

EVOLVING TO SUSTAINABILITY

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ABSTRACT

Humanity needs a conscious transformation, called a paradigm shift, to a system based on sustainable principles. Previous shifts of the magnitude of the Agricultural and Industrial Revolutions allow us some insight into the process. The U.S. dollar has become weak due to debt. In the U.S. and Europe, financial crises in the private sector are raising havoc in the public sector. Growing environmental problems are forcing institutions to be more responsive to limits. China seems to be racing as fast as it can to make the same mistakes as the U.S. and Western Europe. This time there does not appear to be a bottom to the economic downturn; the stages are: slowdown, recession, meltdown, depression, collapse, free fall, transition, transformation. Human nature necessitates freedom within enabling constraints. Women should be respected as equal to men. Ideas for sustainable agricultural practices and viable urban communities lead to an ecotopian economic model of plenitude, prosperity, and social stability within a healthy, nurturing environment planetwide.

INTRODUCTION: THE WORLD AS WE KNOW IT

Out of the rubble of World War II, the United States emerged as the dominant economic colossus. Building on the world trade foundation of the British empire of the previous two centuries, the U.S. dollar replaced the British pound as the world currency that defined economic value. Now the economic power and the political dominance of the U.S. as the World Superpower seems to be waning. Flaws in the taught version of reality are making it increasingly difficult to hold that reality together. With the Cheney/Bush team in control, the U.S. mega-government has gone from having a healthy budget surplus and the world in virtual peace to a multi-trillion dollar deficit and much of the world in a war/terror consciousness.

But the fundamental reality of the dominant American economy has assumed a “whatever you can get away with” mentality – for example, you assume you can throw waste into the river. The multi-national corporate industrial model has assumed that every pristine natural environment is ripe for abuse for the sake of profit.

And, the collective American consumer has mortgaged the future for short run conspicuous consumption without regard to accumulating debt.

Up through 2005, the U.S. economy was bolstered by the inflating value of residential real estate. But what if the dominant economic paradigm is built on half-truths?

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Eventually the half un-truths will accumulate to catch up and overwhelm the dominant dollar and its beneficiaries. Then, the house of cards, the Tower of Babel, will get caught up in its own troubles, and come tumbling down.

Stafford Beer said, “Theory is the only reality countenanced by our culture”. The U.S. economic machine was built on a series of ideas, a sequence predicated on accepted truths about the power of money and the benefits of growth, and the value of an oil/fossil fuel based business machine. Four months before the assault on the World Trade Center in New York City, Dick Cheney said that “conservation may be a sign of personal virtue, but it is not a sufficient basis for a sound comprehensive energy policy”. But the dominant economic model that Cheney defends does not bode well for the future. With a global population of 6.5 billion and continued growth expected, the greed-based economy has turned the planet into a cesspool. But nature bats last.

There are times in history when forces for change precipitate institutional transformation. About 10,000 BCE, the Agricultural Revolution brought about the emergence of fairly reliable food, which led to the development of cities, fast growing populations, and the dominance of the human on the natural landscape. By 1750, emerging technological innovation drove the Industrial Revolution and the acceleration of the tools of mass production. Now the different cultures of the planet are confronted with the cumulative problem of having exceeded the carrying capacity of the planet. Global climate heating due to excessive production of carbon dioxide into the atmosphere is melting the glaciers and the polar icecaps, raising the ocean levels significantly, and creating heat sinks in the temperate mid-latitudes at an increasing and alarming rate.

The only hope for long term human viability is a Sustainability Revolution of the magnitude of the Agricultural and Industrial Revolutions. Western Civilization as we know it cannot go on forever. The automobile based economy is a dinosaur that has a lifespan of little more than a century and cannot survive for much longer. There are many things of benefit that can be created from fossil fuel petrochemicals. Putting them in an engine and exploding them for the sake of moving a two ton vehicle a few miles as fast as a human can is wasteful and shortsighted. Auto congestion is a whole other problem.

While the ecological picture is a pathetic disaster to the point where humans have exceeded the carrying capacity of the planet, it is the financial powerhouse that is falling apart and must be replaced by the emergence of a healthier paradigm of sustainable ideas that are more in tune with the reality of nature.

The next stage of human history will not be easy. Ever since the collapse of the Bear Stearns hedge funds in June 2007 and the run on the British mortgage bank Northern Rock in November, there have been increasing signs that the global economic machine is full of internal flaws and they are working against each other, making it increasingly difficult to maintain the current growth model. Because of the Internet spreading throughout the world, and rapid electronic telecommunications, a sequence of fast, accelerating instabilities will cause the disappearance of various foundations of the

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dominant western economy. On the day of the U.S. holiday for Martin Luther King Jr., January 21, 2008, a hiccup in world stock trading led to a drop of 3% in the stock exchanges of Shanghai, Hong Kong, India, France, Germany, and Great Britain, all within a few hours. The U.S. Stock Exchange did not drop because it had taken holiday, and first thing the next morning the U.S. Federal Reserve lowered its prime interest rate as a psychological ploy to signal (con/manipulate) the U.S. market. The rapidity of the sequential drop of the stock exchanges around the world is a measure of just how connected the global economy has become, and how fragile it is.

That event may turn out to be the equivalent of the collapse of the Berlin Wall, in 1989, which marked the beginning of the end of the Soviet Empire.

The time lag for the U.S. government to make a decision of consequence is months, and events are going to be emerging in time frames of days and even minutes around the world, and the Cheney/Bush administration is going to be mostly standing by helplessly. The stages of transformation of the U.S. economic system look like they will be:

slowdown,
recession,
meltdown,
depression,
collapse,
free fall,
transition
and transformation.

This analysis looks at the problems with the dominant corporate industrial economic myth, the consequences of seeing the planet as a cesspool for personal and industrial waste, the special problems created by the emergence of Brazil, Russia, India and especially China (BRIC), and the components of a healthy ethos for building sustainable communities in the future. In hopes that we have a future.

ANALYTICAL TOOLS: TIME LAGS – DETECTION AND RECOVERY

- Detection Lag: the period of time from when an event or change in status actually occurs until the point in time that its control system detects that a significant change has occurred, triggering a decision to respond.
- Recovery Lag: the period of time from when a control system has made the decision to respond, to then go through the controller's act of change, and then the period of time that it takes for the system to follow through in reaction to the controller's action. (See graphic in *Platform for Change* by Stafford Beer, page 430, Underlying problem in controlling an economic variable, obscured by other mechanisms)

For example, some time in early January 2008, the Cheney/Bush administration and the leaders of the Congress came to the conclusion that the U.S. economy is in so much trouble that they should develop a stimulus package. The stimulus package that included a taxpayer rebate was agreed upon and signed into law in late January, and taxpayers

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began to receive their checks in May. Taking more than four months from decision to implementation seems like a long time.

