Viable Urban Settlements
(Part 2 of "Systems Tools for Institutional Transformation")

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Abstract

Suburban sprawl-based U.S. lifestyle has proven too expensive to sustain. Accelerating petroleum consumption means eventually needing to shift to sustainable energy sources, and systems not dependent on petroleum-fueled energy. For consumers in the U.S., that means energy reduction especially for transportation.

In the short run, an Energy Independence Tax of at least $1 a gallon on U.S. petroleum products would stimulate conservation as well as improve the country's balance of trade deficit. It is possible for the U.S. to redirect its resources towards sustainability, called reindustrialization, which has proved successful in Japan. It is also possible to reorganize large businesses so that they are actually run cooperatively, as proven by Mondragon, in northern Spain, which is the country's 7th largest industrial producer. The book, *Ecotopia*, by Ernest Callenbach (1975) offers a glimpse of what life would be like if a country were dedicated to sustainable living.

Ecological Cities with high density living developments need to flourish while respecting and even enhancing the natural environments, as well as support human community building while cutting commute/road time and feeding the local economic engine. Community is defined as a settlement of around 10,000 people in a biological niche. Using a socio-economic environmental model, a computer information grid provides an adaptable structure for constructive communication between billions of unique individuals, sometimes independent of their current or permanent geographic location. Some indicators of community satisfaction are offered.

Overview: Creating a new Economics focusing on Urban Vitality

We are approaching a time of major social change. The world economy is in trouble, the natural environment is deteriorating, and social problems are growing more severe. Usually, people use their thinking to learn or figure out something from the way other people already do things. Occasionally people think about new things, for themselves, almost like a new idea. This is original thinking, or thinking about something you haven't already thought about. Be an explorer, a pioneer into the depths of your own social consciousness. Think about how things could be improved from how they are now.

We know a lot about human sustainability at the nuclear family scale. It is called the family farm and it has worked in every way but economically for centuries. What we

don't know is how to live in large groups together and maintain a sustainable urban dynamic. The biggest challenge facing the human condition at this time in history is to translate the human potential away from environmental destruction.

In *For the Common Good: Redirecting the Economy toward Community, the Environment and a Sustainable Future*, 2nd edition (1994), Herman E. Daly and John B. Cobb, Jr., argue that the academic discipline of economics is much too narrow in its focus, and should expand to "the individual in community". I am also working from Jane Jacobs' observation that in reality cities are the center of economic activity, and the nation is only a political entity with artificial economic identities, from *Cities and the Wealth of Nations* (1985). I want to explore applying Ernest Callenbach's *Ecotopia* (1975) to the idea of community building within the emerging world wide web of computer networks.

I want to talk about the dismal science of economics, in a way that I hope is more democratic, using the language of political science to argue that we need to reconsider what we mean by economics. Economics deals with 90 percent of a society's here and now needs, and the clumsy, exploratory, always traditionalist political structure struggles with how to address the other ten percent, and are stuck with the economy's problems: the sickness, the conflict, the destitute and the criminal. Like a human skeleton, the political structure must define the status quo. It is the last part of a society to change.

At the beginning of the 20th century, economics and political science were separated into different disciplines, with completely different views of human nature, different values and incongruent theories using different tools and methods. Economics no longer reflects reality, it only reflects the numbers that happen to be collected. This paper is about re-integrating economics and political science, focusing on the local level, the range in which an individual citizen can have an influence in creating economic activity as renewal and rejuvenation.

We need a system that respects the human condition while providing broad leeway for individual exploration and cultural expression. We need a system that works in Johannesburg, Moscow, Mecca or Shanghai, as well as Northern California.

Limits of Current Economic Thinking

Kenneth Boulding decried what he saw as the narrow focus on commodities as the primary abstraction in contemporary economics, completely neglecting the role of human values and preferences (not to mention other species) in its models of economic exchange:

> Economists are understood
> To study goods, if not the Good,
> Although their goods, we often find
> Are pale abstractions of the mind.

Boulding argues for a reexamination of the goals of economics and a reordering of the relative priorities of progress, stability, justice and freedom.

In John Kenneth Galbraith's *The Age of Uncertainty: A history of economic ideas and their consequences*, (1985) he concludes his chapter on John Maynard Keynes: "There are other problems. Keynesian support to the economy has come to involve heavy spending for arms. This, we've seen, is blessed as sound while spending for welfare and the poor is always thought dangerous. With time, too, it has become evident that Keynesian progress can be an uneven thing: many automobiles, too few houses; many cigarettes, too little health care. The great cities are in trouble. As these problems have obtruded, the confident years have come to an end. The Age of Keynes was for a time but not for all time." This from the self-proclaimed Crown Prince of Keynesianism.

In his chapter on Metropolis, Galbraith gets to the heart of our multi-pronged problem: On two other matters the prospect is more grim. First there is the fact that capitalism performs excellently in providing things – automobiles, disposable packaging, drugs, alcohol – that cause problems for the city. But it is inherently incompetent in providing the things that city dwellers most urgently need. Capitalism has never anywhere provided good houses at moderate cost. Housing, it seems unnecessary to stress, is an important adjunct of a successful urban life. Nor does capitalism provide good health services, and when people live close together with attendant health risks, these too are important. They are made more urgent because, on coming to the city, people no longer accept as inevitable untended sickness and then a quiet death as they would in some lonesome sharecropper's cabin. Nor does capitalism provide efficient transportation for people – another essential of the life of the metropolis.

"In Western Europe and Japan the failure of capitalism in the fields of housing, health care and transportation is largely, though not completely, accepted. There industries have been intensively socialized. In the U.S. there remains the conviction that, however contrary to experience, private enterprise will eventually serve. To assert that the inherently public character of these industries, even though the practice affirms it, still seems radical. Nothing is now so important as to agree that the nature of these services is public and then to ensure that their performance is not merely a matter of adequacy but of pride. City life will never be good while housing, health care and transportation are poor.

