Urbanization: A Doomed Experiment?

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URBANIZATION: A DOOMED EXPERIMENT?

TIMOTHY C. WEISKEL

Our repeated failure to create sustainable cities may condemn the human species to extinction.

Current patterns of global urbanization threaten the continued existence of humanity to a degree that makes even the epic political events of recent times seem like just so many petty distractions. Indeed, each of these events is perhaps best understood as a partial, delayed or localized manifestation of the underlying tensions inherent in what anthropologists have come to call the urban transition in the human evolutionary experiment.

The human experiment

We are not accustomed to thinking of ourselves as an evolutionary experiment. The idea seems a bit unsettling. It suggests that things are still open-ended, that not all the results are in, that experience is only tentative, and that the whole enterprise might fail. Of course, in evolutionary terms, the human enterprise might well fail. If the past is anything to go on, this seems quite likely. As any paleontologist can tell you, by far the vast majority of all species that have evolved over the course of the earth's history have met with extinction. From an evolutionary perspective, then, why should our fate differ from that of other life forms?

Some people would argue that this is pessimistic poppycock. We are, so they would assure us, exceptions to the general evolutionary pattern. Our consciousness, intelligence and inventiveness — in short, our capacity for culture — set us apart from natural evolution. Yet the troubling truth is that this may not prove to be so. In evolutionary terms, our much-touted capacities of consciousness, intelligence and inventiveness may not prove to be adaptive species traits in the long run. Ever since the beginning of recorded history, there is ample evidence that these abilities have been deployed by humans with depressing regularity and alarming success to kill fellow human beings. We have become so efficient at this deadly business in our day that serious discussions are still conducted in terms of calculated margins of "overkill" — as if it were possible to kill a life form more than once.

More to the point, weapons are not the only problem that threaten our survival. Even if human warfare can be overcome forever, we are no longer safe on this small planet we call home. In effect, we are just now beginning to discover that one of our major attributes as a species seems to be our wilful or inadvertent tendency to destroy our environment and the habitat or life support systems of other species upon which we ultimately depend for our collective survival.

Ecologists affirm a singular, sobering and universal law of nature: no species can outlive its life support system. Humans will be no exception to this rule. Our uniqueness may consist simply in this: we are perhaps the first species with the genius to design and engineer the processes that lead to our own destruction. Despite all our self-awareness and cleverness, our science and technology, our wit and our will, we may not possess the collective wisdom to avoid extinction.

The urban transition in the evolutionary context

It now seems clear that whether we will survive for very much longer as a species hinges on our capacity to engineer a durable transition to sustainable urban life. This may seem an unusual way to characterize the human predicament, for at first glance, it would appear that this transition occurred long ago. Humans have been living in cities for 6,000 years — perhaps even longer. In the 1930s the famous archaeologist, V. Gordon Childe, highlighted the antiquity and significance of the first forms of human urban organization during the fourth millennium BC. Childe spoke of

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Jerusalem Rebuilt: ***copper engraving, English 1688, from*** **History of the Old Testament,** ***Royaumont***

an "Urban Revolution" as important as the earlier Agricultural Revolution or the later Industrial Revolution. Since his time, scholars have disagreed on the evolutionary importance of urbanization and the preceding process of human self-domestication.

The debate over urbanization and its relative importance in the continuum of human evolution will doubtless continue for decades to come. But for those concerned with contemporary problems, the controversy is likely to remain frustrating and inconclusive because what is at stake is a deeper debate about human nature. Different observers seek to locate the essence of the human experience in differing capacities of the species. They thus tend to assign the urban phenomenon varying degrees of positive or negative valence or determinative importance, depending upon how they judge cities to enhance or inhibit these quintessentially human attributes.

Toward an ecological understanding of urban dynamics

However we choose to evaluate the urban experience, we can nonetheless make a whole range of valid, interesting and practical observations about urbanization relatively independent of value judgments. Cities are, after all, ecological phenomena, and as such they can be measured, modeled and monitored in much the same way as other dynamic systems. Moreover, the new field

of environmental archaeology makes it possible to sift the sands and sediments of time for clues about cities and civilizations long since gone. Thus, the range of comparative and historical evidence before us on the dynamics of urban phenomena is really quite vast and potentially very useful if only we would begin to read it.