PART I: ELEMENTS OF THE PROBLEM STORMY ECONOMIC SKIES AHEAD

The corporate industrial economy is in trouble financially, fiscally, environmentally and socially. This section focuses on the private sector financial and the public sector fiscal difficulties; the following section focuses on long term environmental problems; the social issues will be addressed implicitly in the second half of this analysis.

A Quick History: Europe in the year 1000 was mostly unoccupied forests. By 1500, most of the land was owned, the forests cut down for agriculture. Populations were increasing and converging into growing towns. Trade and new technologies spurred industrialization, higher density cities, crowding and motivation to immigrate to the new Western Hemisphere.

In the 18th and 19th centuries, the U.S. with its vast open spaces and abundant natural resources offered unlimited opportunities. By the end of the 19th century, economic powers consolidated and dominated the political process and the news media. The country shifted from a rural orientation to urban-suburban with the help of electricity and the automobile.

After the First World War, Great Britain lost its global dominance as distance travel shifted from ship to airplanes, and the British pound was replaced by the U.S. dollar as the standard for currency, exchange and value.

The U.S. economic decade was known as the Roaring 20s. Europe was rebuilding from the devastation of the War, and the U.S. was expanding industrial capacity and emerging as a world trade power. The fastest way to achieve wealth was to leverage stock – buy, use a paper profit to buy more, in cycles of growth. People built enormous paper profits – until 1929. Then uncertainty grew and sellers started calling in the buyers. Banks had loaned out their deposits, so they couldn't pay back their depositors. The only way it works is if most people have so much confidence in the financial institutions that they don't all ask for their money back at the same time. When they do, it is called a run on the bank. That happened in 1929, and it led to a margin call on the stock market – stocks that had been pyramiding on each other's value lost their foundation and collapsed in worth.

During the Depression of the 1930s, the U.S. shut down industrial plants as unemployment rose. The growing conflict of the beginning of World War II led President Roosevelt to make the Lend Lease commitment to Great Britain, and stimulate the rejuvenation of underutilized industrial capacity. By the end of World War II, much of Europe and Japan had lost most of their industrial infrastructure. The unharmed U.S. heavy and light industry blossomed as it shifted to consumer goods. The U.S. political process and media were dominated by major corporate industrial interests, and the

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emergence of television provided a new vehicle for creating a predominant definition of reality, as people pursued the corporate/bureaucratic job to finance a middle class lifestyle with a suburban home, cars and the latest electronic gear and appliances.

In the aftermath of the Depression, the U.S. Congress legislated new rules and regulations for the Federal Reserve and the Securities and Exchange Commission to minimize the chance of 1929 ever happening again.

The Current Financial Situation: The driving force of the corporate industrial economy is debt. Companies take out loans, expand their capacity to produce, generate revenue, and nurture growth.

But the bottom line for the corporate industrial economy is greed: the pursuit of money for its own sake (profit at any price). So after World War II, financial geniuses discovered new ways to benefit by getting around the rules. During the 1980s, junk bonds and savings and loans were designed in such a way that seemingly profit could be generated while minimizing potential risks; both junk bonds and S&Ls exceeded their controls and were brought back down to earth.

Until 1999 the Glass-Steingold law (1934) had separated investment banks and commercial banks; Glass-Steingold's repeal created the environment for investment banks to become involved in high risk, unprotected behavior – without the controls built in to the commercial banks.

From the mid 1990's to 2005, one guaranteed way to make a paper profit was in residential real estate, as housing in the U.S. and Europe doubled and tripled in value. The banking and mortgage industry found that they could bundle a package of real estate loans and sell them as securities (securitization) on the stock market and they would increase in price on the open market. As long as the original loans were being paid, there wasn't any risk, and enormous profits. The mortgage companies lowered their standards for approving residential loans, approving loans for people who really couldn't demonstrate a long term ability to meet their financial obligations (subprime) and approving loans with little down payment and adjustable rates based on the then-low interest rates.

In 2005, the bottom started to fall out of the residential market in the U.S. and Europe. Sky rocketing housing prices started to fall. People with stretched incomes became delinquent in their monthly mortgage payments, and faced foreclosure. Those mortgage-based securities started to go sideways, and then housing prices (paper values) started to drop, and new home owners, and home owners who had refinanced based on the increased paper values of their houses, discovered that their houses were worth less than their mortgages (upside down), they couldn't sell for nearly what the paper said they were worth, and they became delinquent, faced foreclosure, and started to walk away, making their mortgage and the securities worthless.

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Last July, Bear Stearns, the fifth largest investment bank in the U.S. saw two of its hedge funds go under. Then in March 2008, it had lost so much paper value that JPMorgan Chase bought it for pennies, only because the Federal Reserve guaranteed it would back Bear Stearns' obligations of \$30 billion with taxpayer funds.

In November 2007, a British bank, Northern Rock, had a run (the first British bank run in over 100 years), which was stopped after several days only because the British government guaranteed the deposits, and eventually took over the bank and an obligation that has grown to 50 billion British pounds (\$100 billion).

The banking structure is based on loans, and the expectation that a business can generate enough revenue to exceed the cost of the loan. Since Bear Stearns got in trouble last summer, banks have gotten tighter about their willingness to give out loans, even to other banks, creating what is known as a liquidity crisis. The Federal Reserve has two tools to free up funds: lowering interest rates and making loans itself. Between mid January 2008 and the end of April, the Fed lowered its prime rate from 4.25 to 2.00, and made \$400 billion available for loans to banks in an attempt to free up liquidity. Sooner or later, the Fed is going to run out of interest rate to drop any further. when the U.S. Federal Reserve lowers the prime interest rate, the rule of thumb has been that it takes six months for the decision to percolate down to the other interest rates and thereby stimulate economic activity. It is a fundamental conclusion of this analysis that each time the Fed lowers the prime interest rate it has less of an impact on the real economy ("Main Street") and is only responding to the consciousness climate of the stock exchange ("Wall Street").

But there is another problem: the almighty dollar isn't as strong as it used to be, in terms of buying power compared to other currencies. Why is that?

Since the end of World War II, the goal of almost every other country has been to sell goods in the world's #1 marketplace, the U.S. Up through 1975, U.S. productivity was so dominating that it had an export advantage (current account surplus) with other countries (except for oil exporters). But because of that tremendous consumer consumption, the U.S. lost that trade advantage, but made up for it by selling knowledge and financial services to retain a net positive balance for another decade. Then during the 1990s, U.S. continued its high consumption pattern while importing more, especially from mainland China. This pattern established a perpetually growing U.S. current account deficit.

Now, basically nothing but debt is holding up the dollar, and it is only a matter of time before it is replaced as the international medium of exchange, as it replaced the British pound after World War I. It will probably be replaced in the short run by the euro of the European Union, but the same financial termites are eating away at that banking system – European banks are carrying a lot of those U.S. housing mortgage-backed securities that used to generate a profit and now are questionable or worthless.

