

City and Technology in Social Theory: A Theoretical Reconstruction of Postindustrialism toward Sustainable Cities

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1. Introduction

The rise of the large city throughout the world during the nineteenth and twentieth centuries had an enormous impact not only on the structure of societies but also on patterns of thought. In particular, the coincidence of rapid industrialization, technicization and urbanization of social life forced social theory to reconsider the relevance of affiliation, cooperation and kinship in explaining the basis of human settlement and community. The radical reorganization of spatial structure seemed to imply an even more revolutionary change in the normative structures underlying social existence. Traditional values that had been thought to bind groups into collective forms of human association appeared obsolete or, worse still, antimodern, in the face of the emerging social order of mechanized, mass producing, and mass consuming crowds of people, buildings and things.

In the grip of rapid, overwhelming

change, a variety of social theories were written to describe the nature of the new order and to identify the role and plight of human thought and action in shaping that new order. A convention of most 20th century social theories of the city was the presumption of a tenuous relative autonomy existing between the sphere of human thought and action on the one hand and the sphere of technology, capital and demography on the other (the former is hereinafter termed the *sociosphere* and the latter the *technosphere*). Both spheres were conceived as possessing the power to change and direct to some degree the advance of urban civilization. The city in this paradigm constituted a socio spatial expression of the interplay and conflict of these two spheres. While most contemporary social theory readily conceded the shaping power of economic and technical considerations on values, it was widely assumed that individual and collective norms operated within these fields to determine which paths were acceptable and which

ones were pursued.

Recently, themes of social priorities and imperatives have been interjected into mainstream theoretical discussion which have greatly altered thinking about the issue of relative autonomy. Coalescing around the notion of "postindustrial transition," a breed of social theory and policy is emerging which stresses that contemporary society is undergoing change of a historic scope and magnitude on par with the earlier industrial urban revolution. The salient question from this point of view is how society and its institutions, including cities, can accommodate the forces of technology, capital and demography and thereby prepare its members for the new postindustrial order. The conventional debate over relative autonomy and the place of human thought and action in the onrush of technology-, capital-, and demography-driven change is downplayed, if not dismissed. Indeed, for some the preoccupation with relative autonomy represents a significant threat to social preparation of postindustrial transition. Cities and social institutions are generally conceived as instrumentalities and are to be judged by their capacities to facilitate rather than direct or specify technological, economic and demographic change. In this framework, there is common agreement that large cities need to "shrink" not only in size, economic activity and population but in social importance. They represent anachronisms of an old manufacturingbased spatial order which need now to adapt to a "new urban reality" (Peterson, 1984: 1).

Below we explore the values and implications of the new urban theory, postindustrialisms. For a

better understanding of the new urban realism, we will present the nature of the changing city-theory relations as represented by the urban historian/philosopher Lewis Mumford. This understanding of urban theories can be seen as the basis for the postindustrialist vision of society and will be the subject of the following part. A critical assessment of the postindustrial development concludes the paper.

2. Relative Autonomy Theories and Industrialization

Three strands of relative autonomy theory can be distinguished. One strand, rooted in architecture, engineering and public health, conceives the city and urban society as physical systems which undergird and support human action and interaction. While these systems serve first and foremost as instruments for human activity, they also shape and constrain the types of social action and even the purposes of such action. Indeed, some argue that there is a "very close connection between our prescriptive values concerning what we should and should not do, and our sense of what we can and cannot do" (Despicht, 1971: 64). From this perspective, the role and value of cities is to be discerned from the socio-technical relations that urban environments engender.

A second strand of relative autonomy theory, rooted in urban sociology (and to a lesser extent in social demography and geography), also conceives the city and urban society environmentally, but in this instance it is the social and moral character of the environment that is emphasized. Human action and in-

teraction is conceived as transpiring within a social and moral order of which technology and physical space are a part, but the relevance and meaning of the latter are to be sought in the larger, more encompassing social system. The city is a social setting in which ecological relations between humans as organisms and their urban environment (spatial, technological, and so on) can be studied.

A third strand of this type of theory, represented by urban economics and some varieties of urban political analysis, takes the view that the city is essentially a setting for the negotiation of advantage. Individual and collective interests are alternately served by and require certain locational or spatial features for their pursuit. Urban society is conceived as an evolutionary changing spatiolocational order that responds to the needs and desires of individuals, groups and organizations, but also acts as a constraint on them. Cities are the temporary artifacts of this negotiation process which in turn is governed by efficiency considerations and interest group dynamics.

Each strand is examined in some detail below.

1) Technological Theories

A commonplace of Western thinking since at least the 17th century has been the association of scientific and technological advance with social progress. With the spread of industrial technology in the 19th century, this association became so widely accepted that it assumed the status of ideology (Kumar, 1978). For some writers, understanding the scientific technological basis of social progress led directly and unam-

biguously to ideas on how society should be organized. Saint Simon, for example, believed that he had discovered instructions for the design of a positive social order in the logic of science and technology. He advocated a Parliament of improvement with its President being the brightest mathematician in society and its membership drawn from the best scientists and industrialists (a small number of seats would be assigned to artists). This body would then determine what was necessary to fashion a new social order according to the laws of scientific reason and technical application (see Taylor, 1975). Less ambitious, but more typical, have been efforts to apply technical thinking to solve specific social, including urban, problems.