In the main, the patterns that emerge from the data are not encouraging. The evidence indicates that, for whatever reason humankind chooses to build them, cities have generally not proved to be ecologically sustainable. In "The Origin and Evolution of Cities," an article published in the September 1965 issue of *Scientific American*, the eminent scholar of pre-industrial cities, Gideon Sjoberg, observed: "There is a significant relation between the rise and fall of empires and the rise and fall of cities; in a real sense history is the study of urban graveyards." The human transition to urban existence began 6,000 years ago, but it is by no means complete. The Urban Revolution may well have been proclaimed, but it has not been achieved. Despite six millennia of experience, we have not yet learned as a species to construct urban environments in which we can live on a sustainable basis.

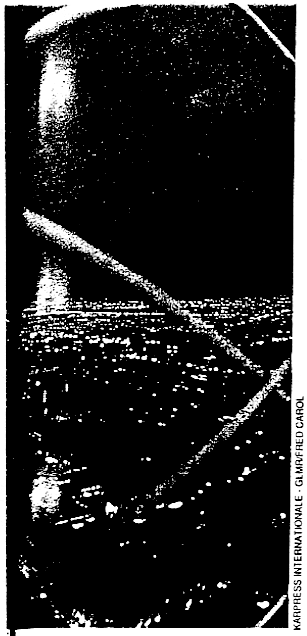
From the 44th floor of the Torre Latino America, the Mexican "Empire State Building," what will soon be the world's largest urban agglomeration spreads out.

The nature of economics and the economics of nature

The reasons for this repeated failure seem to lie in the fundamental contradiction between the nature of economics and the economics of nature. The dynamic interaction between these two orders of phenomena can provide us with a broad ecological framework for understanding and potentially controlling the repeated pattern of boom and bust, expansion and collapse, and rise and fall so frequently documented in the history of urbanization.

Ever since the emergence of urban organization, human economic systems have been characterized by an apparently inevitable tendency toward concentration of capital and power. Economies of scale make it possible to produce or trade more goods with fewer inputs of energy and material. This process, in turn, facilitates the accumulation of surpluses, which can, over time, be further applied to increasing the efficiency of production, trade or raw material extraction. The entire process is what ecologists would call a "positive feedback loop" — a self-generating, self-perpetuating and expanding syndrome, based on metaphors of seemingly limitless growth. It is for this reason that once cities begin to appear in the archaeological record they very rapidly expand outward, extending themselves in networks of communication and hierarchies of control over entire regions as organized states and empires. The whole phenomenon takes place in the period of a few centuries at most and frequently within the space of only a few decades — a mere blink of an eye in evolutionary time.

In the economy of nature, however, concentrations of anything are precarious and unstable. The economy of nature works at fundamental cross-purposes with the nature of human economics. Rather than tending toward concentration, the economy of nature tends toward maximum dispersal. The economy of the natural world is, after all, based upon materials cycling and primary production — that is, the capture of solar energy in chemically bonded form through the process of photosynthesis. Materials cycling and photosynthesis are both pre-eminently decentralized and highly dispersed processes. Most of the important "turnover" in the economy of nature goes on in ways that are inherently difficult to monitor, control or manage, let alone profit from. Indeed, accumulation and the positive feedback loops that generate it are seen in nature's economy to be transitory states subordinated within larger negative feedback mechanisms that assure the stability of the system as a whole. While growth exists in the economy of nature, it is best understood as a transient phase on the way to maturity of a population or community. The search for perpetual growth of any one component within the system would be both silly and suicidal.



KARPRESS INTERNATIONALE - GILMRFIED CAROL

To put it another way, human economies tend to emphasize extraction, production and growth processes that benefit the human species, with relatively little attention given to the "service" sector for the provision of other species' needs. Nature's economy, however, is designed primarily not as a production-driven economy, but rather as a "balanced service economy," meeting the needs of a wide variety of plant and animal species. In this kind of economy, practical upper limits are placed upon the extractive, productive and growth activities of any one species by the overall imperative of providing services for the whole community of interdependent life forms.

For short periods of time, it may well appear that a particular species can hijack nature's economy for its own net benefit, but this is a passing phenomenon. No life form can live in an environment consisting only of its own waste products, and as a result it can survive in the long run only by seeking to provide life support services to a whole range of other species that will assure the continuity of system-wide metabolic processes. In *Fundamentals of Ecology* (Philadelphia, 1971), Eugene Odum, the senior statesman of ecosystem studies, has described the contrasting logic of the two economic systems quite succinctly: "Nature maximizes for gross production, whereas man maximizes for net production."