"There is a larger need. That is to see far more clearly than at present the essentially social character of the metropolis. In its days of greatest elegance, the city was a household, and extension of the domestic arrangements of the ruler. No line then separated private from public tasks. Construction, artistic embellishments and maintenance of the city – what would now be regarded as public tasks – may well have absorbed the larger share of the aggregate public and private income. With the Industrial City it came to be assumed that the payment for public tasks – education, police protection, courts, sanitation, recreation, public entertainment, care of the old and impoverished – would be only a small subtraction from the total revenue. The private household, no one doubted, had the major claim.

"This continues to be the assumption. The consequences all recognize. Among the affluent and even among the poor, services supplied out of private income are far more amply endowed than those provided by the city. Houses are clean, streets are filthy. Personal wealth expands; there are too few police officers to protect it. Television sets are omnipresent; schools are deficient.

"Where capitalism is efficient, it adds to the public tasks of the city; it increases the number of automobiles that must be accommodated in and through the city, adds to the detritus that must be picked up from the streets and makes progressively more difficult the problem of keeping breathable the air and sustaining a minimum tranquility of life.

"This is another way of saying that the social aspect of modern metropolitan life is extremely expensive, far more expensive than we have yet imagined."

Lewis Mumford points out that the real action is in *The Culture of Cities* (1938);
"The city, as one finds it in history, is the point of maximum concentration for the power and culture of a community…The city is a fact of nature, like a cave, a run of mackerel, or an ant heap. But it is also a conscious work of art, and it holds within its communal framework many simpler and more personal forms of art. Mind takes form in the city; and in turn, urban forms condition mind… With language itself, it remains man's greatest work of art. The nature of the city is not to be found simply in its economic base; the city is primarily a social emergent. The mark of the city is its purposive social complexity."

So the challenge is ecologically efficient social action.

Reindustrialization

Whatever the critical limits are for a society, many would argue that the U.S. has already exceeded them. Europe maintains a comparable standard of living to the U.S., with one-third per capita energy usage, and one-third the waste. Can the U.S. use free enterprise to improve its standard of living while lowering its costs and waste?

Part of what makes a city possible is industrial production. The transitional issue to a more efficient society is waste stream reduction. The motto is "Reduce, Reuse, Recycle". The arrow of intensity needs to be in the direction of reuse, not recycle, to take off some of the strain on the economy.

One excellent example of industrial responsibility is the 3M story, as told by Paul Hawken in The Ecology of Commerce: A Declaration of Sustainability (1993): " The archetype of industrial hygiene in this country is the 3M Company. In 1975, Joseph Ling, head of 3M's environmental department, developed a program called Pollution Prevention Pays (3P), the first integrated, intracompany approach to designing out pollution from manufacturing process. The plan created incentives for the technical staff to modify product manufacturing methods so as to prevent hazardous and toxic waste, and to reduce costs. By reformulating products, changing processes, redesigning equipment, and recovering waste for reuse or recycling, 3M has been able to save $537

million. During the 15-year period, it reduced its air pollution by 120,000 tons, its wastewater by 1 billion gallons, its solid waste by 410,000 tons. Over 3,000 separate initiatives have contributed to the cause, and the key to the whole enterprise was a strong mandate from the top management of the corporation, linked with on-going support and assistance to line employees.

In 1986, 3M expanded the scope of the program with a goal to eliminate 90 percent of all emissions by the end of the decade, and to achieve zero emissions sometime after that. Now known as 3P Plus, the plan requires the incorporation of environmental issues on all levels of business planning and is used as a factor in employee performance reviews. The 3M program is an example of making money from preventing waste, which for most companies is the first step to becoming more socially and environmentally responsible."

A Cooperative Alternative to Capitalism

Mondragón Corporación Cooperativa is a business group made of 210 companies and entities, the leading industrial group in the Basque Country and 7th in ranking in Spain, with a total workforce of 70,844 at the end of 2004.

MCC's mission combines the basic objectives of a business organization competing in international markets with the use of democratic methods in its organization, job creation, promotion of its workers in human and professional terms and commitment to the development of its social environment.

What is the Mondragón story, and why is it so important? It has roots that go back at least into the Spanish Civil War, but we can begin in 1941 when a young Basque priest, Father Jose Maria Arizmendi came to Mondragón. Arizmendi, like most Basques, had fought on the losing republican side. He had been imprisoned as a POW, and after his release, had entered the church. His bishop had sent him to Mondragón with the charge of tending to the young, and he began his work by teaching in the apprentice school of the Union Cerrajera, the main industrial company in town. He soon found this too limiting, and by 1943 he had opened a technical training school with the support of the townspeople. In this school, he provided his students with not only a good technical education, but also a sophisticated understanding of cooperation and "the primacy of labor among the factors of production".

After continuing their education, a number of his students tried, but without success, to apply his teachings within the traditional companies where they had found work. By 1954, five of his original 11 decided to form a new company (ULGOR) where they could implement these teachings, and by 1956, after raising funds from local townspeople, they opened their factory with 24 worker-members. During its early years ULGOR focused on the manufacture of petrol-based heaters and cookers. In 1959, they then set up the Caja Laboral Popular ("People's Worker Bank"), credit union that both allowed the co-operative members access to financial services and subsequently provided start-up funds for new co-operative ventures. New co-operative companies started up in the following years, including Fagor Electrónica, Fagor Ederlan and Danobat.

Do you consider co-operativism to be an alternative to the capitalist production system?
_"We have no pretensions in this area. We simply believe that we have developed a way of making companies more human and participatory. It is an approach that, furthermore, fits in well with the latest and most advanced management models, which tend to place more value on workers themselves as the principal asset and source of competitive advantage of modern companies."

Robert Gilman reports in In Context (1996) that the Mondragón cooperatives are based on the much more sensible principle that capital should be rented and labor should have risks, rewards, and control. To do this, they have reorganized the ownership rights normally associated with capital and control.