A loosely knit movement comprised of engineers, architects and health officials set out in the later part of the 19th century to reconstruct cities along more scientific and technical lines (Schultz and Mcshane, 1978). Initially, this work was atheoretical. Members of these professions found cities faring poorly under the press of massive economic change and population increase, and sought to solve problems by changing the physical conditions of urban life. Applying technical reasoning to the design of city water and sanitation systems, their efforts were successful in stemming epidemics such as cholera and the spread of disease. Conditions in industrial cities improved and with them so did the political stature of technologists. Engineers and other professionals acquired power in the local state based on expertise. Municipal departments were created to tend to the urban technostucture and their

members were given special authorities and discretion in decision making related to city utilities. This professional group was seen as working in the objective interest of the city and its inhabitants, and was able to install planning and management practices which survive today in urban governments.

This technical interest in cities was translated into a comprehensive theory of the city by Le Corbusier who argued in *The City of Tomorrow* that:

Under the present conditions which govern our cities, everything is in confusion and at odds, nothing is really properly arranged. If things are once put into shape and order we shall be able to appreciate the calm joys of freedom. Family life could be lived in peace and the bachelor would not have the last word (1971 edition: p.220).

To bring shape and order to the crowded and chaotic modern city, it was essential that we understand its purpose. For Le Corbusier, there could be no confusion here—"A town is a tool." But in their uncoordinated, malformed industrial state, "towns no longer fulfill this function ... The lack of order to be found in them offends us; their degradation wounds our self-esteem and humiliates our sense of dignity. They are not worthy of the age; they are not worthy of us" (1971 edition: 1). If cities and society were to regain their sense of purpose, redesign on a grand scale was necessary. The principles to guide the redesign of society were available in the laws of nature. Natural order informed human order via the development of science and technology. It was this scientific technological orientation

which could provide the livable cities of tomorrow.

Science has given us the machine. The machine gives us unlimited power. And we in turn can perform miracles by its means. We have in our hands a technical equipment which is the sum of man's acquired knowledge. And armed with this equipment, with this thing that has so suddenly come into being and grown gigantic, we can create great works (1971 edition: 148).

Le Corbusier's vision of a scientifically and technologically grounded urban order has its contemporary adherents. Their diagnosis begins, as did Le Corbusier's, with the judgement that cities in the present period are technologically outmoded. In typical fashion Buckminster Fuller was more direct in his assessment than other technologists of progress.

The concept of cities as they now exist developed entirely before the existence or the thought of electricity or automobiles... Cities, as we know them, are obsolete... Trying to rebuild cities to make them accommodate the new needs of world man is like trying to reconstruct and improve a wrecked ship as the shipwreck rests upon the reef, pounded by the surf (1969: 140).

But by calling upon science and the modern technology base (this time developed from military and space exploration projects), it is possible to resurrect a working urban system. Thus, Athelstan Spilhaus in a 1968 paper sought to apply the principles of experimental science to the design of a viable city. Calling for the selective dismantling and dispersing of the "overgrown urban complex of

the U.S." (1968: 710), Spillhaus proposed the replacement of the existing urban order with "800 cities with a population of a quarter of a million each—scattered evenly across the United States" (1968: 711). These experimental cities would earn their name by using building materials which would allow most of the urban structure to be dismantled—"building for living" instead of "building forever" (1968: 712); by the development of an "invisible and inaudible underground" (1968: 712) of city utilities (including transportation); by the elimination of ground-level streets; and by the construction of a city-wide waste collection and recycling system beneath the built surface. Through the exercise of such technological vision, society can avoid "the construction of the slums of the future" (1968: 714). Buchminster Fuller proposed one million passenger vertical-tetrahedral floating cities developed in accord with the principles of a "comprehensive anticipatory design science" which would deliver us from "1966 to utopia" (1969: 143). Others offered proposals for urban systems which were less ambitious but were no less optimistic about the availability of technological solutions to the less desirable urban side effects of progress. Impressed by the achievements of the space program, some advocates of the moon-ghetto metaphor sought to "launch the aerospace companies on problems of garbage collection, education and crime-control" (Nelson, 1977: 17). Still others drew their inspiration from the proclaimed successes of the defense industry and offered proposals for city resurrection which one observer labeled "the ballistic missile

solution to the urban crisis" (Sapolsky, 1969).

Underlying all these proposals was a faith in the power of technical rationality and innovation to solve our social problems and an impatience with what were perceived to be unnecessary political distractions and distortions. While portraying cities throughout the century as moribund, contemporary technological theories have been broadly optimistic about the prospects for reinvigorating this institution. Some urban shipwrecks might have to be abandoned, but new urban technostuctures would be built to take their place. Technological progress and urban improvement would go hand in hand so long as non-objective "political" interests were kept at bay.

