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THE UNLIMITED ECONOMY IN MIND

My own picture of humanity today finds us just about to step out from amongst the pieces of our just one-second-ago broken eggshell. Our innocent, trial-and-error-sustaining nutriment is exhausted. We are faced with an entirely new relationship to the universe. We are going to have to spread our wings of intellect and fly or perish; that is, we must dare immediately to fly by the generalized principles governing the universe and not by the ground rules of yesterday's superstitious and erroneously conditioned reflexes....

Possibly it was this intellectual augmentation of humanity's survival and success through the metaphysical perception of generalized principles which may be objectively employed, that Christ was trying to teach in the obscurely told story of the loaves and the fishes.

—R. Buckminster Fuller

On the 50th anniversary of our nation's Independence, 4 July 1826, Thomas Jefferson, hero of modern liberalism, and John Adams, the great conservative, passed away. Their nearly simultaneous departure followed more than a decade of warm and profound correspondence, in which these two former antagonists exchanged their views on a broad range of topics.

As Adams wrote to Jefferson on 1 September 1816, "You and I ought not to die before we have explained ourselves to each other." What they "explained" to each other in that exchange was their mutual dedication to individual liberty and their common distrust of overweening government at home and abroad as the greatest enemy to freedom and to economic prosperity.

In his first letter of the exchange, Jefferson told Adams, "[Your letter] carries me back to the times when, beset with difficulties and dangers, we were fellow laborers in the same cause, struggling for what is most valuable to man: his right of self-government.

"Laboring always at the same oar," he continued, "with some wave ever ahead threatening to overwhelm us, and yet, passing harmless under our bark, we knew not how, we rode through the storm with heart and hand, and made a happy port."

Now in the third century of its Independence, the United States is once again riding through a storm that may prove more violent than any we have yet faced, a storm that threatens to sweep away our "right of self-government" and our economic freedom.

Despite the so-called Reagan Revolution a vast army of unelected bureaucrats, thick volumes of unlegislated laws and regulations, and confiscatory taxes still threatens to destroy the richness, variety, and vitality of our private economy, while some members of the intellectual establishment scorn both the market and economic growth as viable in "an age of limits."

Internationally, we confront totalitarian Marxist nations which cannot long tolerate juxtaposition or active trade with free democracies and which can survive their own bankrupt economic policies only through military expansionism.

So we are a nation whose freedom and independence are on the firing line, from without and within. How well we respond to this challenge really depends on how much we genuinely cherish our freedom and whether we are prepared to make real sacrifices to preserve it—and, in turn, that depends on the degree to which we equate liberty with economic progress and well-being.

Despite the 1980 elections and President Reagan's early congressional victories, the signs are hardly reassuring. Most troubling of all are the insistent efforts of the predominantly left-liberal "new class" in media and academia to undermine this revived commitment to economic liberty and the market system, and the effectiveness with which they have already painted it with the broad brush of class warfare and the politics of envy.

Even newspapers that ought to know better use the pejorative and classist epithet "trickle-down" to describe even the fairest of broad-based tax-cut proposals—and to suggest that the most classical use of investment incentives and monetary restraint is in some way radical or unconventional.

Although Marxism has fully discredited itself everywhere, its hopeless illusions still seem to mesmerize most of the U.S. media. The economic lines of battle are drawn as never before between those who continue to favor a demand-oriented and redistributionist approach to economic policy, and those who want to shift our policies back to the supply side—between those who favor stimulating and controlling demand with heavy government spending and regulation, and those who want to stimulate more supply through more incentives and a freer market, and who see economic *growth* as the solution to our problems.

In the final analysis, this debate between supply-side and demand-side economics boils down to a question of which is more important to us, liberty or security.

If we believe (as most demand-siders do) that the world economy is substantially a zero-sum game, and that wealth is physical and therefore finite, then collective security will be our primary goal, and the sacrifice of individual liberty will be the inevitable price. But we shouldn't be surprised if, as Thomas Jefferson warned, the trade turns out to be a very poor one, providing neither comfort nor security. Certainly the last decade has made that clear.

If, on the other hand, we are convinced that wealth and substance are essentially metaphysical (and therefore potentially unlimited) and individually generated, we will see liberty as the prerequisite for economic growth, prosperity, and ultimately real security—and economic rights and freedoms as indivisible from civil liberties.

It seems no coincidence that Adam Smith released *The Wealth of Nations* at about the same time that this nation proclaimed its independence from Britain. Freedom and wealth are mutually compatible and complementary, and ideas are pervasively universal in their influence on men and nations. Smith's theoretical challenge to turn loose the production of wealth, by lifting from England and Europe the restrictive bonds of highly regulated mercantilism (with its almost fascist emphasis on licensors, tariffs, guilds, and customs) found its natural metaphysical response in the American colonists' demand to be free of the Crown's economic tyranny. The premise of Smith and the colonists was that real wealth and human prosperity were ultimately the product of individuals, not of the state; and the nation, or group of nations, that provided the most individual freedom would ultimately generate the most prosperity, the most real wealth for all.

Unfortunately, for the past 10-15 years, U.S. economic policies have been dominated by the Keynesian notion that it is demand and government that run the economy, not supply and the market; and that

government, through its fiscal and regulatory policies, can manage the economy by raising or lowering the level of demand, at will. Reinforcing these policies has been the idea that the distribution of wealth is more important than the production of it, that the way to stimulate economic growth is to tax money out of savings and investment and redistribute it into consumption and demand. Not surprisingly, such policies have resulted in a soaring of consumer demand (by inflating money income) and a drastic slowing down of supply (investment and productivity), with the inevitable consequence of raging inflation.

As we reap the harvest of this demand-side approach, we face the uniquely grotesque combination of high unemployment and high interest rates—slamming on the credit brakes trying to cure inflation with interest rates that can be described only as usury.

