relations in which they appear, are developed and deployed. Thus, rather than one or other of information society's dynamics being abnormal, both dynamics must be regarded as parts of the character of the information society. The dominant ontology of normality and abnormality renders the nominated dynamic as the driving force behind the information society while the other is regarded as a problem, a resistance or a misapprehension of the 'logic of informationalism'. While there may be dangers in authoritarian technics (the enclosing dynamic) these can be tempered through social and political practices. In essence, Mumford's position regards the determinism and fatalism of the enclosing dynamic as simplistic (and possibly ideologically driven), whilst also recognizing that the disclosing dynamic may under-estimate the resistance (both explicit and systemic) to the possibilities it highlights.

Therefore, an account of the information society needs to accord to each dynamic an analytical importance which does not render the other as abnormal. This suggests that analysis of the information society has to encompass both dynamics: it needs to recognize that the challenge of enclosure to disclosure and vice versa is not an abnormality but rather the way the global information society itself develops (as previous technological ages have developed). Indeed, to develop a political economy of the information society the implications of this dual dynamic need to be understood as a complex system: not as contradictory and problematic. To achieve this aim a re-acquaintance with Lewis Mumford's analysis of the history of technology is not only useful but, necessary if the sterile dispute between the enclosing and disclosing positions is to be left behind. It locates the information society in the long and eventful history of technology and, as importantly, within a history of competing technics. Additionally it explains why currently at least neither the worst fears of the enclosing dynamic have been manifest, nor the best hopes of the 'democrats' have been achieved. By recognizing this as part of an historic dialectic between authoritarian and democratic technics a complex and useful analysis of the new megalopolis, the invisible city of the information society can be developed.

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NOTES

1. Lewis Mumford's publications are extensive but also represent the continual return to themes he developed throughout his life. Therefore, for those interested in looking at Mumford's work in detail, the two books that lay out his mature perspective are the two volumes of *The Myth of the Machine* (Mumford 1966b, 1971), of which the first is more clearly argued. The shorter 'Authoritarian and democratic technics' (Mumford 1964) establishes the themes I will explore and which underlie much that Mumford wrote later in *Myth of the Machine*. Additionally Donald Miller's biography (1989) offers an excellent treatment of the development of his thought.
2. Earlier versions of this paper were presented at 'Exploring Cyber Society', University of Northumbria at Newcastle, July 1999 and, at the BISA International Relations/International Communications working group in November 1999. I thank Richard Barbrook, Robin Brown, Jonathan Nitzan and Jayne Rodgers for commenting on these earlier versions but, as always the remaining shortcomings are the author's own.
3. A useful account of Mumford's method (which, however, omits his debt to Hegel) can be found in Novak (1987).
4. In the original, Feenberg is discussing both Mumford *and* William Morris as occupying a similar position with regard to the social construction of technology.
5. While I have mainly drawn this account from the article in *Technology and Culture* (Mumford 1964), the same argument is made in substantially similar terms in *Technics and Human Development* (Mumford 1966b) pp. 234–42. Fores (1981) argues that in *Technics and Civilisation* (Mumford 1934) the term 'technics' is only a mask for technological determinism but, even if this is the case, in his later work this term is used to identify the social embeddedness of technology rather than its determination of history. Fores claims are forcefully put but take *Technics and Civilization* as a single work and are not related to Mumford's postwar shift in ideas regarding the history of technology.
6. In *The Culture of Cities* (Mumford 1940) he briefly included an intermediary phase between megalopolis and necropolis, that of 'tyranopolis'. However, this was dropped when he returned to the subject in later works.
7. I owe this point to Robin Brown.

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