2) Ecological Theories

The very opportunities presented by the large city for the exercise of technological imagination were regarded by most human ecological theorists as potential threats to the normative basis of social life. In the view of social ecologists such as Louis Wirth, industrial-based urbanization was producing in its wake tendencies toward social disorganization, deviance and pathology. New normative structures and control mechanisms were necessary to prevent these socially destructive aspects from dominating the urban process.

Wirth (1969) traced the problem to the social consequences of large, heterogeneous populations living in spatially dense settlements. The increase in population size of modern cities entailed a wide range of individual variation, and a parallel growth in formal social controls such

as law, bureaucracy, and mass media. Moreover, increased size was seen as leading to impersonality, anonymity, and superficiality in interpersonal relationship. Wirth held that this situation contributed to a debased rationalism in which people regarded one another as instruments. Without collective action, things would worsen as segmental and utilitarian relationships expanded with the specialization of work brought on by technological and industrial progress. Social disorder was the most likely result.

The close physical contact engendered by high density patterns of urban-industrial settlements also contributed to the alienation of the individual and the breakdown of social norms. Insensitivity to the world of nature and to human uniqueness and intimacy were the expectable consequences of urban crowding and congestion. Similarly, the heterogeneity of city populations undermined social intimacy, encouraging instead personality types characterized by a segmental transitory orientation toward group affiliation. These anomic personalities made up a fluid urban mass easily manipulated by the mass media and mass production.

Yet while the industrial city posed severe problems to social order, it could not be abandoned. For all their social and moral deficiencies, large cities were the dwelling places and the workshops of modern men and women. Technological developments in transportation and communication had elevated the status of cities in contemporary society and had extended the urban mode of living well beyond the confines of the city itself. Industrial urban-

ization and urbanism were inescapable:

It is obviously ... to the emerging trends in the communication system and to the production and distribution technology that has come into existence with modern civilization that we must look for the symptoms which will indicate the probable development of urbanism as a mode of social life. the direction of the ongoing changes in urbanism will for good or ill transform not only the city but the world (in Sennett, 1969: 163).

Rather than resistance, Wirth advised urban adaptation to the evolving social order. Human thought action, while conditioned by the urban milieu, has social and psychological latitude sufficient to follow its own conscious dictates. Moreover, significant elements of the human environment, including technology, are selfmade and can be harnessed or altered by the exercise of rational faculties. Together these features of human ecology left Wirth optimistic about the capacity of metropolitans to substitute rational consensus and planning for traditional kinshipbased structures as mechanisms of social solidarity and psychological stability.

Lately, Brian J.L. Berry has sought to expand the ecological schools basis for confidence in human rationality. Arguing that human beings are by nature highly adaptive and mobile creatures, Berry dismisses Wirth's concern with the alienating potential of urban-industrial life. For him, the technologically driven industrial urban entity is the natural result of human progress. The emergence of "a truly national society, the rise of

a postindustrial economy, the increasing connection between social and spatial mobility, the exceptional performance of the housing industry, and progressive timespace convergence" (1981: 49) are conceived as rational solutions to contemporary urban problems. Whatever social problems that were brought on by high density, large size and heterogeneity were being solved by decentralization which Berry characterizes as "selfgenerated metropolitan growth." Also in contrast to Wirth, Berry asserts that internal community cohesion is actually strengthened by heterogeneity and the value conflicts it can engender. In Berry's analysis, heterogeneity spurs individuals to seek and maintain "enclaves of homogeneity" with the result urban geography is "exquisitely reticulated" with "homogeneous niches" (1981: 51). Berry describes the societal outcome as a "mosaic culture" in which zones of socioeconomic and sociocultural homogeneity are maintained to nourish life styles that are internally cohesive. Wirth's rational planning is not only unnecessary under the circumstances, but misguided. The seemingly unplanned character of modern urbanization is actually pervaded by human rationality. Individuals and groups discover ingenious ways of taking advantage of the urban environment and the technology it houses. Without technocratic coordination, micro-scale activities yield macrosocial order and change. Earlier centralization and recent decentralization reflect the macro-scale implications of the rational search for amenity. In our time urban form manifests the necessary elasticity to stretch and contract in order to satisfy the habitat require-

ments of rationally-guided agents. Berry projects an urban landscape characterized by "increasing scale, increasing mobility and declining density" (1981: 48) which yields a new urban entity—the "Daily Urban System" (1981: 38). This entity expresses in time and space the values, achievements and potentials of late-twentieth century civilization.

Both Wirth's and Berry's ecological theories suggest that a condition of relative autonomy and harmony is obtainable between the sociosphere and the technosphere. In Wirth's case, this autonomy and harmony can be gained with the establishment of rational planning and the organization of urban life along principles of rational consensus. For Berry, the social and the technical coexist in a natural and spontaneous state of balance brought about by the continuous exercise of human reason.

3) Exchange Theories

Whereas ecological theories place their faith in scientific rationality (Wirth) or individual rational faculties (Berry), exchange theories advance the idea of a dynamic, processual rationality (see, e.g., Shackle, 1972; and Gorham, 1969) found in the logics of market competition and interest group pluralism, this processual rationality emanates from individual and group capacities to decide/calculate their maximum interest, but it involves more than the mere summing of its parts. An "invisible hand" is described as operating beyond the particular calculations of rational agents which integrates them into an efficient solution (defined as the maximization of net benefit for a given level of resources). Cities as

places and urbanization as a process of spatial organization are both analyzed within this framework of processual rationality and efficiency.