From the Economist, April 26, 2008, "UBS made public a summary of an internal investigation into the mistakes that led it to write down a total of \$38 billion, the most by any European bank hit by the subprime crisis... Other banks added to the list of woes

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stemming from the mortgage markets. Credit Suisse, UBS's rival, swung to a loss in the first quarter largely because it took \$5.0 billion in writedowns. Bank of America said its first-quarter profit had fallen by 77% compared to a year ago, and that it would increase its provision for credit losses by \$5 billion. Citigroup booked another \$13 billion in writedowns and made a quarterly loss of \$5.1 billion. And Royal Bank of Scotland said it needed to raise \$24 billion, about a third of its market value, in a rights issue to help protect its core capital".

The next international currency could well be the Chinese yuan, but it faces a different set of problems.

On a personal level, too many people who consider themselves to be Middle Class American are using their credit cards for their house payments, and have accelerating credit card debt. The debt pain and disease is spreading from real estate, finance and construction to retail, restaurant and food service, and beyond to the various support networks that service those industries. According to a recent New York Times article, "Because retailers rely on a broad network of suppliers, their bankruptcies are rippling across the economy. The cash-short chains are leaving behind tens of millions of dollars in unpaid bills to shipping companies, furniture manufacturers, mall owners and advertising agencies. Many are unlikely to be paid in full, spreading the economic pain."

The Current Fiscal Situation: During the Depression, President Roosevelt brought in the Keynesian version of national governmental policies to make efforts to steer the economy. Post World War II also brought ideological competition between the command-control Soviet system and the free enterprise open trade of the U.S and Western Europe - government protection for the large corporations. This rhetorical battle put the U.S. economy on a permanent wartime footing, perpetuating devoting economic resources to maintaining arms development and selling arms to belligerents around the world. (When the U.S. and its allies attacked Iraq in 1991, Iraq's most advanced weapons had been provided by the U.S. during the recent Iraq-Iran war.)

The world will never know how history might be different if Al Gore would have won the U.S. Presidency in 2000. The surplus annual budget might have been maintained and the response to 9/11 might have been limited to a concentrated assault in the mountains of Afghanistan to isolate and capture Osama bin Laden.

Instead, 9/11 gave the Cheney/Bush administration the justification to invade Afghanistan and Iraq, and escalate governmental obstruction of the daily working life of the domestic economy and society at great cost to everyone. The Cheney/Bush administration is spending money like there is no tomorrow. First the tax cut, which mostly benefits the richest. Then the Iraq fiasco, which is off-budget, so there is no telling what it is actually costing, in addition to 4000 U.S. military lives, hundreds of thousands of Iraqi lives, millions displaced, and many more millions distraught and fearing for their lives and the prospects for the future.

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In some ways, the worst thing about the Cheney/Bush arrogance is their indifference about the future implications of their actions. In May, U.S. taxpayers received a stimulus of up to \$600, as though that is going to rejuvenate the U.S. retail economy. Where does that \$150 billion stimulus package come from? From the budget deficit – from future taxpayers. Where does the Fed's \$400 billion loan package come from? If the Fed or the Treasury comes up with a program to back the risk of the unpaid housing mortgages, who is going to pay the bill? The U.S. taxpayer. In the name of Republican frugality, the Cheney/Bush administration is ruining the U.S. dollar. There is nothing holding it up but debt.

In California, the Governor's January state budget for the upcoming fiscal year was over \$120 billion, but has since been identified with first a \$14 billion revenue shortfall, that has recently grown to an \$20 billion shortfall - initial state taxes on income, sales, property and corporations are all less than expected in the January budget. In two weeks, the Governor's traditional May Revision of the upcoming Budget will send shock waves for further cutting at the state level in every department.

In the public sector, they should cut salaries, not jobs. In the public sector, salaries and pensions have gotten out of control. The public sector salaries need to be drastically deflated, rather than further increasing taxes and causing more inflation to balance the budget. For the State of California to regain control of its fiscal survival, there needs to be an initiative petition for a state proposition for cutting back public sector salaries to a maximum annual salary of \$50,000 with defined benefits. And, repealing the State Public Employee Collective Bargaining Act (1975) that applies to most state and local public employees, and is the reason why budgets have climbed so much.

Assessing the Global Economy: This is a ballpark attempt to create a benchmark for total aggregate wealth on the planet (in January 2008 trillion dollars) including the annual Gross Domestic Product, plus individual consumer wealth, industrial plant, infrastructure, and potentially accessible natural resources. Perhaps the U.S. Central Intelligence Agency or the World Bank has done an assessment like this, but their version is probably more static. The point is to establish a baseline for future change, so that as the economy goes through turbulent adjustments, it is possible to reassess whether something is going up or down, and indicate possible courses of action.

These are ballpark estimates, a baseline for comparison:

U.S. \$200 trillion total value, \$14 trillion annual gross domestic product;
European Union \$240 trillion total value, GDP: \$16.8 trillion; China \$150 trillion total value, Japan \$100 trillion total value, Middle East \$100 trillion total value, Russia \$50 trillion total value, Canada \$10 trillion total value, Brazil \$10 trillion total value, Australia \$10 trillion total value, India \$5 trillion total value, Venezuela \$5 trillion total value, the rest of the world \$100 trillion total value. Aggregate total global value: \$1,000 trillion.

Prognosis: U.S. falling a lot, EU falling behind the U.S. (Italy, France and Spain are in particular trouble), Japan falling behind the U.S., India falling behind the U.S.; China

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expanding short run, Russia, Middle East, Australia, Canada, Brazil and Venezuela expanding short run to meet resource demands by China.

U.S. Economic Avalanche: while nothing happens all at once, sequential events accumulate. For example, in June 1989, East Germans discovered that they could sneak across the border to Czechoslovakia and then go into West Germany, and a trickle became a flood, and in November the Berlin Wall came down and the Soviet system with it.

The house of cards of the corporate industrial financial system started to fall with the collapse of the Bear Stearns hedge funds in July 2007. The British treasury is backing Northern Rock, but it is only one medium sized British bank. The British government cannot afford to support another over-extended bank, and they are all over-extended.

In March 2008, the U.S. Fed agreed to back JPMorgan Chase for buying Bear Stearns, but real estate in the Manhattan financial district is beginning to lose force and people in related financial businesses are losing their jobs. Then they will lose their homes, and the New York/New Jersey housing industry will go the way of California, Florida and Michigan.

People are falling behind on their car payments and their credit cards, to try to make up their house payments. Once this downward cycle has started it feeds on itself. Like being in the middle of an avalanche, the Cheney/Bush administration can only talk about things they could or should have done but are way too late to do anything about but watch. Most of the decent policies they should have considered would take months or years to implement. Some would have required ethical standards that this administration wouldn't understand anyway. The U.S. pay-the-market model of the 20th century has many problems for housing and transportation.