Fortunately, not all economists have fallen for the Keynesian demand-side illusions. Far from it. The 1980 election, in fact, represented a rejection of such policies and a reaffirmation of highly traditional, classic supply-side, pro-growth economic ideas that had their roots in Say's Law (supply generates its own demand) and Adam Smith's paean to free markets and individual incentives, *The Wealth of Nations*, both products of the 18th century.

These neotraditional supply-siders argue that trying to manage the economy solely through government manipulation of money demand is a little like trying to run a Diesel tractor with power in only one track. They argue that since inflation, in the last analysis, is too much money chasing too few goods, it is at least as important to increase the output of goods supply as it is to reduce the flow of money demand. And since tight money alone only cuts demand (while it also reduces supply through recession), its inevitable result is terrible economic pain without any real purpose, a concentric circle of accelerating despair.

In 1979, a famous U.S. Keynesian economist was passing through customs at Kennedy Airport when the customs officer, noting name and occupation, said to him: "I don't know whether I should let you back in, Professor, considering what you economists have done to this country." That customs officer may not have understood all the nuances of the supply-side/demand-side debate, but he knew back in 1979 that something terribly important had gone wrong with the American economy during the last decade or so; and he was ready for some *common sense*—another word for supply-side economics. He knew by then that the demand-side track had become a dead-end siding.

The best proof of this was that in 1979 and 1980, the United States was the only major industrial nation in the free world whose productivity and standard of living were actually declining, as the average real wage of workers was falling by 3%-5% each year.

This decade-long erosion in real wages clearly signaled that something had to be fundamentally wrong with the economic thinking that was guiding the nation. After all, the whole purpose of economics is to increase income and productivity, not diminish it. The very word "economy" describes and defines "productivity," since both terms encompass that process by which human beings use their intelligence, inventiveness, and investment to produce progressively more value with progressively less effort and fewer materials—to do more with less.

Thus, as presented in 1981, the supply-side program for healing the economic mess was a combination of reducing money demand through restraint in government spending and the money supply, and increasing goods supply, or productivity, through massive reductions in taxes and regulations on both individuals and business. In other words, the new administration proposed to heal inflation by real economic growth taking place in a freer market and with sound money—a formula that was successful long before Keynesian policies were adopted.

It is no accident that the United States, until the late 1960s, was the world's strongest and fastest-growing economy. Though with notable imperfections, it led the world in individual freedom and in rewards for productivity, invention, and investment.

But in the last decade or so, that has changed dramatically; and contrary to belief, it started well before OPEC and the so-called energy crunch, with the increasing domination of the marketplace both legally and logistically by the heavy hand of government regulation and fiscal policies and the ever-tightening brakes of "taxflation." That has been done not so much by the substitution of one economic policy for another, but rather by trading in true economy, per se, for government—exchanging productivity and supply for demand and redistribution.

That is what Keynesian economics is really all about. It provides a rationale for government to stimulate or retard economic activity through the manipulation of aggregate demand, through policies designed to siphon money out of savings (investment) and pump it directly into consumption through heavy deficit spending and transfer-payment programs. It's a rationale that politicians and their close friends, the bankers, find irresistible.

Since the government, in and of itself, produces no wealth or supply, the inevitable result of such policies must always be to depress (through taxation and inflation) real supply, while it stimulates demand and consumption, thus producing diminishing productivity, unemployment, and rising inflation at the same time, something we now call "stagflation."

Social Security is a classic example. Few people realize that the original rationale for this program in the Depression (and within the Roosevelt Brain Trust) was not so much compassion for the elderly as it was the specific Keynesian purpose of pulling money out of savings and pumping it directly into consumer demand as a means of stimulating a then stagnant and deflated economy. Forty-five years later it was still doing the same thing on a grand scale, but for a hugely inflated economy. It worked so well that in 1981 it was siphoning off more than \$150 billion a year from productive payrolls and savings (thus depressing investment and productivity) and pumping it right back into consumer demand, spending, and, therefore, inflation. Social Security taxes in 1981 were nearly 50% larger than the nation's total personal savings. They had been *equal* in 1975.

Furthermore, Social Security has also directly led to the huge drop in one of the most productive segments of the U.S. work force, ages 50 to 65, where, because of early retirement and growing disability pensions, participation dropped from 90% in 1965 to 74% in 1980. Retirees are now growing in number nearly three times as fast as young workers are entering the labor force. This has forced still higher taxes on payrolls (and productivity) and still lower rates of savings and investment, promoting inflation. Inflation, in turn, has led to more and more cries to subsidize demand still further by imposing price controls over energy, rents, and housing—and increasing benefits to pay for them.

The so-called energy crisis was very largely the result of such demand-oriented policies. It is no accident that the decline of U.S. domestic production of oil began in 1971—the same year we first imposed price controls on domestic crude oil. Our refusal to lift those controls in 1974-75 directly stimulated demand, depressed supply, thwarted conservation, and ultimately led to even higher prices when decontrol finally was forced upon us in 1980-81. After full decontrol in January 1981, the demand for oil imports quickly fell 23%, and prices started back down by as much as \$6-\$8 a barrel, even as domestic supply and production increased for the first time, and a worldwide glut developed.

Unfortunately, the statist, who have dominated economic thought in the United States, told us that the only solution to these problems lay in still more controls over wages and prices—that is, the rationing of demand, not the production of supply or the operation of the market.

Deep beneath the surface of this debate over demand-side vs. supply-side economics is a basic struggle between those who now believe that an aggressive pursuit of growth and wealth is no longer a viable option for a resource-scarce world and those who still cherish and believe in the so-called American Dream of ever-upward mobility.