Urban economics presents perhaps the most sophisticated version of exchange theory applied to the analysis of cities. A commonplace of this urban vision is the conceptual device of a "featureless plain" on which "land is bought and sold by free contract, without any institutional restraints and without having its character fixed by any structures existing upon the ground" (Alonso, 1964: 18). The value of this device is that it exposes the role and dynamics of a processual rationality in the economic exchange of location and space. Rational agents can be seen to move freely and instantly in this environment to exploit economic advantage wherever it may be found, thereby establishing a market and exchange values of different locations. Over time these location "rents" lead to a comprehensive economic evaluation of different modalities of spatial organization and distribution of social activities, thereby producing a macroeconomic market for urbanization, suburbanization, multinucleation, etc. Finally, the exchange values of location and space are recognized to be in competition with other resource uses yielding in composite a system of prices which designates the social value of more vs. less of anything relative to everything else. Rational agents adjust their holdings in light of these value margins and a society-wide state of economic efficiency is achieved. The deductive power of this analytic fiction has proved to be substantial. Under its guidance, urban economists throughout this

century have sought to explain city locations, expansion and contraction, as well as the processes of concentration/deconcentration and centralization/decentralization. Edgar M. Hoover, writing on urban economics for over four decades, synthesized the results of this effort in suggesting that the evolution of cities can be explained in terms of a market mechanism for efficient allocation of space and location "to uses and users who can exploit them to best advantage as measured by their willingness to bid" (1975: 14).

Kenneth Arrow echoes this judgement when he suggests that, "the historical development of cities and metropolitan areas and their growth relative to the rest of the country is in large measure the natural and beneficent result of economic forces" (1969: 14).

What has made cities and urbanization valuable throughout most of this century, in this view, is their agglomerative economies, that is, their massing of resources, labor and markets in a compact and often distinct location (e.g., near the mouth of a river or mine) which enables a multiplying and quickening of exchange at an enormous scale. Indeed, William Baumol suggests that the origins of cities can be traced to their agglomerative potential: "When enough economic activity lay close to a terminal and, for lack of cheap and rapid transportation, the labor force also resided nearby, that automatically became a city" (1984: 4).

Recent deconcentration trends are taken to reflect a shift in relative exchange values. The once mutually beneficial nature of agglomerated urban settings has been superseded by a less densely organized spatial

order which better suits the new communication, transportation and production technologies. In turn, these technological changes represent responses to opportunities for greater economic efficiency in the manufacture and delivery of desired goods and services. A new spatial equilibrium is being established in which optimum central city size will be smaller because the exchange value of concentrated space has eroded relative to other commodities. But while reduced in economic value, cities nevertheless remain attractive for some social activities and functions. Their "residual economic advantages" include the headquarter services, variety retailing, and cultural storehouses found within their boundaries. So far, the exchange value of these urban components is sufficiently competitive to sustain the city as "a very viable economic entity, albeit one which is very much smaller than it once had been" (Baumol, 1981: 12). As in all things economic, "change is just a matter of degree" and the "longrun prognosis" for cities in the midst of the current technologically induced spatial reorganization is "relatively encouraging" (Baumol, 1981: 6, 10).

The interplay of technology, economics and politics is taken to be guided by a process of rational exchange. Individuals and groups make known their desire by posting their "willingness to bid" and these bids then form the basis for trading among different goods and services. Cities and spatial organization generally are one of the commodities of exchange. As such, cities serve the instrumental needs of society for location and space, and exist in particular forms and sizes only so long as they satisfy these needs.

By far, exchange theories represent the most confident variety of relative autonomy thinking. Human thought and action are conceived as having wide berth in influencing and indirectly controlling the technosphere through markets and pluralist political processes.

3. Postindustrial Theories and the New Urban Realism

Recently, a body of policy prescriptions with limited theoretical input has been proposed which challenges the view that technology, capital and demography threaten the autonomy of human thought and action. This work builds upon the early efforts of Daniel Bell (1967) and Edward Banfield (1970) to enunciate a postindustrial vision of society in which the technosphere is understood, ultimately, to be socially benign. The speculations of these authors received a stormy reception when they were originally proposed. However, over this decade there has attained the status of theoretical and policy legitimacy to such an extent that it would be seen appropriate to consider this framework the new mainstream. This status seems especially warranted in the case of urban theory and policy.

This vision has received support recently in a 1980 a presidential commission report, *Urban America in the Eighties*, a 1981 National Research Council study, *Rethinking Urban Policy*, and a 1985 Brookings volume, *The New Urban Reality*. All this body of work suggests that "the urban problem" needs to be reconceived. While much of 20th century social theory and analysis has sought to relate cities and their problems to the dynamics of an

industriallybased urbanization, the postindustrial vision regards the industrial era as coming to a close, if not over. In this view, a new dynamic has been guiding cities and societies for some time now. This dynamic has its roots in technological, economic and demographic developments which stress the need for a spatially deconcentrated, servicebased, production consumption system. Innovations in transportation, communications and energy technologies have relieved societies of their dependence on spatial agglomerative economies and businesses and residents are responding by moving out of central cities, and even beyond the urban periphery.