For comparison, here is an analysis of what life was like as the Soviet Union collapsed (from Kunstler's analysis of Dmitry Orlov's book, *Reinventing Collapse*): "For all of its gross faults, Soviet Russia was ironically better prepared for economic collapse and political turmoil than we will be. For one thing, all housing there was owned by the state, and allocated under bare nominal rents, so when the economy collapsed, people just stayed in their apartments. Nobody was evicted. There was scant private car ownership in pre-1990 Russia, so gasoline allocation problems did not paralyze movement. Train service was excellent and cheap, and the cities all had a rich matrix of underground metros, on-street electric trams and trolley-buses, which continued to run even when central authority flickered out. There was no suburban sprawl to strand and isolate people. Official Soviet agriculture was such a fiasco for half a century that the Soviet people were long-conditioned to provide for themselves. For decades, 90% of the food was coming from tiny household gardens. Very little of the success of the post-Soviet transition is set up for citizens in the U.S."

As the next president is elected, growing problems are emerging. In a sequence of stages similar to what is already happening to Bear Stearns, a major financial institution like

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Citigroup or Bank of America will get into serious trouble, then it will be bought by another financial company, most of its jobs eliminated, and a lot of what it had been doing won't be done any more. Then, the second company will wobble and fold, partly as a result of its inability to do the first company's paper work, but also because of the collapsing mortgage industry and subprime problems and illiquidity of the banking industry in general. This will create another step in the domino effect, which topples smaller banks and financial institutions as well as retail and industrial businesses they have been servicing. CPAs will have more work than they know what to do with.

The dollar, the pound and the euro will lose value, and the price of oil will shift to the Chinese yuan, the most stable currency around. As the dollar weakens, the price of gas will climb to \$10 a gallon, and then \$20 a gallon.

While there will be some civil unrest, as thousands and thousands of middle class people lose their jobs, their homes, and their cars, for the most part the U.S. remains calm in the shared realization that the economic meltdown is hurting everyone, all over the country, not just the entitled college educated white middle class that have been living high off of the rest of the planet since the 1950s. In New York City, Boston and Chicago, people abandon their suburban homes, and move into vacated downtown office buildings. They organize buying clubs to purchase basic foods and commodities, and talk about ways to survive the upcoming winter cold. Regardless of who becomes President, the shanty towns that grow in every major city will be so reminiscent of the Great Depression of the 1930s that they will be known as Bushvilles, not Hoovervilles.

People who have relied on their book learning and financial intelligence to be successful enough to pay other people to meet their needs start thinking about how to work within their newly discovered community to build a network to cooperatively meet their personal and social needs.

THE PLANET AS A CESSPOOL

According to Canadian archeologist Laura Smith, it now takes 20% longer for human tissue (skin, muscle, bone) to decompose than it did 100 years ago. Some of that is due to preservatives in our food, some of it is due to junk in our environment.

During the 20th Century, humankind has exceeded the carrying capacity of the planet. We have 6.5 billion people now, and are continuing to grow. It is what Garrett Hardin identified as the "tragedy of the commons," that each individual feels it is our right to use as much of the natural resources as we want or can purchase. As corporations or even as nations, humans have exceeded the environmental regrowth capacity for forests and fish in the sea of many countries. The quality of water and air in too much of the planet is polluted. A reciprocal problem is that we are diminishing the amount of open space and wilderness, and species are disappearing as a consequence. And then there is climate change.

In addition, there are several specific problem areas (information for this section is taken from *The World Without Us*, by Alan Weisman):

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Nuclear contamination: with 441 operating nuclear power plants around the world, it is amazing that there have been only two known cases of near disaster: Chernobyl and Three Mile Island. TMI was contained, and actually Chernobyl was partly contained. Even so, contamination from Chernobyl was so severe that three days later increases in radioactivity were detected in the atmosphere in Sweden, leading to international concern in response to initial denials by the Soviet government. Now the area is contaminated for miles around, with toxic levels of radioactivity for centuries.

With increasing demand for oil worldwide, and pressure for greater use of energy by China and India, China is planning to develop nuclear power on a large scale. Repeated denials by the Chinese government during the developing SARS pandemic does not engender confidence that a nuclear accident would be admitted by the Chinese government until long after a problem had emerged.

And then there is the question of what to do about the waste from the 441 existing plants. Altogether they annually produce 13,000 tons of high-level nuclear scrap. In addition, the U.S. alone generates 3,000 tons of spent fuel a year. So far, only shortterm solutions have been developed, and the plan to put the waste in 55 gallon barrels and dropping them in the ocean would only lead to turning the oceans and fish into carcinogens.

Plastics waste stream: Since World War II, commercial science has been devoted to the production of different forms of plastics such as acrylic, nylon, polyester, polyethylene, polypropylene, polystyrene, and polyvinyl chloride. Eventually these virtually non-destructible products enter the waste stream, and because they are light, the wind and water carry the waste to the oceans. Billions and billions of tons of plastic in the oceans. Birds and fish think the colorful plastics are food. Water currents pulverize them, they turn to powder, plankton swallow them, and they enter the food chain as they are clogging up the plankton's digestive tracts and bringing pollution inside all of the fish that depend on plankton as a primary food source.

Farming Pollution: "Nearly 12% of the planet's landmass is cultivated, compared to about 3% occupied by towns and cities..." Pesticides, heavy metal toxins and persistent organic pollutants (POP) that show no sign of degrading are contaminating our soils and entering the food chain. But it is the heavy dosages of artificial chemical fertilizers that have a long term impact on our drinking water. "The worst impact of phosphates and nitrates, however, isn't in fields, but where they drain. Even more than a thousand miles downstream, lakes and river deltas suffocate beneath over-fertilized aquatic weeds. Mere pond scum morphs into algae blooms weighing tons, which suck so much oxygen from freshwater that everything swimming in it dies. When the algae collapse, their decay escalates the process. Crystalline lagoons turn to sulfurous mudholes; estuaries of eutrophic (oxygen depleted) rivers balloon into gigantic dead zones. The one spreading into the Gulf of Mexico at the mouth of the Mississippi, charged with fertilizer-soaked sediments all the way from Minnesota, is now bigger than New Jersey". What the U.S. calls standard farming practices is not sustainable, it is deadly.