The second thing they have done is to create a total system - a federation with its own services provided by the second level cooperatives. In fact, they cover the whole gamut of modern economic activity - heavy industry, light industry, agriculture, retail distribution, finance, housing, education, and research.

The Mondragón group has decided that no cooperative should be larger than about 400 to 500 members - the village scale. This decision grew out of their only strike that took place in 1974 in their first and largest cooperative, ULGOR with 3,462 members. What they saw in hindsight was the near impossibility of establishing adequate communications channels in such a large unit. This helps to emphasize that the Mondragón system is not just built on a few rules and principles. It thrives on an active "village culture" within each cooperative. Yet it thrives even more because they have built a supportive network of these economic "villages", and the whole network has a supportive relationship with its region.

Yet perhaps most important, they have healed the split between labor and management/ownership, thereby allowing much more balanced and wholistic decision making. Consider what happens in our system when a plant fails to produce the profit expected of it. The owners look at the situation purely in terms of the return on capital, and if they could get a better return elsewhere, they may well close the plant. The investments the workers have in their community and all the social costs of the closing do not enter into the accounting of the relative profitability of keeping the plant open. _In the Mondragón system, all these factors are considered. The Mondragón worker-owners are not sentimental and they will not tolerate a non-performing business, but when a cooperative runs into trouble, they are willing to put out the extra effort to find a new and better way. If it means lower income and lower profits for a while, they - as workers and owners, the business and the community - are willing to put up with it. They can make hard choices much more creatively and with more balance than those who are locked into adversarial roles.

Finally, to all this praise of the Mondragón system should be added a note of balance. Their model does not cover the full spectrum of business types, but only certain medium scale businesses. These cooperatives happily coexist with a large number of small businesses, and it is not clear if an international airline or a major oil company could be

successfully organized on the basis of a federation of self-governing units with less than 500 members. Perhaps, but there may be yet another way that is better. Even for the kind of medium sized industrial business that is the normal Mondragón type, different cultural conditions may make changes in the model appropriate.

The people of Mondragón have been very pragmatic and we should be no less so. Yet their model stands out as so much more effective than other attempts at industrial cooperatives that it would be wise to take their achievement as a starting point. We have a lot to learn from the people of the Pyrenees.

Ernest Callenbach's 1975 book, *Ecotopia*:
New York Times reporter Will Weston offers public reports and personal journal entries about a western country called Ecotopia.

Ecotopia is a land of forests, fertile farmland and small communities in the western part of the North American continent. Its people believe in a "stable state" ecology – decentralization, small-scale factories, workers control of production, biodegradable plastics, soil conservation and respect for animals, plants and trees.

Weston's reportings give a full view of Ecotopian life. Ecological hardware is grounded in an everyday life of dumping the trash, getting the kids to school, building interpersonal relationships and work. And it seems that each person aspires to live in balance with nature.

Ironically enough, what makes Ecotopia such a comfortable place is its Americanness. A synthesis of many Eastern concepts and Western ways, it is very much down home. A new universal spirit is there, yet it is still recognizable – very familiar. It is as though you could live there.

Tom Friedman's Energy Independence Tax
Pulitzer prize winning journalist Tom Friedman advocates that the U.S. government add at least another $1 tax to the cost of a gallon of gasoline, to discourage people from driving so much, and putting less demand on foreign oil, so that the U.S. sends less dollars to places like Iran. As long as the U.S. is an oil net importer, the U.S. is dependent on Middle Eastern countries in a way that they have the leverage enough to cause the U.S. to become embroiled in an impossible war in Iraq. Friedman's real idea is that the U.S. make a commitment to energy independence, which is only going to happen when the U.S. withdraws from its love affair with the automobile. His short term solution is that the price of gasoline be raised until it hurts to drive.

Bicycles in the future, Cars in the past
From *Energy & Equity* by Ivan Illich:
The exchange value of time is reflected in language: time is spent, saved, invested, wasted and employed. As societies put price tags on time, equity correlates inversely with vehicular speed. The order of magnitude of the top speed which is permitted within a transportation system determines the slice of its time budget that an entire society

spends on traffic. The automobile, the accelerating individual capsule enables society to engage in a ritual of progressively paralyzing speed.

The model American puts in 1,600 hours to get 7,500 miles: less than five miles per hour. In countries deprived of a transportation industry, people manage to do the same, walking wherever they go, and they allocate only three to eight percent of their society's time budget to traffic instead of the 28 percent Americans sacrifice. What distinguishes the traffic in rich countries from the traffic in poor countries is not more mileage per hour of life-time for the majority, but more hours of compulsory consumption of high doses of energy, packaged and unequally distributed by the transportation industry.

Self-Powered Mobility: Bicycles are not only thermodynamically efficient, they are also cheap. With his much lower salary, the Chinese acquires his durable bicycle in a fraction of the working hours an American devotes to the purchase of his obsolescent car. The cost of public utilities needed to facilitate bicycle traffic versus the price of an infrastructure tailored to high speeds is proportionately even less than the price differential of the vehicles used in the two systems. In the bicycle system, engineered roads are necessary only at certain points of dense traffic, and people who live far from the surfaced path are not thereby automatically isolated as they would be if they depended on cars or trains. The bicycle has extended man's radius without shunting him onto roads he cannot walk. Where he cannot ride his bike he can usually push it.

The bicycle also uses little space. Eighteen bikes can be parked in the place of one car, thirty of them can move along in the space devoured by a single automobile. It takes two lanes of a given size to move 40,000 people across a bridge in one hour by using modern trains, four to move them on buses, twelve to move them in their cars, and only one lane for them to pedal across on bicycles.

Davis, California: Not Quite Ecotopia

Davis has a reputation for being an ecotopian paradise, but it is another bad example of California suburban sprawl dependent on the automobile. Sure, there are 35,000 bicycles, but the bikes have to battle the cars which dominate the roadways. A majority of the people who attend the Saturday Farmers Market drive their cars. Because the town doesn't have a hook and ladder fire truck, only a few of the buildings in the city are even three stories. When London had its first million people, it was the same number of square miles as Davis has with 50,000.