Back in May 1979, Speaker of the House Thomas P. "Tip" O'Neill told the graduating class at Providence College that we must "learn to live with limits" and accept "scarcity and shortages as facts of life." In 1981, liberal economist Robert Lekachman warned us that "the era of growth is over, and the era of limits is upon us"; and he called for a "credible agenda" to include total government management and allocation of credit, investment, and natural resources in what he described as "a democratically planned policy," in which wages and prices would be permanently controlled.

This debate was joined symmetrically at the very moment of the 1981 presidential transition:

The rapid depletion of irreplaceable minerals, the erosion of topsoil, the destruction of beauty, the blight of pollution, the demands of increasing billions of people all combine to create problems which are easy to predict and observe, but difficult to resolve.

–Jimmy Carter
Farewell Address
16 January 1981

It is time for us to realize that we are too great a nation to limit ourselves to small dreams. We're not as some would have us believe doomed to inevitable decline. We have every right to dream heroic dreams.

–Ronald Reagan
Inaugural Address
20 January 1981

The flight to freedom of the 52 American hostages, commencing minutes after President Reagan finished his address, seemed a perfect metaphor for the inaugural itself. After a four-year litany of limitation, 226 million Americans finally were liberated—at least from the dismal dirges of President Carter's modern Malthusianism—and asked to dream heroic dreams.

Curiously, pessimism was not Mr. Carter's natural demeanor. He came to office exuding confidence and competence. He seemed unafraid and undaunted by the challenges that faced him. His attitude seemed characteristically American in its buoyancy. But the seeds of his destruction were contained in the large coterie of limits-to-growth ideologues with which he staffed his administration. Ironically, their policies, born and bred in the think tanks and academies of an economically declining Northeast, shaped both the substance and the rhetoric of the first president from the new Sunbelt, where economic growth is almost a religion in itself.

So President Carter's smiling walk down Pennsylvania Avenue on his inaugural day gradually gave way to the melancholy metaphors of his "national malaise" speech of July 1979, when, for the first time, the American mood shifted from its normal 2-to-1 "optimistic about the future" to nearly 2-to-1 "pessimistic

about the future" (CBS-N.Y. Times polls). It was that pessimism that Americans ultimately rejected at the polls.

Long before the 1980 election, the distinguished British-born journalist Henry Fairlie told a dinner party of startled sophisticates, "No matter who wins this election, by 1984 America will be surging with new life. It will have recovered its confidence and creativity, economically, politically, and culturally." Fairlie had apparently sensed what most of the intellectual establishment hadn't. The American people were already in the process of reaffirming their faith in the potential of the individual human spirit for creativity and growth.

In that sense, the 1980 election, far from being devoid of issues, turned out to be a profoundly metaphysical debate between the more spiritual, or theistic, view of the world and the more humanistic and materialistic view of it; between those who sense that the spiritual is the dominant force and those who see the physical as the primary limiting factor; between those who feel that the real energy of the universe is mental and, therefore, infinite and those who believe with equal passion that energy is material, finite, and running out; between those who believe that an economy should be an expansively unfolding creative idea and those who look upon it largely as a zero-sum game.

This was at its roots a religious debate. After all, to believe in a wholly materialistic universe, governed by chance, necessity, and implacable physical laws, is, by definition, to accept entropy, mortality, and despair—and by inversion, to disbelieve in immortality, hope, future, and God.

Out of such a nihilistic view must arise a profound desire for collective security against a hostile environment. To such a mentality the notions of faith, individuality, freedom, confidence, and even incentives are regarded merely as psychological factors instead of substantive spiritual and economic forces. After all, if wealth and Substance are really finite, why bother with incentives? Why strive to grow?

Given the dominance of this intensely materialistic scientific determinism in academia as well as the media, is it not surprising, in a land largely built by religious refugees, Jew and Christian, Protestant and Catholic, that religion itself should finally rear its head and plunge full blown into the political arena? What we are talking about, however, is something far more profound than the sometimes petty puritanism and rural religiosity which at times have seemed to dominate recent elections.

We are dealing, no less, with the basic conflict between two entirely different concepts of man and his universe, concepts that affect every aspect of our social and economic lives, one determinedly physical and finite and the other profoundly metaphysical and infinite; the one (collective socialism) rooted in fearful concern about visible resources, the other (market capitalism) springing from faith in spiritual reality. Or, as George Gilder has written in *Wealth and Poverty*, "Capitalist production entails faith—in one's neighbors, in one's society and in the compensatory logic of the cosmos. Search and you shall find, give and you shall be given unto; supply creates its own demand. It is this sequential logic that essentially distinguishes the free from the socialist economy." Above all, he warns, "When faith dies, so does enterprise." St. Paul puts it more profoundly: "We walk by faith, not by sight."

For more than a decade now, America has been moving away from its historic approach of walking by faith and has been attempting vainly to walk by sight—that is, to chart a precisely econometric course toward the elusive grail of material security and safety, using the life nets of collective government, steered by the lifeboat mentality of environmental extremism that measures our wealth with physical callipers—by what we can see rather than by what we can *know*. Not surprisingly, productivity and enterprise have deadened even as security has diminished.

Just as Adam Smith's expansive *Wealth of Nations*, which spawned the American dream, was nurtured in the rich spiritual soil of the Anglo-Scottish enlightenment of Locke and Burke, with its profoundly metaphysical (and, therefore, infinite) view of mankind and the world, so today's distributionist and age-of-limits economic thinking has sprung full-blown from the largely atheistic, scientific determinism of the 20th century, with its deeply physical (and therefore finite) view of the world, and has found its rationale in the dialectical materialism of Marx.