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Corn Ethanol is a mistake: Cheney/Bush's invasion of Iraq, subprime housing mortgages and corn ethanol are among the dumbest things the U.S. is doing. The obsession with corn for ethanol has turned corn into the number one cash crop, with states like Iowa devoting so much land to corn production that they have to import food and are not self-sufficient, and eliminating land availability for other crops. Over ten percent of the corn crop is currently used for ethanol. The growth and production of the corn requires transporting seeds, making fertilizer, herbicide and insecticide, as well as operating tractors and other farming equipment - processes that all require fossil fuel. The conversion of corn into ethanol through industrial fermentation, chemical processing and distillation also uses large amounts of fossil fuels, not to mention the transportation of the materials via diesel trucks. And then there is the long term impact of mining the soil, with repeated applications of fertilizer and pesticides reducing the productive life of the U.S. farm belt, and contributing to the pollution described above. U.S. corn for ethanol means that U.S. farmers are converting from soybeans to corn, so Brazilian soybean farmers are expanding into cattle pastures, so cattlemen are cutting forest in the Amazon. Anywhere on the planet, biofuels only increase the carbon footprint, causing more global warming. The only way that ethanol is a positive is in converting cellulosic biomass waste, and scientists haven't discovered the enzymes to make that feasible yet.

TRUE COST PRICING

In a post-industrial, ecologically responsible, stable state economy, people devote over a third of their budget to food, and materials are quite expensive.

By comparison, in the corporate industrial economy, maximum effort goes into minimizing the producer's costs for manufacturing goods. The process is proprietary so that the producer can charge a lot. Natural resources are obtained without respect to environmental destruction. Waste is absorbed by the environment or paid for by the taxpayer. And the primary purpose of the political process is to minimize the producer's obligation to be responsible for the consequences of production and consumption.

The U.S. Environmental Protection Agency was set up by the Nixon Administration and its real mission is to maximize the likelihood that producers can pollute and not be responsible for their waste.

The real cost of an automobile should take into account the total cost of the pollution of mining the metals, creating the roads, adding to the congestion and inconvenience, the law enforcement, and the incarceration (half of the people in U.S. jails are convicted of auto related crimes). In current dollars, a car should cost a minimum of \$200,000 (about ten times its current price).

In the current economy, most of the real cost of goods is born by the public, the environment and the future. The political debate is always about who should benefit and how much who should pay.

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BRIC: BRAZIL, RUSSIA, INDIA AND CHINA

Traditional economists looking at the prospects of the U.S. going through at least a recession are heartened by the prospects of the emergence of traditionally underdeveloped countries doing really well, and bringing the global economy out of a complete collapse. At the top of the list are BRIC: Brazil, Russia, India and China.

Since this analysis is focusing on the ability of an economy to have long term sustainability, these countries should be evaluated by three criteria: economic equality, ecological self-sufficiency and political openness.

The economic equality has a straight forward measure: The Gini coefficient is a summary measure of income distribution, ranging in a value between 0 and 1. Zero would signify that income is perfectly equally distributed, and 1 would indicate that all income is concentrated in the hands of a single individual. Examples of relatively equal economies include Sweden, 0.25, Japan, 0.25, and Germany, 0.28. Examples of high inequality include Brazil, 0.59, and Mexico, 0.55. In 1983, China's Gini index was 0.28, but by 2004, it had increased to 0.47, surpassing the U.S.'s .45. Russia's is .41, and India's is .37.

Ecological self-sufficiency is more complex. Brazil is still a mostly underdeveloped country. While the relative numbers of growth are good, the self-sufficiency is narrow, with a large portion of the society living a subsistence existence. Worse, the Amazon rain forest is one of the most depleted ecosystems on the planet, and there is very little effort for making the soil last more than a couple of seasons following the destruction of the rain forest by slash and burn.

According to *The Economist* (3/29/08), Russia's Mr. Putin "has done much to stoke fears of a new cold war. He has suppressed democracy at home and acted more aggressively abroad. Long-range bombers once again lurk close to NATO countries, and the rust is being taken off other bits of Russia's military machine. Russia has used oil and gas as a political weapon, periodically cutting off fuel supplies to neighbors".

India's economic surge is completely dependent on providing services to the U.S. and Europe; if those economies go down, they won't be needing the inexpensive versions of services the Indians are providing.

China's economy is taking over the world, but it is an extremely short time frame of success, at great ecological cost. It is significant that the Chinese Gross Domestic Product has increased by 7% per year for the entire 1978-2005 period, the most sustained period of rapid economic growth in human history. However, according to a December 2000 report by the U.S. Embassy in Beijing, pollution costs the Chinese economy anywhere from 3 to 8 percent of GDP each year. In addition, ecological damage potentially costs another 5 to 14 percent. Even at the low end of these two estimates, environmental damage is roughly equivalent to annual economic growth, meaning that the economy is

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producing little or no new net national wealth. It is systematically destroying the sources of its future wealth. China is the opposite of ecological self-sufficiency.

China's dirty technology has global consequences. Climate change measurements since 1955 at a major neutral mountain site in Hawaii, Mauna Loa, show a consistent rise in CO₂. Only now the readings have to be checked to see if they are biased by increasing coal burning in China. Dirty Coal generates 63% of China's energy, and it thickens the air for miles.

China's government officially recorded over 60,000 environmental demonstrations in 2006, and 70,000 the following year. Water and air pollution are the worst of any urban area on the planet, and it is largely due to their attempt to drive their economic engine. China may well become the leader of the industrial world, at the time when the rest of the world's population stops tolerating even much lower levels of pollution than China is willing to accept.

Further China is notorious for their single party political domination and repression. Attempts by the party to bring the positive image to the world stage with the Olympics are already creating tension with Tibet, and many other parts of the country have their own problems with the central government. China is close to a million mutinies, and there is great potential for anti-government demonstrations during the Olympics.

China needs to discover that global leadership is not defined by arrogance, hubris, repression, poor quality control or pollution. Until China transcends its monolithic, all-powerful but perpetually behind the times Communist Party, and explores a grassroots, bottom up kind of democratic representative structure, it is living in antiquated chaos that other countries will fear, but not respect, let alone emulate.

PART II: SPOTLIGHT ON THE FUTURE HUMAN NATURE AND ENABLING CONSTRAINTS

We are approaching a time when the established rules of the western culture's economic order are falling apart. How do we get through a time of increasing social disorder – and how can we come out of this a safer, sustainable viable community?