Beneath the spatial dispersion of population and economic activity, a web of technological and economic structures has been detected by postindustrialists which are believed to give centrifugal form and direction to an otherwise centripetal-looking process. The new technological and economic order obeys and underlying logic of efficiency which is yielding coordinated, centralized "command-and-control" centers that are neither spatially nor locationally constrained (National Research Council, 1983: 38-58). In fact, the new order is global in organization and scope. A post-industrial world does not require large central cities, David Lewis had forecasted in 1969 that:

The United States as a whole has become a complex network of communications and services and every major city, and thus every citizen, is a component of this intricate network—connected by telephones, and television, power grids and consumer production, airways and

highways.

The closed urban form, the finite and mononuclear city of tradition, gives way to a new species of urban form in which the basic factor is mobility; an open-form in which the basic factor is mobility; and open-form, multinuclear, multidirectional city—a city which is infinitely additive and infinitely variable in its capacity for growth and change (1969: 302, 303).

Sixteen years later, Paul E. Peterson, editor of the 1985 Brookings study on *The New Urban Reality*, summarizes the position taken toward cities and confirms Lewis judgment: "The industrial city has become an institutional anachronism. If the great manufacturing centers of Europe and the American Snowbelt developed as by-products of the industrial revolution, their decline is no less ancillary to contemporary technological change" (1985: 1).

In the new postindustrial order it is necessary to cut our national, political and social ties with the traditional city, which has become obsolete. In fact, the abandonment of cities in national policy has the status of social imperative (Byrne et al., 1985). As the 1980 presidential report *Urban America in the Eighties* (UAE) counsels, "there are no national urban problems" and placing "the swirl of local and regional concerns ahead of an overall concern for the nation is both inappropriate and illadvised" (1980: 99, 100). An entirely different policy orientation is needed which recognizes that "a new urban system is emerging" based on mobility and adaptation to change (Hanson, 1984:

52). The future importance of cities as places is in doubt. A period of "policyguided disinvestment" and urban "slenderizing" is necessary to prepare American society for the global, competitive order of post industrialism (UAE, 1980: 105). For this reason, placeoriented policies must give way to peopleoriented one. Of greatest importance are policies which focus on the people-to-jobs nexus and are studiously neutral as to either the place of those jobs or the place of the prospective worker. Sectoral employment and development strategies which invest in the "strongest" industries should replace traditional urban and regional planning for balanced growth (National Research Council, 1983: 180-181). The plight of "less resilient areas" (National Research Council, 1983: 182) cannot be overlooked, but under no circumstance should national policy be structured around priorities to address the needs or conditions of these areas:

Instead of developing remedies on behalf of urban areas, the federal government should concentrate its attention on policies that have no specifically urban component to them at all... The best urban policy, and the one most in keeping with American traditions, would thus not focus on the special needs of cities at all. Instead, it would be directed toward dispersing racial concentrations by increasing the choices available to racial minorities (Peterson, 1985: 25,26).

The consequence of such a policy orientation is intended to be the reduction of the social and political status of cities in society. As Peterson puts it, "cities must simply accept a less exalted place in

American political and social life than they one enjoyed" (1985: 1). The diminished importance of cities is only rational given that they are "no longer the most desirable settings for living, working or producing" (UAE, 1980: 4). Contemporary postindustrial analysis is toughminded in this regard: "Industries rose and fell—and so did empires, and so did cities" (Fallows, 1985: 47). Efforts to resist change are not only futile but dangerous: "A rebuilt South Bronx can only lure the jobless into remaining longer—reconstructed homes will be transformed into slums soon enough, and—the torch will be back at the task of destroying them" (Baumol, 1981: 13). Rather than undertaking "a counter productive effort to keep losers afloat" (Long, 1983: 21), the appropriate national response is to allow "the fates and fortunes of specific places—to fluctuate" (NAE, 1980: 65).

In the postindustrial vision, the concepts and analytic frameworks of traditional urban geography, demography and economics, regional science, and even urban politics and sociology have little, if any contemporary relevance (Byrne and Martinez, 1987). Agglomerative and localization economies, compaction dynamics and landuse specialization can still be recognized, but the study of these urban features can only reinforce a sense of the declining significance of urban places. Multinucleation, polycentrism, population size, density and distribution may be interesting topic for urban geographers and demographers to investigate, but the study of these things is not terribly important from this perspective. And the notions of democratic citizen

ship and community as locally rooted are projected as quaint but outmoded ideas of a bygone era.