Davis is known for its environmental awareness. Most University of California campuses have a quarter science students; UC Davis has 60% biological science students, which includes majors as varying as plant pathology, wildlife biology, evolutionary genetics, viticulture and enology (winemaking), as well as tangential programs like design, human development, landscape architecture and agricultural managerial economics, as well as a medical school and a veterinary medicine school. I worked for a year in college in what was then the only Department of Environmental Toxicology in the world.

So Davis has these biology folks coming out of the woodwork, most of whom love to think about the environment, and the essential concept of the interdependence of life. Recycling is expected in most households and many people love to talk about ecology. There are a lot of nice gardens, but the suburban sprawl is not efficient. The city and the University should consider more high density housing, instead of just more of the same.

Davis recently received a top award, Platinum, from the League of American Bicyclists, for having a leading 17 percent of all trips made on bicycles. This is down from 22 percent in 1990. The rest of the U.S. is a whole lot worse.

Erlangen: European city with bicycles
From a 1993 report by Dietmar Hahlweg, _Former Mayor of Erlangen, Germany:

Erlangen, well known as University city, "Siemens" City and Ecocity, has a population of 100 000. Erlangen is a centre of modern science, research and industry, especially strong in medicine, medical technology and health. Out of the total number of 80 000 jobs , 25 000 people are working for Siemens and 10 000 for the University, almost 20 000 in the field of Medicine/ Medicine Technology and Health

We started and intensified measures and projects, to save energy, water and other resources and to avoid damages to water, air and soil, whereever possible and we especially promoted recycling.

Most important and most controversial: We started a new process of traffic planning: After years of a one-sided car oriented and car dominated traffic planning policy, we stopped to privilege the car traffic, started measures to reduce and calm car traffic in residential areas and in downtown and promoted and encouraged vigorously the environmental modes of mobility in the city, as walking biking and public transportation. Motto: Equal mobility rights for everybody in our city.

With our new traffic policy we were successful in reaching fairly equal mobility chances to walk, to bike, to ride the car and to use public transportation. The motorization is high, according to the high living standard, 54 000 cars for 100 000 people. But they also own around 80 000 bicycles, and use them a lot. The bike traffic rate of the people, who live in Erlangen, is near 30 %. (Bicycles account for 35% of Munster, Germany's daily trips.)

The city has implemented a pro-bicycle policy since 1977. It would like to see cycling becoming the main
means of transport in the city. With this goal in mind, it has decided to give priority to the construction of tracks for long-distance commuting by bicycle (up to 10 km). The road network stretches over 405 km whereas there are 185 km of cycle tracks, which make up 46% of the whole network. 522 in 1000 people own bicycles.

Measures have also been taken to ensure that cyclists welcome cycle tracks. Extremely detailed plans were drawn up, which means that cyclists are not pushed to the perimeter of the traffic at the various intersections, but they are completely integrated into the

traffic with their own lanes and traffic lights. At certain intersections they even enjoy priority above cars.

Erlangen is a green city (40 % forest, natural land) surrounded by great forest areas and farmland, which are secured by a regional plan. _ The green areas inside the city and around the city have been connected by green routes, safe and attractive to use by foot or bike for all daily purposes school, work, shopping and leisure.
This makes Erlangen a "healthy" city with optimum conditions for fitness for everybody through easy access to green areas from every dwelling in the city by foot or bike within 5-7 minutes.

Although all these changes were very controversial in public and city council, today they are widely accepted. Downtown (again) is the commercial, social and cultural heart of the city. Places (before parking lots) and streets offer ample room to meet, to stay and are good stages for community festivities, events and festivals. Liveliness and urban atmosphere have never been better before.

Urban vs. rural policies
Letter to the Editor, Sacramento Bee, 7/15/2000:
Ancient U.S. history is to blame for most of our bureaucracy. By 1865, a majority of the country's population was living in cities of more than 5,000 people. Clearly, the action moved from counties to the cities more than a century ago. Yet many of our domestic political problems now are the consequences of rural money dictating social, economic and tax policy for urban society. Just like Japan.

Counties are designed for rural government, not social policy such as courts, health and social services. Most government since the New Deal has been to try to set up special districts to compensate for the limits of rural-oriented counties. The state should refocus around cities, which would allow the elimination of most of California's special districts and half of the state bureaucracy.

Majority support today for Proposition 13 is a reflection of a serious problem with government, but just saying no to the money will not improve governance. Bureaucratic confusion and miscommunication are the problem, and cleaner lines of communication are necessary to improve the situation.

Ecocities
From Richard Register's (2004) *Ecocities: Building Cities in Balance with Nature*:

The quality of life depends largely on how we build our cities. Given that cities are so large, damaging and yet potentially beneficial, you'd think we would have long ago devised the science, study, discipline and art of ecologically-healthy city building. The higher the density and diversity of a city, the less dependent on motorized transport, and the less resources it requires, the less the impact it has on nature.

The idea of Ecocities recognizes all these dilemmas and opportunities and the new realities of the twenty-first century, from rising atmospheric carbon dioxide, shrinking water tables, loss of agricultural land to sprawl – and energy wasting dead end of the automobile/highway/fossil-fueled industrial complex. Yet there are signs of the transition to sustainable communities and cities, which we must make if we humans are to survive; so our goal is: cities that can actually build soil, cultivate biodiversity, restore lands and waters, and make a net gain for the ecological health of the Earth.

Hazel Henderson points out that we humans have spent 98% of our collective history together as gatherer-hunters in roving bands. Yet we now comprise a six billion-person human family, living largely in huge mega-cities like Sao Paulo, Mexico City, Shanghai and Tokyo, with very little experience of managing our affairs at such a scale. We are consuming some 40% of the entire planet's primary biomass production. This is accelerating the rate of extinction of our fellow species on which we are dependent, as we have migrated to the ends of the Earth.