Yet even Karl Marx, who so despised individuality and spirituality as economic or political perspectives, nevertheless understood their extraordinary potential for the generation of wealth and productivity:

The bourgeoisie has been the first to show what man's activity can bring about. It has accomplished wonders far surpassing Egyptian pyramids, Roman aqueducts and Gothic cathedrals . . . the bourgeoisie, during its rule of scarce one hundred years, has created more massive and more colossal productive forces than have all the preceding generations together.

Unfortunately, while Marx acknowledged (and his contemporary followers still acknowledge) the power of free-market incentives, their preoccupation with an intensely material view of the world led them to the conclusion that such incentives would only lead to the unfair distribution of a finite resource base. To this day, those on the left, including the most noble civil libertarians and traditional liberals who otherwise support political and social freedom, argue that the free marketplace cannot cope with the equitable distribution of what they regard as limited material wealth.

While they reject the totalitarianism of Marxist states, they succumb to Malthusian views of limits to growth. In this sense, they fail to understand that the intellectual and spiritual forces that seem to produce wealth relatively easily in a free-market setting are, themselves, the real wealth of the universe—the unlimited substance which sustains us. These are what R. Buckminster Fuller refers to as "the metaphysical component of wealth"—the ideas, inventions, and technology that have enabled us to go right on expanding real wealth, even as the so-called physical resources seem to the superficial materialist to be narrowing.

It is this essentially spiritual view of the world's economy that really separates the supply-siders who believe in growth as a fundamental economic mandate and the demand-siders who think in terms of redistribution. The more materialistic one's perspective on the world, the more inevitably economics itself becomes a science of rearranging and allocating demand and wealth, and the more likely one is to accept the prognoses and prescriptions of Marx and Malthus. After all, if there really is only so much to go around, it should at least be distributed fairly.

Conversely, to believe in supply-side economics is by definition to reject this construct of a strictly matter-based economy, and especially to reject the materialistic premise of environmental extremists that the Second Law of Thermodynamics is leading humanity quickly toward an entropy watershed in which the planet itself rebels against its inhabitants and their economic values.

The central message of nearly all religious prophets throughout history has been to look beyond these limited presentations of the physical senses into the ultimate potential of the mind and spirit. The common denominator of faith was and is the willingness to recognize that our real wealth comes not from finite natural resources or uncertain material conditions, but from the triumph of the metaphysical over the physical, of attitudes over appearances. Or in St. Paul's words, "Through faith we understand that the worlds were framed by the word of God, so that things which are seen were not made of things which do appear."

The history of our nation, for all of its myriad faults and shortcomings, is the unfolding of the progressive triumph of the free human spirit and intelligence over limitation and lack. True, we have been blessed with abundant natural resources. But other nations and continents have had even more. Yet they prospered much less.

The prosperity that has unfolded around the Western world is, to no small extent, the direct result of the outpouring of American technology and the overflowing wealth of ideas that have fueled not only our own growth, but so many of the economic miracles of Japan and Germany, not to mention the prosperity of some Third World nations.

As Professor John W. Kendrick of George Washington University wrote in the American Enterprise Institute's *Economist*, "Actually much of the high growth of productivity abroad has been due to catching up with U.S. levels of technology." His econometric analysis of the sources of our productivity gains and losses over the last two decades attributes most of the net gain to "advances in knowledge," which is shorthand for technological breakthrough. Only a small fraction has come from capital investment in present plant and equipment.

It is Kendrick's thesis, in fact, that as our economy moves more and more into the realm of high technology, capital investment will have less and less relationship to economic growth or productivity, since so many of the technological breakthroughs of the 1970s and '80s are effectively reducing the amount of capital needed to produce economic value itself.

Kendrick's analyses grew out of the seminal work of Edward F. Denison at the Brookings Institution which shows the immense degree to which differences in productivity among even the most developed nations arise not so much from capital investment or economies of scale as from fundamental differences in the level of technological knowledge. Denison found that almost half of the productivity differentials that the United States has enjoyed over its main competitors has been a function of technological knowledge and research and development advances.

For example, of the 44% productivity advantage the U.S. enjoyed over Great Britain in 1976, nearly 30 points of that arose from technological factors and other aspects of the knowledge gap, which give U.S. industry its real lead over the rest of the world. Similarly, of the 49 point advantage the U.S. enjoyed over Japan in 1976, 26 points (more than half) derived from the technology gap.

So, even as economists and policy makers in Washington are concentrating on ways to increase capital investment in new plant and equipment, the thing that is most responsible for keeping the United States competitive in the world market has relatively little to do with physical assets and almost everything to do with metaphysical assets—invention and technological breakthroughs. It is an interesting and significant fact that the state of Massachusetts in 1981 had one of the lowest levels of new capital formation in the nation and one of the highest rates of economic growth. Its high-technology industries involve relatively modest plants but an enormous investment in individuals (engineers and scientists) and in their ideas, which are providing the greatest breakthroughs in our economy today.

In 1955 a company I worked for installed a computer to handle payroll and billings. It cost \$150,000 a year in rentals, took up 900 square feet in floor space, and required eight full-time people just to keep it going. In 1981 a Massachusetts company produced a computer that sold for less than \$15,000, does four times as much work, is about the size of a small desk, and requires only one person to operate.

The Economy in Mind

Back in 1970 an electronic desk calculator cost \$280 and weighed nearly 20 pounds. In 1980 one could buy a hand calculator that does the same work more quickly for less than \$20, and it weighs only four ounces.

In its infancy in the 1940s, television was a tiny screen in a huge box. Today it is a big screen with a much smaller box of longer-lasting and more efficient parts.

In the 1930s, the average radio was a large box with a separate speaker a small sound. Today it is a three-inch rectangular cube held in the palm of one's hand, with enough volume to make dogs scream in terror, and it uses a fraction of the energy it once required.