A vast majority of the people alive today carry around a mental model of how the world works by weaving together various combinations of the basic tenets of established religious, economic and political traditions. Most of us live in a crowded urban world of many people, scarce resources, daily conflicts, limited time and too many options. While it is nice to think of the challenges as wonderful, too often they are frustrating and sometimes downright depressing. Over the years, religious leaders and great social thinkers have developed different philosophies to cope with the dilemmas of human struggle. Each of us brings together our own unique combination of these traditions. Without trying to slight the depths of these various bodies of reflected human experience, here is a crystallization of the major ideas that bring us to what we think of as society:

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Hindu: God is in all things

Buddha: the universe is infinite

Confucius: there is a need for social order

Jewish: each individual has a relationship with a higher power, and with other people

Jesus: see and love God in your daily life to find heaven in this life

Catholic: society has a relationship with God

Islam: be devout, pray to God daily, fast during Ramadan, give to the poor, at least once go on a pilgrimage to Mecca

Luther: each of us has the choice for good or evil, and many challenges to act each day

Calvin: rewards for your labors

Hobbes: society needs to control powerful individuals

Locke: society cannot work without a social contract

Adam Smith: division of labor is more efficient

Jefferson: least government is best government

Elizabeth Cady Stanton: a woman must be independent before she can be free

Malthus: uncontrolled population growth leads to scarcity, war, famine and disease

Lincoln: a country should maintain unity and reconstruction driven by reconciliation

Darwin: adaptation is the key to species survival

Marx: each according to their ability, each according to their need

Keynes: government has a role to play in stimulating the economy

Justice William O Douglas: leave a place better than you find it

Maslow: food & shelter, safety, love, productivity and creativity are basic human needs

Kennedy: ask not what your country can do for you, ask what you can do for your country

Galbraith: what the private sector does poorly should be done well by the public sector

Ernesto Che Guevara: at the risk of sounding ridiculous, let me say that the true revolutionary is guided by feelings of love.

While most people try to do the right thing most of the time, every community has some established limits, some method of enforcing them, and some mechanism for punishing those who fail to live within the constraints. The purpose of this analysis is to offer a foundation for an examination of what role society, the government and our formal economic institutions can address in the future. What role should government play?

Short answer as a challenge to be addressed by the rest of this analysis: create a new ethic, based on the idea of plenitude instead of greed, and live within the finite limits of a healthy planet.

WOMEN HOLD UP HALF THE SKY

We need to create a climate of consciousness that demands minimum standards for human rights around the world. Assume every person has a right to health care and survival. That alone would eliminate half the crime in the world. Stand up to cultures that inhibit women's rights and ability to speak out and provide for themselves, as some claim is the tradition of Mormons, Muslims, Catholics and too many husbands. As Herman Daly and John Cobb point out in *For the Common Good*, "efforts to reduce the

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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 religions arose during that period, and their teachings are deeply affected by social need. Today, however, a different basic attitude is required. Having a child 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, those who choose not to deserve the respect and appreciation of all. They should be aided and morally encouraged to act on their choice and not be caught in the trap of an unwanted pregnancy.”

POST INDUSTRIAL SUSTAINABLE FARMING

Michael Pollan, author of *The Omnivore's Dilemma*, and *In Defense of Food*, came to the agricultural campus of the University of California, Davis to talk about a sustainable farm, where soil is added, not deleted:

“Just to summarize this farm: It is a polyculture, as the name suggests. He has a hundred acres of grass, and he grows beef, pork, broilers, eggs, turkeys, rabbits, and he has six species. They grow in this very intricate symbiotic system. Every animal is contributing some eco-system service to another. A hundred acres of grass, 400 acres of wood lots. Very hilly land. Not very good for row crops, but very good for grass. One of the first questions I asked Joel, What kind of farmer are you? Are you a rancher, a chicken farmer, are you an egg farmer? He said, No, I am a grass farmer.

“That is very striking to me. We don't eat grass. There is no market in grass; there is a little market in hay. How can you be a grass farmer? He explained to me that is the basis of this ecosystem he has created. He is modeling these relationships on nature, the relationships of animals in nature. Just to give you one example, and there are several of these. They are all kind of wonderful. The relation of his beef and his chickens, his laying hens. He does grass fed beef, and he has a herd, seventy five animals or so. They spend one day in a paddock and they graze it really completely, when you put that many animals in a quarter acre, they graze it all down completely. Then at the end of the day he moves them to another paddock. What allows this to happen is this very light, cheap electronic fencing, which I think is the most important sustainable agriculture technology for animals agriculture. I could carry a quarter acre paddock on my shoulder and set it up myself in ten minutes, it is really remarkable stuff. They would graze down that pasture, and then we would build another one right next to it. He would then open the door...

“You hear about moving the cattle, and you need dogs, and chewing tobacco, a lot of trucks and a lot of screaming, and it wasn't like that at all. They knew the drill. They did it every day. He was less like a cowboy than a Maitre d', he kind of opened the door, and the cattle would move from one to another. They were so happy to get the next pasture because there was all that fresh green grass and the end of the day is when it is sweetest because it has been collecting sugar all day and that wonderful contented sound of cows ripping the grass and ruminating. It was a great end of the day scene.

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“Then he has his chickens. He waits three days. He calls it his hen mobile, and it looks like a ramshackle prairie schooner, he has made it himself, it is not an elegant piece of technology. He lowers the gangplank, and three hundred laying hens come streaming down the gangplank, and they fan out over the pasture. They go right for the cow paddies. And what they want to do is eat the larva, the maggots out of the cow paddies, and the reason he has waited three days is to grow those maggots as big and as juicy as he can, but if he waited any longer, they would hatch and he would have flies everywhere.

“By understanding the life cycle of this parasite, he is able to grow the important protein source for his chickens. They eat all of the flies, they take care of his fly problem. He calls the hens his sanitation crew. And they do these other things, in the process of digging out these larva, they spread the manure. They fertilize the paddocks with the very rich nitrogen manure themselves, and then he knows exactly how long they can be there before the nitrogen load is too high, and then he moves them to the next paddock. Six weeks later he has this flush grass in a blaze of growth, and he can either cut it for hay or he can bring in the cows again. It is a really exciting relationship because it is based on the relationship of birds and ruminants in nature. Birds are always following ruminants and cleaning up after them.

“To really appreciate it, we have to bear down, and remember I said he is a grass farmer, and look at the grass plant itself. Just think about one of those grass plants in one of those paddocks. What is happening is when a grass plant is sheered by a ruminant, it does something very interesting. It wants to keep its root mass in rough balance with its leaf mass. It is called the root shoot ratio. So what it does is it sheds roots, to balance out, and when it sheds the roots, it kind of cauterizes them and they die, then they are set upon by all the life living in the soil, the earthworms, the protozoa, the bacteria, the viruses, the fungi. And they digest those roots.

“And when they are done digesting it, that is soil, that is compost. That is how soil is built, it is built from the bottom up. That is how the great top soil of the prairies that pulsing of the pasture. He is actually creating soil. What does that mean? What that means is that at the end of the year, I will tell you how much he takes off this land: 40,000 pounds of beef, 30,000 pounds of pork, 10,00 broilers, 12,000 turkeys, 1,000 rabbits, 35,000 dozen eggs, off of this hundred acres. At the end of the year, there is more biodiversity, not less, more fertility, not less. More soil, not less. The significance of that is: This is not a zero sum system. In our heads all of us are stuck in this idea, that for us to get what we want from nature, nature must be diminished. It is a process of subtraction. He is suggesting it need not be that way, a sustainable, a truly sustainable system can actually improve the soil, improve biodiversity, leave the land better than before we removed our food from it”. (Mondavi Center, University of California, Davis 11/29/06)

Pollan talked about other things as well, some of which have been published in his new book, *In Defense of Food: An Eater's Manifesto*. His rules are: Eat Real Food, Not Too Much, Mostly Plants. It provides a contrast with his picture of Polyface Farm and all its meat. Most people could have a “victory” garden, and take control of their own food, and

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share with their neighbors. Growing vegetables is easier than raising livestock. Just keep in mind the idea of replenishing the soil with nutrients and body, and paying attention to what the soil and your plants are trying to tell you.