According to Henderson, we have overshot the optimum in cars, suburbs, sprawl and its attendant patterns of energy waste, pollution and environmental destruction. We have overshot the mark in losing community and identity among thousands of acres of huge tract homes in former family farms – with even more demand for more roads, concrete, parking lots and strip malls.

Henderson thinks the economy can be graphically represented by a "cake chart," a take-off on the pie charts economists use tirelessly to express percentages of this and that. The top layer of the cake is the "private" sector: production, employment, consumption, investment, savings. The next layer is the "public" sector: infrastructure, schools, municipal government and various services. The third layer down is the underground economy including tax dodges, black market exchange, and the like. Beneath these three "monetized" layers, in which cash is used as a means of valuation and exchange, is the non-monetized layer, based on bartering, home-based production, "sweat equity," and what she calls the "love economy" of volunteerism: working to support family and friends with vegetables, cleaning, baby sitting, medical advice, and so on. In turn, this base layer of the human economy rests on the bottom layer of the cake, nature's economy: the natural "resource base," which not only ultimately provide everything basic to the human need for sustenance, but also serves to clean up our messes if we don't get too far out of hand. To which Register adds: Given the order, with the human edifice built upon the natural one, it is clear that if our rules differ markedly from nature's we are likely to run into problems.

Back to Register: Cities are by far the largest creations of humanity. Designing, building and operating them have the greatest destructive impact on nature of any human activity. As we construct them today, cities also do little for social justice, not to mention for the grace and subtlety of human intercourse. Yet our built communities, from village and town to city and megalopolis, also shelter and launch many of our most creative collaborations and cultural adventures and artifacts. As we build automobile/sprawl/infrastructures, we create a radically different social and ecological

reality than if we build closely-knit communities for pedestrians. Contrast American sprawl with European traditional cities.

A study called *The Cost of Sprawl* was undertaken by three U.S. agencies – The Council on Environmental Quality, Housing and Urban Development, and the Environmental Protection Agency – and released in the spring of 1974.

The study compared low-, medium-, and high-density communities, and measured their impact on schools, fire and police services, governmental facilities, roads and utilities. It demonstrated that higher-density communities required 50 percent less land and 45 percent less investment cost in infrastructure (buildings, roads, landscaping and utilities), caused 45 percent less air pollution and a similarly reduced amount of water pollution runoff, and used 14 to 44 percent less energy and 35 percent less water. Costs of fire, police and other governmental services were similarly reduced in the higher-density community.

The high-density model was a mix far from the extremes of Manhattan, Hong Kong, or Paris. It included two- to six-story buildings and nothing taller. It left out the cost of the automobile entirely and it did not mention the savings from using transit in higher-density areas.

As we build so shall we live. The city, town or village – this arrangement of buildings, streets, vehicles and planned landscapes that serves as home – organizes our resources and technologies, and shapes our forms of expression. It is the key to the future healthy evolution of our species and will determine the fate of countless other species as well. The city, in fact, is the cornerstone of the civilization that currently embraces the entire planet. Insofar as our civilization has gone awry, especially in regard to its impact on the environment, a very large share of the problem can be traced to its physical foundations. Considering the crisis state of life systems on Earth – the collapse of whole habitats and the increasing rates of extinction of species – it follows then that cities need to be radically reshaped. Cities need to be rebuilt from their roots in the soil, from their concrete and steel foundations on up. They need to be reorganized and rebuilt upon ecological principles.

Recent trends have not been encouraging: In 1960 one-third of the citizens of the U.S. lived in cities, one-third in suburbs, and one-third in rural locations. By 1990 well over half lived in suburbs. Between 1970 and 1990 the population of California increased approximately 40 percent while the land area of cities and suburbs went up 100 percent.

By 1992, after a new wave of suburbanization, the U.S. was getting approximately 60 percent of its oil from the Middle East. The better the gas mileage, the more the suburbs sprawl out over vast landscapes, the more demand there is for cars and freeways, and the more cars are needed to service the expanding suburbia. Ultimately and ironically, the more gasoline is needed. Thus the energy-efficient car helps create the energy-inefficient city. The car is part of a whole system of complex, necessarily interconnecting parts existing in an interdependent relationship with the total environment it helps create. Now

that we have spent about half of the planet's full endowment of petroleum resources, time to rely on petroleum is running out.

The bigger picture is far from encouraging. China started closing Beijing's streets to bicycles to make way for cars in 1998, and it is currently engaged in a massive highway-building program. It plans enormous shifts of population from rural areas and farming to cities and manufacturing and business, and shifts from rail, bicycle and pedestrian cities to cities for motor vehicles on rubber tires – a colossal transformation in the wrong direction. The arrow is in the direction of increasing problems for the Chinese: according to UC Davis China expert Don Gibbs, China uses seven times as much energy as Japan per unit of production, 3.5 times as much as the U.S., and they are designing an exclusively auto based transportation system with highways and little public transit.

As Ivan Illich says: "The automobile has created more distances than it has bridged," and once created, rendered bridging those distances without the automobile virtually impossible. Thus we have become structurally addicted to cars. The structure of the city, even whole national transportation systems, have become thoroughly dependent upon them.

Register then quotes Jeff Kenworthy and Peter Newman, who studied thirty-two cities around the world and concluded: "Traffic engineers still claim freeways are better for fuel emissions, but the results of our study do not. Economically, they also appear to have failed. Our data show that, instead of people in cities with freeways saving time, and hence being more productive, they just spend more time in their cars. Freeways space cities out and hence overall travel is increased. Those cities which do not go for freeways but instead build up transit and bicycle access have gained economically and environmentally … Some short-term pain will be experienced as businesses and developers adjust their plans to a more transit-oriented city, but experience shows that the transition is worthwhile."

Ecocity takes the idea of urban life in a new direction. The truths from which the ecocity idea emerges are based on the human body – its size, speed and requirements for nourishment, shelter, procreative and creative excitement and fulfillment – and on the relations of living organisms to each other and their environment.