The important insight for public policy figures to keep in mind about the conflict between human economic systems and the economy of nature is that ultimately nature's economy wins. While the two economic systems can work at cross-purposes for varying periods of time, they must ultimately be reconciled, and in that reconciliation, human economies are re-adjusted to operate as radically reduced subsets of natural ecosystemic processes. This is so because the earth itself is a closed material system subject to rates of materials cycling that are part of broad bio-geochemical processes.

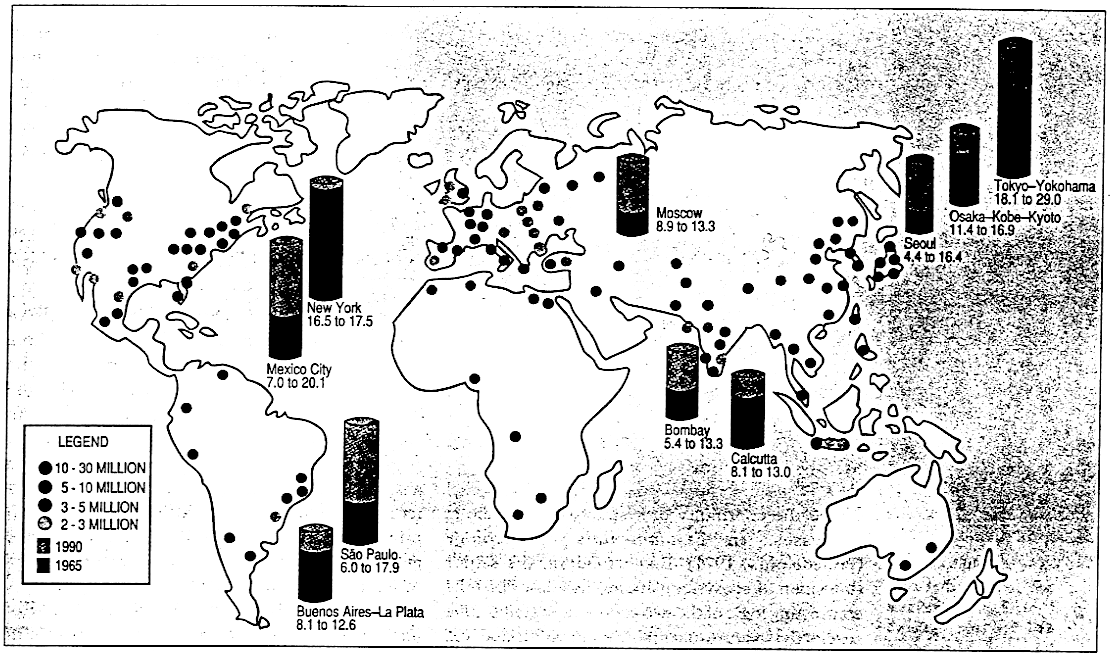
Lessons from a historical and ecological perspective

Although the ecological analysis of cities and the environmental history of past civilizations may seem remote to policy makers in our day, these studies may provide the best single source of metaphorical and allegorical insight needed to guide and shape large-scale contemporary planning processes. Designers, urban planners and politicians would do well to study the ecology of ancient Athens for clues to contemporary survival. At the very least they would discover that historically the growth of cities has been accompanied by the degradation of land resources in their vicinity as well as the acceleration of regional soil erosion and estuarine siltation. It is also valuable to recognize that cities have tended to have a devastating impact on the biodiversity of their surrounding regions, reducing enormous human populations to near-total dependence on a radically reduced range of plant species. While economists tend to focus on the processes of accumulation facilitated by cities — and therefore have emphasized that urban growth is a positive good and serves to stimulate economic activity in proximate rural areas — they have generally underestimated the ecological costs involved in these periods of economic efflorescence. These ecological costs can no longer be left out of the equation.

In the long run, when accentuated urban growth has been fueled by accelerated resource extraction in proximate areas, leadership in the cities has time and again been faced with the dilemma of diminishing returns. In this situation, either it can choose to increase the rate of localized extraction, thereby accelerating resource depletion and risking social revolt, or it can seek to satisfy its needs from further afield through trade, out-migration or systematic colonization. Since greater margins of profit can be obtained from foreign trade with communities opening up new agricultural lands, the comparative advantage of agriculturalists in the immediate proximity of cities declines, and they frequently migrate off the land and into the city. This process, in turn, aggravates the expansion of the urban population, which can now be adequately provisioned only by reaching further and further afield for foodstuffs, fuel and materials. In ecosystemic terms it is possible to say that once they emerge, cities become expanding organisms acting much like parasites on their surrounding regions.