Twenty-five years ago it took 15 pounds of feed and 14 weeks to raise a 2½ pound frying chicken. Today it takes 5 pounds of feed and 7 weeks to raise the same size bird for market.

These examples help to explain why most economists spell America's economic future in two words: high technology—that is, the technology not of more complex material structures but of better mental expression. In Cambridge, Massachusetts, for example, Polaroid now employs more than 12,000 people, largely because of the creative inspiration of one man, Edwin Land, whose ideas and inventions have brought great economic progress and jobs to the state, not to mention satisfying products to hundreds of millions of people around the world, and permanent wealth for many. He did this by transforming low-cost metal, paper, chemicals, and plastics into tremendously valuable and useful photographic products. All through the genius of his ideas.

In much the same way, most of U.S. economic growth in the 1970s and 1980s came not out of the mines or mills or assembly lines but off the chalkboards of the universities, as high technology replaced old-fashioned durable goods as the nation's economic leader.

Despite the fact that America's automobile and steel industries have steadily lost out to imports, despite the destruction of American textiles and leathers by Taiwan, South Korea, and Spain, and despite slowing productivity compared to the rest of the free world, U.S. manufacturing exports have actually been soaring. Prior to the recession of 1980, our economy was providing work for the highest percentage of our population in history, nearly 60%—far higher than in any other Western nation.

The single most important reason for this was the boom (both domestically and internationally) in the products of American high technology, from computers to communications equipment, from genetics to cybernetics. High technology has offered positive solutions to the world's most pressing economic problems, such as:

- ◆ Inflation—The real costs of most high-technology products have actually been declining steadily.
- ◆ Productivity—High-technology products are fundamental to increasing it.
- ◆ Energy use—Most high-technology products require very low inputs of energy to produce or use them, and are intimately associated with energy conservation.
- ◆ Environment—Most high-technology industries are noninvasive, that is, they do not pollute, and they make heavy use of plentiful resources (such as silicon from sand).
- ◆ Capital costs—Most of all, high-technology industries are not capital intensive but labor intensive, requiring, on average, less than half the level of capital formation (plant and equipment) per worker as heavy durable-goods industries such as autos and steel.

Both the glory and the potential danger of the high-technology boom is that the real capital for these industries is not in factories and machines but in creative and inventive people and their ideas; not in

money but in mind-wealth. The future of our country, with its apparently narrowing base of the more obvious material resources, lies more than ever before in building up this metaphysical capital through high technology in its broadest sense and the sponsorship of the invention it implies.

Consider Japan, whose 114 million people are now crowded on less than 144,000 square miles of some of the lowest-resource territory in the world. Yet with a population density 15 times that of the United States and 11 times that of the world as a whole, Japan is now the world's leading manufacturing exporter, the third-richest nation, and the fastest-growing economy in terms of productivity.

When we compare Japan, with its per capita GNP of more than \$9,000 a year from a population density of 900 per square mile, with Zaire, one of the richest resource countries of Africa, with its per capita output of less than \$120 from a population density of only 30, we realize that even in this age of resource scarcity, a nation's wealth still has far more to do with people than with territory.

As F. A. Hayek put it so well:

Only since industrial freedom opened the path to the free use of new knowledge, only since everything could be tried—if somebody could be found to back it at his own risk—and, it should be added, as often as not from outside the authorities officially entrusted with the cultivation of learning, has science made the great strides which in the last hundred and fifty years have changed the face of the world. The result of this growth surpassed all expectations. Wherever the barriers to the free exercise of human ingenuity were removed, man became rapidly able to satisfy ever-widening ranges of desires.

The Energy of Mind vs. the Entropy of Matter

Ironically, in the face of this actual experience of the progressive unfolding of mental wealth, one of the more persistent arguments of our time is the doomsday prophecy that America's economic future is now limited. The basic premise of this doleful scenario is that America became rich because of our rich material resources, particularly oil. Now that our oil seems to be running out, it is time for Americans to begin scaling down our economic expectations. These ideas were summed up in a special section dealing with "The Energy Crisis" prepared by the editors of *The Christian Science Monitor* on 28 June 1976: "The United States' dominant position in the world today is largely due to the historical fact that the potential of oil as a cheap energy source was realized during the nation's industrially formative years and the country has been blessed with large domestic reserves." With these reserves now seeming to decline, the *Monitor* goes on to propose that "Americans, as a people, rethink many of their national and personal priorities. It is clear that the consumptive lifestyle which has developed in the U.S. in the last quarter-century cannot continue indefinitely."

In short, we are told that Americans must begin to scale down their standard of material livelihood and hold down their economic growth because their material resources are limited. Not only do such concepts not square with America's basic mental posture as the land of unlimited individual opportunity, but they do not readily agree with historical or economic reality.

In an article in the June 1980 issue of *Science* magazine (and also in his book, *The Ultimate Resource*), Julian Simon of the University of Illinois has taken on the no-growth prophets with an overwhelming mass of statistical evidence: "Bad news about population growth, natural resources, and the environment that is based on flimsy evidence, or no evidence at all, is published widely in the face of contradictory evidence." He refutes these assumptions: "Statement: The food situation is worsening in less-developed countries. Fact: World per capita food production has been increasing roughly 1% yearly for the last 40

years. . . . Statement: The danger of famine is increasing. Fact: Since World War II there has been a dramatic decline in famines. . . . Statement: Urban sprawl is paving over the U.S. including prime agricultural land. Fact: All the land used for urban areas, plus roadways, totals less than 3% of the U.S. Each year 1.25 million acres are converted to efficient cropland, while only 0.9 million acres are converted to urban and transportation use."