The density, diversity, form and function of cities, and the awareness of their citizens in this regard, are now key factors in evolution. On the positive side, the very form of the city, by providing access to culture, resources and nature, has the potential to raise consciousness of evolution to new heights. Though the effects on biology and evolution of today's enormous sprawled cities are grim, learning about such cities and about the alternatives to them gives us the tools to solve many urban and evolution-sized problems.

Register's favorite idea is "access by proximity," that the easiest way to cut transportation costs is shorten the distance. He really sees the solution as growing structures up that leave some room for other things besides work.

The size of the center is the horizontal multiplied by the vertical, and so a four-story height limit, though more dense than one or two, still forces horizontal development out several times over relative to a cluster of, say, ten- to twenty-story buildings, and eliminates the kind of civic focus that can produce grand plazas, parks, settings for sculptures and other special features. The vertical dimension can multiply the center's size several times without affecting whatever horizontal distance is being considered. Tall centers are thus far richer culturally and economically than low rise ones.

In fact, given that building materials and construction techniques are easily able to support much taller building and that tens of millions of people are living or working at the fifth story or higher already and appreciating its benefits, it strikes me as nothing less than perverse for architects and theorists to refuse to explore the possibilities. Some of the most beautiful buildings on Earth are taller than four stories. Elevated gardens, art and public spaces on rooftops, terracing that could take rooftops up four stories at a step, bridges and rooftop streets that could make a real adventure of the third dimension – almost none of these are seeing serious experimentation.

The traditional village structure is one of the most profound inventions in history, and it applies to cities as well as villages. In ecocity transformations there is a direction, scale and form seen here: toward the centers, and smaller and taller.

The challenge of Ecocities is to find community in harmony with nature.

Community Based Information

I propose an analytical construct for creating a community/city oriented political economy through computer networks. It is the beginning of the way to design a practical administrative governmental information structure for the evolving society that seems to be emerging.

I want to operationalize the concept of community, to develop mechanisms for the individual citizen (a person of the city) to meet her or his needs in freedom and responsible industry. My goal is prosperity.

Kirkpatrick Sale is a pioneer in thinking about urban sustainability. In *Human Scale* (1986), he wrote that a community of 5,000 to 10,000 takes on the stature necessary for real economic independence – as indeed, if we needed reassurance, the greater part of human history has demonstrated. At that size, energy systems are most economical and efficient, and at that level the labor force available for the economy would amount to between 2,00 and 5,000, divided evenly between manufacturing and services. Using current standards, a thousand people could operate one plant in each of thirteen basic manufacturing categories – and the current standards seem far bigger than the optimum for either efficiency or humanity, and they include some truly behemothian places. In a rational economy, it would no doubt be possible to reduce those sizes by half, but even if it were by no more than a quarter, that would still mean a community of 10,000 would have 2,000 factory workers, would be able to staff three plants in each of these basic

categories, enough to supply a small population with practically all of its manufacturing needs and allow it some diversity as well. The rest of the people able to work would be part of the service sector of the local economy.

How would Thomas Jefferson react to this idea of community level government? Well, Jefferson actually proposed dividing counties into wards of five or six square miles and to impart to these wards those portions of self-government for which they are best qualified, by confiding to them the care of their poor, their roads, police, elections, the nominations of jurors, administration of justice in small cases, elementary exercises of militia. These wards are pure and elementary republics, the aim of all of which together composes the State, and will make of the whole a true democracy as to the business of the wards, which is that nearest and daily concern.

Model for Individualized Community Information

This is a model for a computer grid of a person's local economy. It should be user friendly and provide linkage of the information structure between an individual and the larger economy, decentralization in a global context. With electronic cash transfer, it is possible to eliminate many of the established paper transfer processes.

[computer grid, Figure 2 goes here]

The model has two grids: #1 is the Personal Concentric Political Space, which puts the individual in the context of community, all the way up to the planetwide level. Grid #2 is the Economic Areas of Concern, which is designed to be overlaid onto Grid #1, so that scaled information can be stored in its appropriate cubical in the matrix. For discussion and analysis, ball park population definitions are: family: 10; neighborhood: 100; community: 10,000; district: 100,000; region: 1 million. So Los Angeles would still be megalopolis with 8 million people, but it would become 7 to 9 regions for administrative purposes, which would allow consistency in communication, in ways that are currently impossible with the city/county built in conflicts.

The idea is that the model should be useful to business people as well as municipal bureaucrats and citizens investigating the government.

This computer model does not exist yet. It still needs to be built. Needed features include: a model for today's city, real time and up to date, called "CityData," to be interactive and user friendly, with numbers easily converging for analysis; plus "CityFuture" which focuses on the future, identifying options and even assessing the probability of their outcome.

Inputs for the model include: information, money, food, energy, people with talents and potentials, and outputs that include economic goods and services (public and private), waste, pollution, and a changing culture as people evolve, leave and pass away.

The model needs to include as complete a picture of each community as possible, including:

- geography: land contour, flooding and drainage problem areas, soil classifications, land uses, roads and their status, sewers, wells, water sources as well as quality;
- climatology: seasonal changes, amount of rain, heat in summer, seasonal energy conservation programs;
- demography: population age distribution, aging over time, births and deaths;
- energy grids: telephone, energy utilities, ability to have wireless computer connection (current cutting edge criteria for technology-available community), cable tv, potentials for green energy and community self-reliance;
- economy: resources, people with skills and credentials, cash flow, incremental growth, dynamic equilibrium, taxes and public finance, commercial/residential/industrial/agricultural/open space uses, infrastructure, privacy protection of personal health and financial records, schools, libraries, child care, senior services, public programs, input/output for local, region, state, national and international;
- city and community government: legal constraints, budgets and accounting systems, jawboning, special relationships with other levels of government.

The computer model needs to have a dynamic, interactive, democratic evolution, with feedback and internal controls, privacy controls and protections, and at least be compatible with MacIntosh and IBM PC.