From a postindustrial perspective, the relative autonomy problem is selfcontradictory. If one favors objectively-based, technologically-led patterns of social development, one should favor urban decline in our age. If one favors a rationally organized society built on consensus, the message is identical—urban decline is necessary. And certainly if one favors economic progress, the inescapable conclusion is that urban decline is desirable. Indeed, postindustrialism embodies an inevitability theses within its logic. The underlying forces of societal change are beyond social choice. Economic, demographic but, especially technological considerations dictate the direction and course of change. Social accommodation rather than social choice is required. If all goes as forecasted, the deteriorating state of cities confirms both the autonomy of the technosphere in matters of societal change and the futility of policies and plans to reverse the situation. The sacrifice of cities as social institutions is logical, necessary and efficient. And in any event, it couldn't be otherwise. There is no urban crisis, only transition.

4. Counter-Theories: Technology and the Loss of Social Balance

The implications of postindustrial thinking extend well beyond the abandonment of cities as significant social institutions. Social understanding of the relations of human thought and action to the technosphere is radically altered under this doctrine. The work of three

counter-theorists—Lewis Mumford, Jacques Ellul and Langdon Winner—can be used to expose the nature of this change in understanding and to point out why the postindustrial orientation constitutes a direct threat to human thought and action.

In his *Technics and Civilization*, Lewis Mumford records the transformation of Western societies from communities of self-reliance to machine collectives based on surplus production. A similar theme is found in *The City in History* and in *Myth of the Machine*, volumes 1 and 2. This machine inspired transformation directly challenged longstanding ideas of community as the traditional guild city was overwhelmed by the values of the new technics. For Mumford, urban settlements in the prepaleotechnic period¹⁾ were constituted on a harmony between the socialcultural and the technical-economic. Every artifact from the tool to the market was scaled intentionally to facilitate social control and authority over its development. The civis exhibited balance between technological-economic capacity and the needs of urban life.

As an paleotechnic civilization evolved, all possibility of a condition of balance among cultural, religious, social and political activities on the one hand and economic and technical pursuits on the other had been destroyed: "every part of the city (has been turned) into a negotiable commodity" (1961: 446). In place of this possibility, and imbalance of technics and economics rules as a "tendency toward settlement" has been overwhelmed by the universalizing Paleotechnic "tendency toward movement" [1945]. The streets are turned into thoroughfares for the promotion of trade; the "organic

tissue of neighborhoods and smaller communities" is under continuous threat (1961: 552). Expansion becomes an end in itself and leads to congestion on a mass scale. There was and is, no way out of the expansion-congestion syndrome; "congestion and expansion are in fact complementary movements" (1961: 551). Movement away from the megalopolis simply adds to its reach. Cities have lost their distinctive spatiality and with it an essential aspect of their social meaning. They are borderless spaces, "formless urban exudations" (1961: 505) which are literally bursting at the seams. It was the task of social theory to halt this social retrogression by conceiving an urban society which affirmed rather than attacked life values.

[A]n orgy of uncontrolled production and equally uncontrolled reproduction machine-fodder and cannon-fodder: surplus values and surplus population—The dirty crowded houses, the dank airless courts routinized and dehumanized factory, the drill schools, the second hand experiences, the starvation of the senses, the remoteness from nature and animal activity—here are the enemies. The living organism demands a life-sustaining environment (1961: 263, 248).

Postindustrialists advocate the replacement of the social with the technical. By Jacques Ellul's analysis, this process has been under way since at least the 18th century. It is not whether or when, but how and why technique has effectively assumed complete power in contemporary society that is at issue.

Technique, "the totality of methods rationally arrived at and

having absolute efficiency in every field of human activity" (1964: xxv), is conventionally conceived as the servant of human agents. For Ellul, this folk wisdom masks completely the scale and extent of the competition between the social and the technical. Since the era of industrialization and urbanization began, society has been under constant scrutiny and criticism by the technical view. A battle for authority and legitimacy has been waged between the social, a normative entity and technique, the objective entity. The advantage of the technical view, when the issue is posed in these terms, is so pronounced that the latter's dominance should come as little surprise.

Technique is a means of apprehending reality, of acting on the world, which allows us to neglect all individual differences, all subjectivity. Technique alone is rigorously objective. It blots out all personal expression. Today man lives by virtue of his participation in a truth become objective. Technique is no more than a neutral bridge between reality and the abstract man (1964: 131).

It is the hallmark of technological society that the choice between objective and subjective paths is routinely and always decided in favor of the former.

Less well-recognized is the capacity of technique, once chosen, to substitute its own logic and requirements for these conventionally assumed to be the exclusive or distinctive province of human association. But as Ellul observes,

Technique ... creates a bond between men. All those who follow the same

technique are bound together in a tacit fraternity and all of them take the same attitude toward reality. There is no need for them to converse together or to understand one another. A team of surgeons and assistants who know the technique of a given operation have no need to address one another in order that the necessary motions be correctly performed at the right moment ... Technique is of necessity, and as compensation, our universal language ... Today the sharp knife of [technical]specialization has passed like a razor into the living flesh. It has cut the umbilical cord which linked men with each other and with nature. The man of today is no longer able to understand his neighbor ... He no longer understands the vocabulary of others. Nor does he comprehend the underlying motivations of others. Yet technique, having ruptured the links between man and man, proceeds to rebuild the bridge which links them ... It produces a new type of man always and every where like his duplicate, who develops along technical lines (1964: 131-132).