Simon's most telling critique deals with our supposedly diminishing resources of energy and minerals—a routine charge that flies directly in the face of historical fact. Data prepared by the National Commission on Materials Policy show that the known reserves of virtually every major mineral and energy form are larger today than they were in 1950, despite accelerating use. Or, as the National Commission on Supplies and Shortages concluded in 1976, "The geologic, economic, and demographic evidence indicates that no physical lack of resources will seriously strain our economic growth for the next quarter century and probably for generations thereafter."

Why? As Professor Simon points out, "Because we find new lodes, invent better production methods, and discover new substitutes, the ultimate constraint upon our capacity to enjoy unlimited raw materials at acceptable prices is *knowledge* . . . And the source of knowledge is the human mind."

Simon, like Buckminster Fuller, is arguing that the continuous unfolding of human knowledge and intelligence is the principal cause of our becoming equipped to do progressively more with progressively less, that is, to turn otherwise useless matter into useful life-sustaining value—in short, to practice *economy*.

In this sense, economics itself is anti-entropy, the constantly evolving process of imposing order, utility, and value on otherwise orderless, useless, and valueless matter. The danger, of course, is that even as our economic and metaphysical processes generate wealth where none was before, we are easily mesmerized into believing that the wealth is in the objects and products we have created instead of in the thought process and ideas behind them. We transfer the focus of our mental accounting process from the metaphysical to the physical. We fail to remember, for instance, that it was the internal combustion engine that gave oil its present value, and not the other way around.

It is this largely unaccounted metaphysical component of wealth that is the real reason why in the last 70 years alone we have gone from less than 1% of humanity being able to survive at any reasonable level of health and comfort to nearly half of humanity now surviving at a standard of living positively unimagined at the beginning of this century. As Fuller points out, "This utterly unpredicted success occurred within only two-thirds of a century despite continually decreasing metallic resources per each world person."

In fact, economic analyses show that, contrary to the doomsdayers, the real prices of virtually all major natural resources, both in terms of constant hours of effort and general commodity price levels, have steadily *decreased* for as long as there are reliable statistical records, or more than two centuries. Economic history, in other words, puts the lie to these limits-of-growth notions.

As Simon argues, "The fall in the costs of natural resources decade after decade, century after century, should shake us free from the idea that scarcity must increase *sometime*. There is no convincing economic reason why these trends toward a better life, and toward lower prices for raw materials (including food and energy) should not continue indefinitely . . . there are no meaningful limits to the continuation of the process."

Why then are we subjected to so many gloomsday prophecies of limited resource scarcity? Aside from the obvious ideological biases of the sources of these predictions, the primary reason seems to be the

adoption of the *engineering* approach of inventorying natural resources rather than the use of historical *economic* analysis.

"With the engineering method," Simon says, "you forecast the status of a natural resource by estimating the presently-known quantity of the resource on or in the earth; predict the future rate of use . . . and subtract the successive estimates of use from the physical inventory."

The problem with this method, of course, is that no one really *knows* what the present inventory is for any resource, nor can we possibly predict either the discovery of unexpected new lodes of these resources or the substitution factor—that is, the arrival of altogether new products to displace old ones.

As scientists H. E. Goeller and A. M. Weinberg argued in the *American Economic Review*:

We now state the principle of "infinite" substitutability. With three notable exceptions—phosphorus, a few trace elements for agriculture, and energy-producing fossil fuels (CH₂)-society can subsist on inexhaustible or near inexhaustible minerals with relatively little loss of living standard. Society would then be based largely on glass, plastic, wood, cement, iron, aluminum, and magnesium.

Dynamic economic analysis, as opposed to static engineering inventories, makes a convincing case for this rosy prediction; and it has been used with great effect to refute one scarcity scenario after another with the actual historical perspective of steadily rising resource availability at steadily lowering costs. George Gilder notes that "such [doomsday] views are suitable for analysis not in the universities (where they often prevail) but on the [psychiatrist's] couch."

Unfortunately, under the sanction and direction of President Carter, such Views found their way off the academic couch and well into the mainstream of American political and pseudoscientific thought through the publication, in the summer of 1980, of the much-touted *Global 2000* report. It was prepared very largely by bureaucrats within federal agencies whose organizational power stake lies not in abundance but in scarcity, and whose summary forecast was predictably gloomy:

If present trends continue, the world in 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world we live in now. Serious stresses involving population, resources, and environment are clearly visible ahead. Despite greater material output, the world's people will be poorer in many ways than they are today.

For hundreds of millions of the desperately poor, the outlook for food and other necessities of life will be no better. For many it will be worse. Barring revolutionary advances in technology, life for most people on earth will be more precarious in 2000 than it is now.

The problem of course was that *Global 2000* (like so many of its predecessors) presented a viewpoint supported by sernscientific conjecture but deeply marred by historical and statistical reality.

Herman Kahn and Ernest Schneider of the Hudson Institute called the report "Globaloney":

The insistence of "Global 2000" that the world is headed straight for disaster is intrinsically implausible. Gross World Product and Gross World Product per capita have been *growing* inexorably almost every year for at least a century. Life expectancy, the best single available indicator of human life and welfare, continues to lengthen almost everywhere, year after year. Pollution levels in the developed world are being reduced: as the rest of the world becomes more affluent, this pattern will probably be repeated. Even more basic, of course, is the peaking of world population growth which

occurred in the 1960s. Given these facts, it seems passing strange that the doomsdayism of "Global 2000" is playing to rave reviews.

Julian Simon was even more specific and blunt in debunking the essential contentions of the report, many of which are still prominently accepted as conventional wisdom in the public consciousness and media. In noting that *Global 2000* predicted that "the world fish harvest is expected to rise little, if at all, by the year 2000," he cited the statistical evidence that in the past 20 years the catch has more than doubled, with increases almost every year—hardly a case for stagnation. As for "Globaloney's" thesis that per capita food production would increase by only 15% from 1970 to 2000, Simon argued, "over the less than 30 years from 1950 to 1977, per capita food production rose by around 30%. Why project *half* that rate of increase for an even longer period of time?" Why, indeed.