The focus is to provide a combination of services as a basic package that can replace the current paperflow/banking economy. Such a dynamic interactive program would need to: identify an individual person, record their business transactions, document their contact with the government, give them personal control of their own health and financial records, allow controlled electronic funds transfers, and have up to date information about all government services, and just about anything else that person might want to know.

Now this may all seem pretty sterile. Focusing on a particular community can make it a lot more real, as you fill in the pieces in a particular puzzle.

Public Policy Transformation

For local elected officials, and especially state legislators:
An accessible statewide model of information that allows analysis and manipulation, with statistics and preliminary models of their areas of jurisdiction, which decision making bodies can then adapt and refine to reflect reality as best they can. Every jurisdiction would have its own model, dynamic and interactive. There should be an extensive social component underlying the model, so that when policy involving taxes, or social or economic sectors is proposed, numbers are plugged in, and social consequences and budgetary costs can be cranked out for whatever future time periods seem relevant (always 1, 2 and 5 year time spans, and average month at buildout as a baseline for comparison with other projects across the board).

Then you will have a city council where the computer information enthusiast replaces the lawyer as the person at the table who knows the most about how to manipulate the rules.

Living Budget

Len Duhl is an advocate of Healthy Cities, as a metaphor for looking at a metropolis as a living entity that should encourage thriving people. This is the challenge that science should be focused on for future work, from many different perspectives.

What is a Healthy City? should be the challenge before every decision before local government. It would mean creating criteria to measure what would be a health improvement in a particular place. It would change the rules of the game and how money and personnel are allocated.

Socio Economic Environmental Impact Report based on a Living Budget

Current California City Planning Problems
California municipal planning law is dominated by environmental case law that goes by the generic name of CEQA: California Environmental Quality Act. While the most recent omnibus bills probably deserve the title, the law in toto is the opposite of comprehensive. It is a piecemeal patchquilt.

The original legislation in the early 1970s was to respond to a court question about a proposed Public Sector project's potential impacts on the environment. Eventually the courts expanded the process to be required of private sector proposals as well.

Case law has built up a convoluted way of analyzing a proposed project, and that method, with the Draft Environmental Impact Report (DEIR) and then Final EIR (FEIR) has become the way to define most of the public evaluation process.

Actually, the entitlement of the terms of the Development Agreement, following the approved Mitigation Plan in the FEIR is the most important because the Development Agreement lays out the actual conditions that the project will be held to, and very few people in the public pay any attention to either the mitigation measures or the terms of the Development Agreement.

CEQA looks at traffic and air quality, but it doesn't really look at social or economic impacts of other people (except for ancient native burial grounds that should be protected).

The most recent court-ordered CEQA requirement (referred to as the Bakersfield decision) is to question whether the proposed project will promote blight among existing businesses. The proposed bureaucratic solution is to write a white wash that it will only improve, and will not cause blight, as though that is all the economic analysis necessary to approve the project.

The original assumption with CEQA was that large economic forces readily bulldoze (literally as well as figuratively) the environment and so the environment must be protected with some boring bureaucratic process. What about existing communities and other businesses? Don't they deserve equal footing in the debate about the future? They already have a stake and have invested time and energy.

If we expand the planning concept beyond land use, to a greater emphasis on the people who actually use the land, maybe policy makers won't be quite so surprised how it actually turns out. The General Plan should include Economics, Health and Human Services, so that policy issues can be evaluated from an overall perspective.

The EIR is a monstrous analysis of the ways a project might impact the environment. It is basically a bureaucratic catch-all, so that every possible option is intended to be covered. So that the project can go forward even with impacts to the environment. The key non-tools of the CEQA process are the negative declaration, overriding considerations, and mitigations, all of which are designed for rejection avoidance. Is this any way to run a city?

The negative declaration says "no sweat, do it anyway." Overriding considerations says "so what, do it anyway." And mitigations are ways the project can improve something else in exchange for approved environmental damage. EIRs have become bureaucratic hoops that offer renegade environmentalists a bunch of public hearings to try to derail the particular project.
_The general plan should be constructed differently. Land use should be seen in the context of a society with an economy. With the social element first, and an economic needs assessment second, and then land use third, the city government could have the conceptual framework for tying together the issues of public policy. The concept can become practical with a city computer model based on demographics, an economic model, the traffic model, and the GIS of the infrastructure.

With this comprehensive socio-economic land use model as a background, when someone makes a policy proposal, council members and staff can fiddle with the computer model for impact assessments at 1-year, 2-year, 5-year and longer time frames. Obviously, the future is more fuzzy the further one attempts to peer, but it beats a delayed staff report where no one even remembers why staff researched the question in the first place.

Staff is rightly concerned about information security, and the model would need to protect the integrity of city databases, while making the model available to the public so that decision making is available to all.

The purpose of the SEEIR (Socio-Economic Environmental Impact Report) is to peer into the future and assess impacts locally and citywide. To make a best guess estimate of how the variables fit together now, and then how the situation might differ if a particular policy were to be enacted, everything else sort of being equal. A SEEIR would be a lot

more adaptive than the EIR. The EIR is static and mechanical at best, where the SEEIR is dynamic and social. The point of the SEEIR is to enhance the effectiveness of the policy discussion so the local economy can meet our needs and improve our quality of life.

Establishing community standards for Quality of Life

Daly & Cobb refer to Thomas Michael Power, *The Economic Pursuit of Quality* (1988): Even in the commercial sector of the economy, what we really purchase is quality, not quantity. Beyond a rather low level of income we do not spend our money mainly for pounds or calories of food, but for taste, nourishment, and variety. Our clothing budget is not spent on homogeneous body covering, but for qualitatively distinctive and stylish clothes. Many important qualities are supplied outside the commercial economy, such as clean air, scenic beauty, safety and a sense of community. It is the sum of commercial and noncommercial qualities that accounts for total economic welfare. These qualities are not independent of physical dimensions, but neither can they be reduced to physical dimensions alone. Economic development is the increase in the sum of marketed and nonmarketed qualities available to individuals in the local community.