The spread of the technical view in our era across geography and culture is also poorly understood.

In all countries ... there is a tendency to apply the same technical procedures ... In the course of history, there have always been different principles of civilization according to regions, nations, and continents. But today everything tends to align itself on technical principles. In the past, different civilizations took different "paths"; today all people follow the same road and the same impulse. This does not mean that they have all reached the

same point, but they are situated at different points along the same trajectory (1964: 116-117).

Technical invasion is a commonplace, according to Ellul. Nontechnical cultures collapse in the face of technical culture because technique is modernly regarded as indispensable for progress. These two capacities of technique—to replace altogether the social with the technical and to spread without regard to geography or culture—point to the most chilling future of technological societies, their totalitarian orientation. Technological society's procedures, policies, values, and even the thoughts and actions of its members, fall under technical evaluation. Nothing can be spared technical consideration in the pursuit of "the truth become objective." How can a technological society rationally prevent objective analysis? Technique can leave nothing untouched in a civilization. Everything is its concern ... [I]t is a whole civilization in itself" (1964: 125-126).

In a world covered with "networks of waves, wires and paper" (1964: 145), autonomy has indeed passed from the sociosphere to the technosphere. But contrary to post-industrialist ideology, this passage is anything but liberating:

All the business of life, from work and amusement to love and death, is seen from the technical point of view. The number of "technical slaves" is growing rapidly, and the ideal of all governments is to push as fast as possible toward industrialization and technical enslavement (1964: 117).

There is undeniable truth in the postindustrialist proposition that

nonadaptation to the technological requisites of modern society courts disaster. Langdon Winner has put the matter bluntly: "certain technical means stand at the very basis of human survival. Failure to provide for them is to invite discomfort, suffering even death" (1977: 102). Precisely because technology can be essential to social existence, it is accorded in technological society the status of a moral standard. Through its association with survival and comfort, technique furnishes root meanings of good and bad, necessary and unnecessary, appropriate and inappropriate. Moreover, technical criteria are regularly employed to judge social alternatives. The consequence of this invasion of technical values is the subordination of the political: "the rule of technological circumstances in the modern era does in fact supplant other ways of building, maintaining, choosing, acting and enforcing, which are more commonly considered political" (Winner, 1977: 237). In this respect, technique offers not merely a means for fulfilling an end but also a framework of moral and political judgments that defines social needs and judgments.

These developments threaten to cut off humanity from its own subjective being. With technique's assault on moral and political thought and action, human beings are left without a sphere of conscious purpose. Human life is reduced to a string of technical episodes with our body parts exerting the needed operations; an assessment reminiscent of Marx's, when he suggested that capitalism debased labor to the point where the laborer merely carried out the act of

"watching the machine with his eyes and correcting its mistakes with his hands... In the factory we have a lifeless mechanism independent of the workman who becomes its mere appendage" (Marx, 1987: 409, 461-462).

5. Toward a New Theory of Sustainable Cities

Traditionally, social theorists understood cities as expressions of the common good. *Civitas*, the Latin root for city and citizen, expressed the transformation of societies from a social mass ruled by force and the scarcities of nature to one based upon community and a shared political vision. This community exercised social choice in an endeavor to create and sustain the common good. In essence, the city was understood as a source of, and even a requirement for, the attainment of civilization.

The machine inspired transformation of Western societies directly changed the long-standing ideas of communities of self-reliance to machine collective based on surplus production. An ideology of industrialism pervaded the new social order rationalizing the dehumanization of urban life. By the 1930s, even conservative strands of urban theory realized the dilemmas posed by industrial urbanization and sought their remediation through national policy or efficiency negotiation. Industrial cities were still the place of conflict between *sociosphere* and *technosphere* with the relative autonomy.

However, in postindustrialism the earlier theoretical concerns with the questions of relative autonomy are dismissed because postindustrial

forces are alleged to be benign servants of humanity. Abandoned by postindustrial orientation is the prospect for livable cities. The only significant role left to cities is to surrender whatever remaining economic assets they might have to those economic agents which can make the highest and best use of them. Community role in this framework is to adapt to change, not to influence it. For which we were counseled to develop "incubators" and "enterprise zones" to spin-off new enterprises; "technology centers" to hatch new ideas; and "economic intelligence systems" and "formation sentries" to monitor progress at transition and to identify "midlife retooling" needs. In the postindustrial vision, the fixed boundaries of physical space becomes to be superceded by forces of "variable geometry" as a "pace of flows" substitutes for a "space of places" (Castells, 1985: 14-15).

If all goes as desired, the new postindustrial order will be, as far as possible, featureless. In that way, a vibrant life of perpetual motion can be enjoyed by one and all. Before we dismiss the urban crisis and accept the postindustrial world of vibrant motion, we need to develop a new theory of cities, furthermore society, in which the cities recover their sociosphere and self-reliant ecosphere, what we would call sustainable community.

A sustainable development of cities recognizes the finite capacities of the current resource base, and embraces the goal of balance in sociosphere and technosphere. Characteristics of the postindustrial growth and sustainable development models are contrasted in Table 1.