BUILDING SUSTAINABLE COMMUNITY

Community. The area you frequent. More than a neighborhood, less than a nation, a state or even a city. Cities try to have an identity, a reputation, things they are known for. Cities have a sense of community, but this is a focus on community in a practical, every day, how can we make the system work, reality way.

Cities are wonderful, even magical, as Lewis Mumford wrote in 1938, in *The Culture of Cities*,

“The city, as one finds it in history, is the point of maximum concentration for the power and culture of a community... 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.” And from Mumford’s *The City in History* (1961), “the chief function of the city is to convert power into form, energy into culture, dead matter into the living symbols of art, biological reproduction into social creativity. The positive functions of the city cannot be performed without creating new institutional arrangements, capable of coping with the vast energies modern man now commands: arrangements just as bold as those that originally transformed the overgrown village and its stronghold into the nucleated, highly organized city”.

The problem with cities is that they are simply too big to administer face-to-face, where the regulator knows and lives with the people who are affected by the effects of their semi-regal bureaucratic actions, and interpretations of policy.

The term Economics originally meant “managing the household” but it was also a state of mind for the ruling government. John Kenneth Galbraith put it in the perspective of “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

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amply endowed than those provided by the city. Houses are clean, streets are filthy. 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.”

This is a discussion about a shift from the Industrial City, to an Ecological City, where there is an expected net ecological benefit from urban human living, rather than the ecological disaster that cities have become. The first thing to do is create some definable terms, beginning with community, which is being defined as a population of around 10,000 people.

For discussion and analysis, ballpark population definitions are: family: 10; neighborhood: 100; village: 1,000; 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 problem is counties. They are out of date and obsolete. Ancient European and U.S. history is to blame for too much 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 the U.S.'s 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 land-focused rural government, not social policy such as courts, health and social services. Most domestic 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 continuing the tax cut reform of 1978 known as Proposition 13 in California 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.

Thomas 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,

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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.

Within this community-sized focus, individuals can mobilize and have a greater impact. Asking how can we improve the quality of life in cities (how can we make them healthier) can become the identified challenge of local groups and governments.

First off, the United States needs to recognize that energy consumption and waste generation are out of control, three times Europe's, even though there is a comparable standard of living. The difference is what Richard Register refers to as "access by proximity." Because most European cities were laid out before the automobile required an additional 70% space for its roads and parking, cities are much more compact, so they require less energy and resources to maintain.

The problem is the automobile. The world has exceeded the peak oil point, the midpoint in our potential use of petroleum on the planet. It is a finite resource, and eventually we will have used up most of it. That is any where from twenty to a hundred years away, but perhaps even in our lifetimes, depending on how rapidly we continue to accelerate our use of it to drive cars.

Ivan Illich wrote in *Energy & Equity* in 1978 that "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 annually puts in 1,600 hours including work time to pay for the car and gas, as well as insurance and taxes 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 lifetime 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

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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."

Cities could be designed to work ecologically. According to Richard Register in his book, *Ecocities: Building Cities in Balance with Nature* (2002), "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

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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.

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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.

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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.

Register is advocating that we build tall compact buildings, and allow open space around them. 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 is 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. For that, we need up to date information.

The biggest change of the last decade is the advancement of the Internet which has made communication and information sharing instantaneous. The technical work requires creating an information grid to manage individual/community/city data, to protect privacy while at the same time allowing public and economic decision making to improve the local community.

From the individual's point of view, the computer information model needs to accommodate individuals' lives to their convenience, and basically include what is called the Consumer's Economic Space:

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Housing, Education, Transportation, Food, Health, Media, Clothes, Energy, Recreation/Entertainment/Leisure, Management of the Economy/Banking, Public Assistance/Retirement/Social Security, Taxes/Public Service/Volunteering.

Current computer technology would allow the consolidation of the information flows so that any community could maintain its information base if there is local political will. The existing city political structure creates two computer programs, called City Data and City Future. Within them, they build the ground rules for how the local area creates its own future.

The next social science challenge is to identify how to improve quality, described on a personal level by Thomas Michael Power in *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”.

Empirically, define local 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, longterm 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.

Most people care about their community, and take pride in it. It is the major long term investment of their lives. It would be nice to have an economic language that encourages community action that makes efficient use of scarce resources and is ecological.

For a hands on manual for creating good politics around issues in your local community, *Economic Renewal Guide: Collaborative Process for Sustainable Community Development*, by Michael J. Kinsley, Rocky Mountain Institute, 1997

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TRANSFORMATION TO ECOTOPIA

In 1975, Ernest Callenbach published a book called *Ecotopia*, about an ecologically-responsible society: “a few Ecotopian militants spread the point of view that economic disaster was not identical with survival disaster for persons – and that, in particular, a financial panic could be turned to advantage if the new nation could be organized to devote its real resources of personal energy, knowledge, skills, and materials to the basic necessities of survival. If that were done, even a catastrophic decline in the GDP (which was, in their opinion, largely composed of wasteful activity anyway) might prove politically useful.

“What was at stake, informed Ecotopians insist, was nothing less than the revision of the Protestant work ethic upon which America had been built. The consequences were plainly severe. In economic terms, there was a drop in the Gross Domestic Product by more than a third. But the profoundest implications of the decreased work week were philosophical and ecological: mankind, the Ecotopians assumed, was not meant for production, as the 19th and 20th centuries believed. Instead, humans were meant to take their modest place in the seamless, stable-state web of living organisms, disturbing that web as little as possible. This would mean sacrifice of present consumption, but it would ensure future survival – which became an almost religious objective, perhaps akin to earlier doctrines of “salvation.” People were to be happy not to the extent they dominated their fellow creatures on the earth, but to the extent they lived in balance with them. As a basic philosophy, the idea of political power is to put technology and social structure at the service of humankind, rather than the other way around.

“The Ecotopian economy must be considered a mixed one, but some elements of the mix are novel, and because of ecological and political considerations the balance of the mix is quite different. During the economic transition, people realized that a new era was indeed upon them and began spontaneously taking over farms, factories and stores. This process was chaotic, but it was not anarchic; it was controlled by the local governments and local courts. Such take-overs set the tone for the ongoing tasks of production and distribution of essentials; and they worked. But more massive and deliberate economic changes soon took place, above all in the diversion of money and manpower toward the construction of stable-state systems in agriculture and sewage practices, and in the scientific and technical deployment of a new plastics industry based upon natural-source, biodegradable plastics. (The public transportation system, which remains an infringement on the stable-state principle, also consumed many resources.)