Throughout this entire positive feedback process or syndrome, there is a steady transfer of effective decision-making power over the use of rural resources out of the hands of the rural populations themselves and into the hands of those who control urban economic assets and grain surpluses. The result is that subsequent systems of agricultural production are frequently designed or imposed with little or no reference to their long-term ecological sustainability. Those who are in a position to make the key economic decisions are often poorly informed about rural ecological circumstances, while those rural populations most closely aware of the ecological limitations of the land are no longer in a position to determine economic decisions. Consequently, policies that are clearly irrational from an ecological perspective are nonetheless pursued time and time again because of their immediate economic rationality to urban elites. An ecologically rational yet urban-originated agricultural policy may well prove to be a logical impossibility.

THE WORLD'S LARGEST METROPOLITAN AREAS



Source: Population Crisis Committee, Washington 1991

If these syndromes of growing urbanization and consequent rural resource depletion persist over time, they are likely to take on a markedly violent character for three reasons. First, to extract the resources needed for an expanding urban population from a diminishing resource base in the city's immediate vicinity, it is often necessary to use force to coerce rural populations. Second, in competition with other similarly structured urban centres, it is necessary to defend accumulated stores of wealth and forcefully protect arable land under the city's control. Third, to acquire new arable territory at greater distance from the city, to assure access to scarce timber and metals, or to obtain supplies of captive labour, it is necessary to engage in more or less frequent military expeditions, which can themselves serve as the basis for colonization and subsidiary urbanization in "foreign" regions.

In *The City in History* (New York, 1961), Lewis Mumford — one of the city's greatest chroniclers — stated that these processes ". . . invited a centralized military control, systematic robbery, and economic parasitism — all institutions that worked against the life-promoting aspects of urban civilization, and finally brought one city after another to its ruin. That was a final ambivalence and contradiction: for the many gains made through the wider associations and laborious co-operations of the city were duly offset by the negative economic activity of war. That cyclic disorder was embedded in the very constitution of the ancient city."

While the stately and placid urban structures of Western Europe and North America, may seem far removed from these violent processes, it is worth remembering that in recent centuries the worldwide processes of mercantile and industrial colonialism were spawned in an effort to provision and sustain European urbanization. The violence of European imperial expansion and colonial rule must be considered as part of the calculus in assessing European urbanization. Just as Greek colonial settlements on the Italian peninsula were stimulated by the need to provision Athens with grain, and Roman colonialism in North Africa and Egypt supplied the tables of Roman cities with food, so too modern mercantile and industrial colonialisms were launched with fossil fuels and the steamship to feed the material, energy and foodstuff appetites of growing industrial cities in Europe and North America.

In the process, of course, the phenomenon of urbanization has been thoroughly universalized. Initially organized as trading outposts, administrative centres or military garrisons, the cities of former colonies in the Third World have now become the fastest-growing urban centres on the globe, driven by seemingly uncontrollable posi-

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tive feedback mechanisms. New means of transportation and relatively cheap sources of energy have meant that these cities have grown out of all proportion to their surrounding ecosystems. They have become parasites and predators on the ecosystems in their immediate vicinity, and they are sustained for the time being by the precarious structure of international trade in both foodstuffs and fossil fuels. When this structure shakes or collapses, cities around the world erupt in violent outbursts of social protest.

The prospect for cities

How will any of these urban centres fare in the decades to come? The question is genuinely an open one. There is clearly increasing awareness that cities are not ecologically sustainable as they currently exist. Furthermore, there is a sense of urgency in responsible policy circles that a whole range of things need to be done fast to engineer a durable transition to more sustainable forms of urban life. These are hopeful signs. But can we plan fast enough and well enough to outpace the syndromes of "cyclic disorder," to use Mumford's phrase?

Sincere efforts are now under way to design controlled and sustainable ecosystems. As this article goes to press there is much attention being paid to the Biosphere Two experiment in which a team of eight selected individuals sealed off from the world will spend two years in an artificial environment that attempts to mimic some of the functions of natural ecosystems. The project has cost tens of millions of dollars; but one cannot help wondering, even if the experiment works perfectly, what it will teach us about human and humane survival. Will a glass-and-steel bubble in the Arizona desert tell us how to make the world's cities ecologically sustainable?