Probably the most invidious and pervasive gloom of *Global 2000* concerns the Department of Agriculture's repeated assertion that "each year the nation loses 3 million acres of farmland" to urban development and transportation (highways, etc.). Curiously, H. Thomas Frey, of the USDA's own Economic Research Service, found that from 1969 to 1974 the total shift of land from agriculture to urban-plus-transport was only 0.9 million acres per year, less than one third as much as *Global 2000* had contended. In 1978 the Economic Research Service put out a study which showed that new cropland was being created by draining swamps and irrigating deserts at the rate of 1.3 million acres per year. So 400,000 acres *more* of new agricultural land are now being added than old land is actually being lost each year to urban development. These facts support the contention of geographer John Fraser Hart that "urban encroachment on rural land is not a serious problem in the United States." They also verify the statement by Frey that "we are in no danger of running out of farmland."

Because of the hysteria generated in the media by *Global 2000*, Americans are routinely subjected to headlined articles about "America's vanishing farmland." While U.S. farmers struggle to market surpluses caused by excess crop production, local officials pass unnecessary new laws to protect us from these nonexistent dangers. In July 1980 Governor James B. Thompson of Illinois issued an executive order to "protect prime agricultural land," which, he said, has steadily declined [in Illinois] at an average rate of approximately 100,000 acres per year." Professor Simon quickly reminded the governor that the U.S. Census of Agriculture shows that between 1974 and 1978 the land actually harvested in Illinois rose from 21,517,665 acres to 22,826,463 acres, an average annual *increase* of 262,000 acres.

The most serious economic challenge facing U.S. agriculture today is keeping excessive productivity from so glutting the market that it wipes out farm income. The fact that less than 3% of the American population who are farmers now feed not only the most food-consuming national populace on earth but also 20% of the rest of the world as well, does not seem to deter the Globaloney-makers. Entropist Jeremy Rifkin concludes his appointed round of dismal despair:

As more and more energy is expended in American agriculture, the entropy of the overall environment increases. The accumulating disorder in the form of pollution and soil erosion increases the overall cost for both society and the agricultural sector. . . . The final victim of the process is the consumer at the checkout line at the neighborhood supermarket, who is forced to pay higher prices every week for the food—energy—needed to sustain life.

The truth, though, is that these American consumer "victims," about whom Rifkin and others worry so much, continue to, pay the lowest cost for finished food goods of any nation on earth, and receive the highest level of nutrition. Even in a so-called deep recession, they experience a level of abundance in the marketplace about which most nations, and especially those with planned economies, can only dream.

Now, if it is true, as many argue, that America's position of economic power and its broad distribution of wealth really were solely the result of our vast but now supposedly diminishing material resources, how can we explain the extraordinary backwardness of the USSR, which sits on even more natural resources than ours? Why is it, for example, that the Soviet Union, with greater agricultural potential, must import our wheat? Why is it that Brazil, with some of the richest natural resources in the world, has a standard of living only an eighth of ours? The answer, of course, is that wealth is only partly dependent on material resources. It is far more dependent on the ideas that give those material resources value.

The oil we now regard as so precious was utterly worthless to the American Indians, who did not even know it was there, and only a little more valuable to the white men who first discovered it but had few uses for it. What ultimately gave oil its value were the technological inventions of those who found ways to use it, to make it serve us, to increase our freedom, our mobility, and our standard of living. More than 300 billion barrels of oil lay useless and valueless under the Persian Gulf for eons until a developing Western civilization gave oil its temporary value. Does it not seem likely that the same inventive forces of human imagination will one day take that value away from oil even before it runs out and give it to some other resource, say, to hydrogen or tritium or some other element?

Similarly, uranium was worthless until Einstein (working alone, and removed from economic necessity) comprehended more of the real nature of the material universe, and thus potentially released all of us from bondage to old and limited ideas of energy. From *Spaceship Earth*: "Abraham Lincoln's concept of 'right triumphing over might' was realized when Einstein as metaphysical intellect wrote the equation of physical universe $E = Mc^2$ and thus comprehended it. Thus the metaphysical took the measure of, and mastered the physical."

In the last analysis, real wealth is (and always has been) productivity—the ability, as Buckminster Fuller puts it, "to cope with the forward days of our lives"—that is, to provide the goods and services that further free mankind from bondage to drudgery and unrelenting toil. In turn, this ability to cope derives from ideas and the inventive capacity to take inanimate materials and transform them into useful inventions and products—to make the planet productive.

"Wealth is the progressive mastery of matter by mind," says Fuller, and in his equation, even supposedly "rich" natural resources take on the qualities of wealth only as the result of human invention and ideas. And since ideas are unlimited, so, Fuller argues, is real wealth. From this perspective both the capitalist and socialist ideologies are wrong because they continue to approach the material world from the standpoint of limitation—of not enough to go around—of thinking that matter itself is wealth, that material energy is the only energy, and that because of entropy, wealth itself is inevitably disappearing, not being generated.

The result is that the world has too long been dominated by the "pirate mentality," the race for control by nations and enterprises over specific and seemingly finite material resources—"a constant Malthusian-Darwin-you-or-me-to-the-death-struggle," all on the assumption that some kind of economic Armageddon was just always around the corner. Yet this Armageddon, or Doomsday, which has regularly been predicted as imminent for centuries, has not come because it does not have to and shouldn't. The discoveries of Einstein and subsequent physical scientists have released us partially from the cruel physical laws that declare that our universe is running down and our energy running out. We are protected by the laws of conservation, as Fuller points out:

Energy is not only conserved but it is also finite. It is a closed system. The universe is a mammoth perpetual motion process. We then see that the part of our wealth which is physical energy is

conserved. It cannot be exhausted, cannot be spent, which means exhausted. We realize that the word "spending" is now scientifically meaningless and is therefore obsolete.