“The new tax system relies entirely on a corporation tax – that is, a tax upon production enterprises (including individuals). It is based partly on net income, but also partly upon “turnover,” or gross income. Like most functions of governing, tax-levying is carried out by the communities (mainly cities), which delegate very limited powers to the regional and national levels. The reasoning behind this system is complex, but it turns upon the view that all taxes are fundamentally a means of the government seizing a share of

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economic output and putting it to publicly determined purposes – and that this seizure should therefore be at the immediate source, simple, understandable, just, and open to public view. (Ecotopian tax returns are not confidential.)

“This tax policy includes laws that redefine the position of the employee. The workers in an Ecotopian enterprise must now all be “partners”: a person cannot just set up a business, offer wages to employees, fire them when they are no longer needed, and pocket the profits. There is no personal income, sales, or property taxes in Ecotopia. Aside from personal articles, no Ecotopian can inherit any property at all. There is a land tax that encourages concentration and probably accounts for the remarkable compactness of Ecotopian cities. There is a widespread aversion to other types of tax on the grounds that they are either regressive or promote divisiveness among people – whereas the enterprise tax, bearing as it does on collective groups, is thought to promote solidarity, and competition between work groups.

“There is no super-rich class in Ecotopia. Certain occupational groups, such as artists, scientists and some doctors, have slightly higher incomes, though national training policies deliberately seek to keep such differentials moderate. But there are said to be no individuals in Ecotopia who grow personally rich because they control the means of production and hire other people’s labor power.

“Direct absentee investment by one enterprise or person in another enterprise is not permitted. Surpluses can thus only be “invested” by lending them to the national banking system, which in turn lends funds to enterprises. This gives the bank tremendous leverage on the economy; it appears to contradict many Ecotopian protestations of decentralization, even if the national bank does maintain regional branches that have great autonomy.

“Ecotopian enterprises generally behave much like capitalist enterprises: they compete with each other, and seek to increase sales and maximize profits, although they are hampered by a variety of ecological regulations. The fact that the members of an enterprise actually own it jointly (each with one vote) puts certain inherent limits on what these enterprises do. For instance, they do not tend to expand endlessly, since the practical maximum size of joint-ownership firms seems to be less than 300 people – beyond that they tend to break down into bureaucratic, inflexible forms and lose both their profitability and their members, who seek more congenial environments. Also, the enterprises seem to be just as concerned with conditions of work as they are with profits, and in many instances members seem willing to accept lower profit and wage levels in exchange for a comfortable place to work or a way of organizing work which offers better relations among people doing it.

“The tax revenues are used by the community governments to support their recycling services, housing, power, water, telephone, medical services, police, courts and so on. Education is financed as a free-market private enterprise. A pro rata share of tax funds goes to the regional and national governments, to support operation of larger-scale

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systems such as the trains, defense, telecommunications, and most of the research establishment.

“Despite the importance Ecotopians attach to agriculture and other rural affairs, the Ecotopian constitution is city-based and not rural-based. The Ecotopian main cities dominate their regions through a strict application of one-person-one-vote principles. Furthermore, the county level of government is omitted entirely.

“There is a surprisingly small national welfare system, considering that Ecotopians enjoy a lifetime “guarantee” of minimal levels of food, housing, and medical care. While some citizens, especially those working on untried developments in the arts, utilize this guarantee to exist without jobs, most people either feel the guarantee level is too abject to exist on, or find it’s desirable to work in order to provide themselves with a lively social life. The old and disabled, of course, must survive by taking advantage of the guarantee; and, while low, is perhaps slightly higher than the U.S. Social Security system (which does not have the health, housing and food benefits of Ecotopia.)

“The Ecotopian government established long-range economic policies of diversification and decentralization of production in each city and region. Laws were introduced that flatly prohibited many types of highly polluting manufacturing and processing operations. Since tens of thousands of employees were put out of work, the new government made two responses to this. One was to absorb the unemployed in construction of a train network and of the sewage and other recycling facilities necessary to establish stable-state life systems. The other move was to adopt 20 hours as the basic work week – which, in effect doubled the number of jobs but virtually halved individual income. (There were, for several years, rigid price controls on all basic foods and other absolute necessities.)

“Ecotopians spout statistics on social costs with reckless abandon, calculations that inevitably involve a certain amount of optimistic guesswork. Ecotopians claim their system is considerably cheaper, if all the costs are added – and not ignored, or passed on through subterfuge to posterity or the general public. Acknowledging all the costs is necessary in order to achieve the stable-state life systems that are the fundamental ecological and political goal. If, for instance, the practice of “free” disposal of wastes in watercourses was continued, sooner or later somebody else would have to calculate – and bear – the costs of the resulting dead rivers and lakes. There is a relentless tendency to fix responsibility on producers.

“Ecotopian plastics are entirely derived from living biological sources (plants) rather than from fossilized ones (petroleum and coal). Originally there were two major objects for the researchers. One was to produce the plastics, at low cost and in a wide range of types: light, heavy, rigid, flexible, clear, opaque, and so on – and to produce them with a technology that was not itself a pollutant. The other objective was to make them all biodegradable, that is, susceptible to decay. This meant that they could be returned to the fields as fertilizer, which would nourish new crops, which in turn could be made into new

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plastics – and so on indefinitely, in what the Ecotopians call, with almost religious fervor, another steady-state system”.

CONCLUSION: RESPECTING INDIGENOUS POPULATIONS

The ultimate law of human ecology is: Nature bats last. No matter how smart or powerful humans are, we must live within the real constraints of nature.

This means that decision taking should be driven down to the lowest level, that people who will have to live with the consequences of an action should be the ones who are the final authorities. If the people of Valdez, Alaska had the choice, every one of them would have said that all oil tankers should be double-hulled, with electronic detectors to notify the ship’s captain if the outer hull had been violated, so that action could be taken before the inner hull is punctured and oil spilled. Single hull oil tankers are an example of a false economy that is prevalent in corporate industrial decision taking.

Western Civilization has spent the past five centuries imposing itself on the rest of the planet, and the results are not pretty. Most indigenous cultures know a lot about how to respect their native environment, and most industrial corporations do not. The theme of Jared Diamond’s book, *Collapse: How Societies Choose to Fail or Succeed* is that if a culture destroys its forests it will destroy itself. Industrial corporations are destroying most of the forests on the planet.

There is open debate about what is meant by the term “survival of the fittest”, especially by those species endangered by human action. Nature doesn’t care whether the human species survives or not, and unless our species turns its back on the automobile based economic system, the species may not survive to see the 22nd Century.

We need to create a healthy future. The planet needs fewer people, and we all should take responsibility for the planet’s health as well as our own and our community’s. We need a system that works.

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