Define sustainability by means of quantifiable limits and safe minimum standards; establish an optimum scale that takes into account the physical carrying capacity of a defined area, then focus on developing statistics that measure welfare.

A local area should be evaluated in three areas: quality of life, cost of living and standard of living. Together, these three commonly recognizable terms add up towards what Stafford Beer calls eudemony, or well-being. They are a first draft at creating a quantifiable measure of "optimal community." Quality of life includes air and water quality, long term health indicators, and intangibles of the natural environment. Cost of living focuses on a market basket index of basic goods. Standard of living includes measures of percent self-sufficiency, as well as the upper strata for the more high stepping. Communities can compare their statistics with other areas, and gradually come up with standards, by decentralized agreement. People looking for a new place to live will compare different communities' statistics. Long time residents will understand their own community's unique idiosyncrasies. And people will try to improve their numbers.

Finally, we must create a climate of consciousness that demands minimum standards for human and civil rights, around the world. Assume every person has a right to health care and short term survival. Stand up to cultures which inhibit women's rights and ability to speak out for themselves, as some would claim as a religious right. A focus of efforts to reduce the excess of births over deaths should be on unwanted babies of mothers of any age. In earlier times when more children were an asset to the community as a whole, a woman had an obligation to have children, and, on the whole, more rather than fewer of them. All the great traditional religions arose during that period, and their teachings are deeply affected by that social need. Today, however, a different attitude is required. Having children is a privilege rather than a duty. The community may not have to deny

that privilege to any couple who truly desires to exercise it. But by the same token, those who choose not to should be encouraged to avoid the trap of unwanted pregnancy.

Areas for further work:
Recovery time, regeneration, renewal

For the thirty years I have been working on these ideas, my focus has been on the mechanics of social institutions, but in the back of my mind is always a question about resiliency.

Biological systems have sensitive indicators for environmental change. A slight but significant and therefore detectable drop in temperature leads to a shiver. Similarly, a rise in heat or activity, and the body starts to perspire, the water droplets drawing heat as they evaporate.

In *Platform for Change*, Stafford Beer condemns the lag in information feedback, and focuses on feeding forward information, so that you can evaluate future options at this moment in time.

A "refractory period" is the recovery time of a neuron that has fired, the time it takes to recharge itself.
The other side of the feedback question is how long it takes for a particular system to recover before it can even respond to feedback again. These are fundamental questions for large scale organism adaptation.

Inconclusion: After Antidisestablishmentarianism: Organizing the Anarchists

"It's a wonder that anything's left," said Hortense, the lawyer, in Jane Jacobs *The Nature of Economies.*

"Isn't it? said Kate, the ethologist/animal behaviorist. "And yet in most places, most of the time, people have managed to avoid destroying their habitats, including many they've occupied long and continuously. What could possibly have restrained our species? Something did, or else much of the earth, long, long since, would have been laid waste, then laid waste again as fast as it recovered – when it did recover. I'm speculating that our evolutionary endowments, like those of the laziness of the great cats, or the elephants' enjoyment of water play, or the grooming chimps do to each other, must include traits that check habitat destruction."

"When and if we get a real science of economics," Hiram the ecologist added, "maybe from a symbiosis of nonsupernatural economics with nonmisanthropic ecology. Nature is far from perfect by criteria that would guide what we conceive of as intelligent, careful planning. Embryos go awry in their development. Species fail to adjust to changed circumstances and go extinct. A case can be made that development and co-development foster disorder by throwing new uncertainties into the pot. But within the confusion,

redundancy, and unpredictability, the stupendous processes we have been discussing are operating: development and co-development through differentiation; expansion through diversification; continuation through self-refueling; stabilization through self-correction – all brought into order through unpredictable self-organization. Working along with natural principles of development, expansion, sustainability, and correction, people can create economies that are more reliably prosperous than those we have now and that are more harmonious with the rest of nature."

"Darwin lived in England in its heyday of empire building," said Hortense the lawyer. "His society idealized military virtues, masculine prowess, conquest, and hierarchical prestige. Look at his idenitification of altruism with the willingness of soldiers to sacrifice their lives. Darwin didn't seem to notice that in his very society, all around him, women bearing children were going into the equivalent of battle and doing it again and again, often making the ultimate sacrifice – their own lives. If one looks for altruism's extreme expression – self-sacrifice – in childbearing, altruism is no evolutionary puzzle.

"Hey, feminist evolution!" said Hiram.

"No, just plain straightforward evolution," said Hortense. "Peculiar only in not being skewed by masculinist evolution."

"But men are altruistic, too," said Armbruster, the intellectual. "How do you account for that?"

"Children inherit their nature from both parents," said Hortense. "In our species, the genders are much more alike than they're different."

The greatest president in the history of the United States, surpassing founding George Washington, was Abraham Lincoln. This from Doris Kearns Goodwin's *Team of Rivals: The Political Genius of Abraham Lincoln*, about his vision for the future of the American democratic experiment: Even before the approaching military success in Atlanta, which would transform the public mood, Lincoln had alleviated his own discouragement by refocusing his intense commitment to the twin goals of Union and freedom. He gave voice to these ideals in late August with an emotional address to the men of an Ohio regiment returning home to their families. "I happen temporarily to occupy this big White House," he said. "I am a living witness that any one of your children may look to come here as my father's child has. It is in order that each of you may have through this free government which we have enjoyed, an open field and a fair chance for your industry, enterprise and intelligence; that you may all have equal privileges in the race of life, with all its desirable human aspirations. It is for this the struggle should be maintained, that we may not lose our birthright…The nation is worth fighting for, to secure such an inestimable jewel."

In the U.S., the Republicans and the Democrats are mostly concerned about the past, and defending themselves. I hold out some hope for the values of the Green Party. It is the grandmothers, not the bean counters, who should be setting our standards.

Post-Adam Smith, post-Karl Marx, post-Keynes, we need a system that works.

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[Ecotopian evolutionary runner goes here, Figure 3]

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