To this promising view, critics may correctly argue that Fuller is considering only the First Law of Thermodynamics (conservation) and conveniently ignoring the Second Law, which states that even though total energy is conserved, it is continually moving from a usable state to an unusable state (entropy). From Jeremy Rifkin:

For example, if we burn a piece of coal, the energy remains but is transformed into sulfur dioxide and other gases that then spread out into space. While no energy has been lost in the process, we know that we can never reburn that piece of coal and get the same work out of it.

The problem, however, with this extreme fixation with the Second Law is one of perspective. The universe may indeed be a closed system according to the laws of thermodynamics, but the earth itself is not.

To a fascinating degree, today's environmentalists have adopted the scientific equivalent of the 19th-century millenarians, and have become the 20th-century "billenarians," worried about the extinction of the cosmos and vainly trying to sell that worry as a paradigm for earth's immediate future. Even as the millenarians lost their credibility in the 19th century, it now seems likely that the billenarians will lose theirs in this era, as they continue to ignore the anti-entropic rush of human thought from the purely physical to the increasingly mental and metaphysical, a rush which, thus far at least, has far outdistanced the so-called narrowing resource base. It is still creating new wealth and capacity at a rapid pace, even as it pauses to clean up the environment.

To many, the history of the Western Judeo-Christian world has been marked by this slow but progressive triumph of the spiritual and metaphysical over the physical and finite. The Bible itself is a central message of anti-entropy, the pursuit of an economy that exists in spirit and mind transcending the boundaries and limits of matter. Jeremy Rifkin gives tacit notice to this:

It should be emphasized that the Entropy Law deals only with the physical world where everything is finite and where all living things must run their course and eventually cease to be. . . . It is mute, however, when it comes to the vertical world of spiritual transcendence. The spiritual plane is not governed by the ironclad dictates of the Entropy Law. The spirit is a nonmaterial dimension where there are no boundaries and no fixed limits to attend to. The relationship of the physical to the spiritual world is the relationship of a small part to the larger unbound whole within which it unfolds.

At the same time, even within the physical construct of the Second Law of Thermodynamics, experience shows that the most important energy is not physical but mental, and that if the physical or energy part of our wealth may seem to diminish, the metaphysical or know-how part of our wealth can only increase. Even when we make mistakes we learn more; and the more we learn, the more we understand and the wealthier we become. We are always being taught through clearer ideas how to do more with less.

This process, which Fuller calls "synergy," is nothing more than a restatement of the old postulate that the whole is greater than the sum of its parts, that a complete idea is more valuable and powerful than its individual components. Man is obviously more than \$4.98 worth of chemicals. A computer is clearly more than a few hundred pounds of metal, plastic, silicon, and wire. A car is far more than 3,000 pounds of metal, rubber, and plastic. Synergy, then, is the description of the process by which whole concepts or ideas transform otherwise useless material parts into valuable products or services. The wealth, or value, is produced not by the matter but by the ideas that transform it. The ultimate extension of this synergistic

process is that as the *idea* of any product becomes better understood, the less matter is needed and the more real wealth is created.

The promise of synergy is that as we increase our metaphysical capital—our know-how, our understanding of the world around us—our economic wealth can only grow, it can never decline. The danger Fuller sees is that "because our wealth is continually multiplying in vast degree unbeknownst and unacknowledged formally by human society, our economic accounting systems are still unrealistically identifying wealth as matter," and therefore ignoring our real potential. Some economists now question, for example, whether the level of capital investment any longer bears any relationship to economic growth—and whether we are even measuring economic growth adequately in present accounting models. These models leave us wholly ignorant of vast changes in real economic development.

Such ignorance not only leads to individual limitation and hoarding but also promotes the establishment of the very governmental and bureaucratic structures, controls, and regulations that could stifle the economic and technological progress of which we are truly capable. The ballyhooed energy crisis was a vivid illustration. As soon as price controls were lifted we experienced a world oil glut. Proponents of a still more dangerous notion called "re industrialization" argue that we should pour vast capital funds into old industries that technology is now rendering obsolete, instead of encouraging the process that replaces them with new breakthroughs.

It would also seem that a nation which can put a man on the moon can, through the same inventive process, the same devotion to the technological mastery of material limitations, break down the presently assumed limitations on our material energy resources—either by discovering whole new reserves of current fuels or by breaking new ground into entirely new sources of energy not even now understood, and (as is now happening) through the exigencies of the market learning how to use far less energy to more effect.

In recent times, the apparent decline in uranium supplies prompted the development of the breeder reactor, which produces new fuel about as fast as it uses up old. We may not ever decide to use it, but it demonstrates our synergistic capacities, and may well become, with more effective safeguards, a future energy resource. No one yet knows the full potential of solar energy, or of genetic engineering, or of fusion, since all these fields are still relatively early in their development. But in each area our horizons are expanding, not contracting. Biotechnology all by itself provides a glimpse at renewable resources within earth's open system.

Our economic future is not now and never has been tied to the physical assets we now see, but to the vast untapped potential of creative thinking—the metaphysical process which can show us entirely new reserves and new and easier ways of doing things, extending value and increasing wealth without depleting our planet. The only impediment to this is a fearful or limited concept of the real source of our wealth, a lack of faith in our ability as free individuals and institutions to generate whatever we need and to allow new ideas to unfold and new processes and resources to develop—in short, to continue to explore the unlimited economy that exists in mind.