The characteristics of the con-

ventional growth model embody the objective of wealth-creation, as decisions are based upon the economic costs of production, and the definition of viable options is restricted to those that can be incorporated into the existing infrastructure. The tendency has been toward the development of not only large-scale technical systems, but also toward centralized control, which has expanded to an international scale. Within this framework, conventional growth as been typified by the development of urban/industrial based centers of production.

Reversing or halting the resource-intensive and socially destructive modes of growth requires a re-orientation of urban values, goals and interactions to one that encompasses an ideology of sustainability. Urban community, energy efficiency and environmental protection become primary goals of this alternative view of development, refocusing societal emphasis away from short-term economic advantage and toward longterm viability; away from economic cost and toward social and environmental concerns.

The concept of sustainable cities is founded upon the interaction and mutual dependence of society and the environment. Environmental impacts are to be treated as central concern in economic decision making, stressing the preservation of resources and patterns of growth which enhance longterm economic viability and environmental integrity. Economic growth remains a dominant goal of development in the sustainable model; however, improved efficiency in the use of energy and environmental resources is viewed as essential to long-term

Table 1. Development Models: Comparison

| Postindustrial Growth Model | Sustainable Development Model |
|---|---|
| ⟨City⟩ | |
| <ul style="list-style-type: none"> • Goal is profit maximization. • Commodity oriented • Urban/industrial-based centers of production • Consumption driven • Cities are seen as "factors of production" | <ul style="list-style-type: none"> • Goal is long term growth/viability • Community oriented • Regionally dispersed centers of production • Consumption/conservation in balance • Cities are seen as limited, vulnerable, requiring stewardship |
| ⟨Technology⟩ | |
| <ul style="list-style-type: none"> • Large scale • Central/international system • Technology choice is driven by industrial infrastructure needs • Technical decisions governed by production/economic costs • Limited technical options <ul style="list-style-type: none"> -those that fit are favored | <ul style="list-style-type: none"> • Small to moderate scale • Decentralization/locally responsive system • Technology choice is user driven • Technical decisions governed social/environmental costs • Multiple technical options <ul style="list-style-type: none"> those that create flexibility are preferred |
| ⟨Energy⟩ | |
| <ul style="list-style-type: none"> • Fossil fuel-based • Goal: to secure abundant, low cost supply • Reduce vulnerability by diversifying sources of supply • Energy/technology-focused • Efficiency in economic production <ul style="list-style-type: none"> -scale economy -technical efficiency | <ul style="list-style-type: none"> • Greater use of alternative energy sources • Goal: to secure end use efficiency • Reduce vulnerability by reducing energy intensity • Energy/environmental conservation-focused • Efficiency in end use/energy services <ul style="list-style-type: none"> modularity energy efficiency |
| ⟨Environment⟩ | |
| <ul style="list-style-type: none"> • Ecological assumption <ul style="list-style-type: none"> -humans dominate the environment • Environment is seen as an abundant source of commodities • Environmental impacts external to economic choice • Use strategy: intensive, governed by economic profitability | <ul style="list-style-type: none"> • Ecological assumption <ul style="list-style-type: none"> -humans/nature are mutually dependent • Environment is seen as exhaustible, but sustainable resources • Environmental impacts central and internal to economic choice • Use strategy: selective, governed by conservation principle to ensure long term economic viability <ul style="list-style-type: none"> non economic dimensions |

productivity, and future, as well as present, needs are considered to be of fundamental significance. As stated by the World Commission on Environment and Development:

Sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technology development, and institutional change are made consistent with future as well as present needs (World Commission, 1987: 9).

Sustainable versus postindustrial growth models of development juxtapose urban, energy and technological concerns with economic considerations, and efficiency in the use of environmental resources. The sustainable growth technology which is characterized by small to moderate scale systems that are responsive to needs and flexible in use can be contrasted with conventional large-scale systems that define and circumscribe technical options. Finally, postindustrial growth embraces the goal of maximum profit, while a perspective of sustainability incorporates social/environmental costs of development. While the goals of sustainable development are applicable to all countries, both developed and developing, the paths by which countries reach these goals will vary according to existing conditions and institutional frameworks.

6. Conclusion

Postindustrial theory and ideology proposes that in the parallel demise of cities and ascendance of technology, economy, and demography as shaping forces of society, a liberative

age is upon us. The legitimacy accorded postindustrial view in contemporary society should, at the very least, alarm the theoretical community. Certainly, the sustained efforts of Mumford, Ellul and Winner to warn us of the stakes involved when social institutions such as cities are sacrificed for efficiency should be sufficient to end what has so far been an eerie silence.

It is a critical time for efforts to secure an affective urban framework to promote sustainable development. Successful development of an energy-efficient, environmentally sensitive cities will empower developed and developing countries to advance their social aims while avoiding many of the security, pollution and inequality dilemmas that have accompanied conventional industrial development.

Note

- 1) Mumford divides history into three periods: the Eotechnic phase which covers preindustrial society, the Paleotechnic phase which covers industrial society, the Neotechnic phase which covers postindustrial society.

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