It is both tragic and ironic that, in the same week that the Biosphere Two team sealed itself into its antiseptic environment in Arizona, the city of Athens — a historic urban centre which many humanists regard as the birthplace of Western civilization — found itself choking on uncontrollable levels of air pollution. A Reuters news report on October 2, 1991, painted a truly bleak picture:

> A third day of heavy air pollution in Athens closed schools, left streets deserted and sent hundreds of people to hospital with heart and breathing problems. . . .
>
> All private cars and half of Athens' taxis have been banned from the city. Authorities closed primary schools after at least 20 children were reported to have fainted.
>
> Pollution indicators broke emergency levels for the third day and hospital sources said about 350 people had been treated.

We have had 6,000 years of experimenting with the transition to the urban social form without enduring success. From what ecologists tell us, we now have about six decades left — or until about 2050 — to get it right for the world as a whole. If Athens is any indicator, time may run out much sooner than that. It is upon this monumental transition that public leadership should be focusing its attention in the months, years and decades to come. ▼

SUMMARY

Current patterns of urbanization threaten the continued existence of humanity. Like other species before us, we may face certain extinction if we fail to live within the limits of the ecosystem. Currently we are using our intelligence to kill each other, and are destroying the environment on which we depend for life. Our distinction as a species may reside in our unique ability to engineer our own destruction.

We have yet to make a durable transition to sustainable urban life — even though the Urban Revolution occurred 6,000 years ago. That revolution — and the preceding process of human "self-domestication" — spurred the development of humanity. Yet every urban civilization seems to have followed an inevitable cycle of efflorescence and decline.

The problem may lie in the contradiction between human economics and the economy of nature. The first pursues concentration of power, leading to repetitive syndromes of growth and collapse. The second seeks dispersal and system-wide stability. In the end, nature's economy is bound to prevail. Human economies, in the long run, can only function as subsets of the economy of nature.

Studying cities of the past and their environmental impact may help guide urban policy makers today. Cities tend to degrade their surrounding rural areas, engendering rural-urban migration and the subsequent colonization of more distant regions. As time goes on, farming policy falls under the control of urban elites with little knowledge about or concern for rural ecological sustainability. Eventually, violence is likely to be used to coerce rural populations, defend against competing cities, and obtain a supply of labour. In ecosystemic terms, the violence of recent European colonialism is directly linked to the process of European urbanization.

Awareness is growing of the need to change to more sustainable forms of urban life. It remains, however, an open question whether we can engineer the transition before increasingly violent catastrophes engulf the rapidly growing urban centres of the world.

RÉSUMÉ

Les formules actuelles d'urbanisation menacent l'existence même de l'humanité. Tout comme d'autres espèces avant nous, nous sommes menacés d'extinction si nous n'arrivons pas à respecter les limites de l'écosystème. L'intelligence, nous nous en servons pour nous entretuer et nous détruisons l'environnement dont dépend notre survie. Notre distinction peut tenir à ce que nous soyons les architectes de notre propre destruction.

Quelque 6 000 ans après la révolution urbaine, il nous reste encore à négocier la transition vers le mode de vie urbain viable. Cette révolution urbaine — de même que le processus antérieur «d'autodomestication humaine» — a aiguillonné le développement de l'humanité. Néanmoins, chaque centre urbain a subi un cycle le menant à l'apogée puis au déclin.

Le noeud du problème pourrait résider dans la contradiction entre économie humaine et économie naturelle. Alors que la première vise la concentration du pouvoir et tend vers l'accélération de la croissance; la seconde en favorise la diffusion et l'équilibre général. Nul doute, c'est la nature qui aura le dernier mot. L'économie humaine, à long terme, ne peut fonctionner qu'en s'imbriquant dans celle de la nature.

L'étude des anciennes cités et de leur impact environnemental peut éclairer les concepteurs contemporains de politiques urbaines. Les villes tendent à spolier les secteurs ruraux environnants, à susciter la migration de la campagne vers la ville et la colonisation de régions de plus en plus éloignées. La politique agricole tombe alors sous la férule d'élites urbaines désintéressées d'une écologie rurale viable. Le recours à la violence est probable pour mettre au pas les populations rurales, répondre à la compétition d'autres cités et s'assurer d'une main-d'oeuvre abondante. Un exemple patent: la violence du colonialisme à la base de l'urbanisation européenne.

La compréhension du besoin d'évoluer vers des formes de vie urbaine plus viables ne fait que croître. Il demeure cependant douteux que nous puissions assumer la transition avant que la catastrophe n'engloutisse nos villes.