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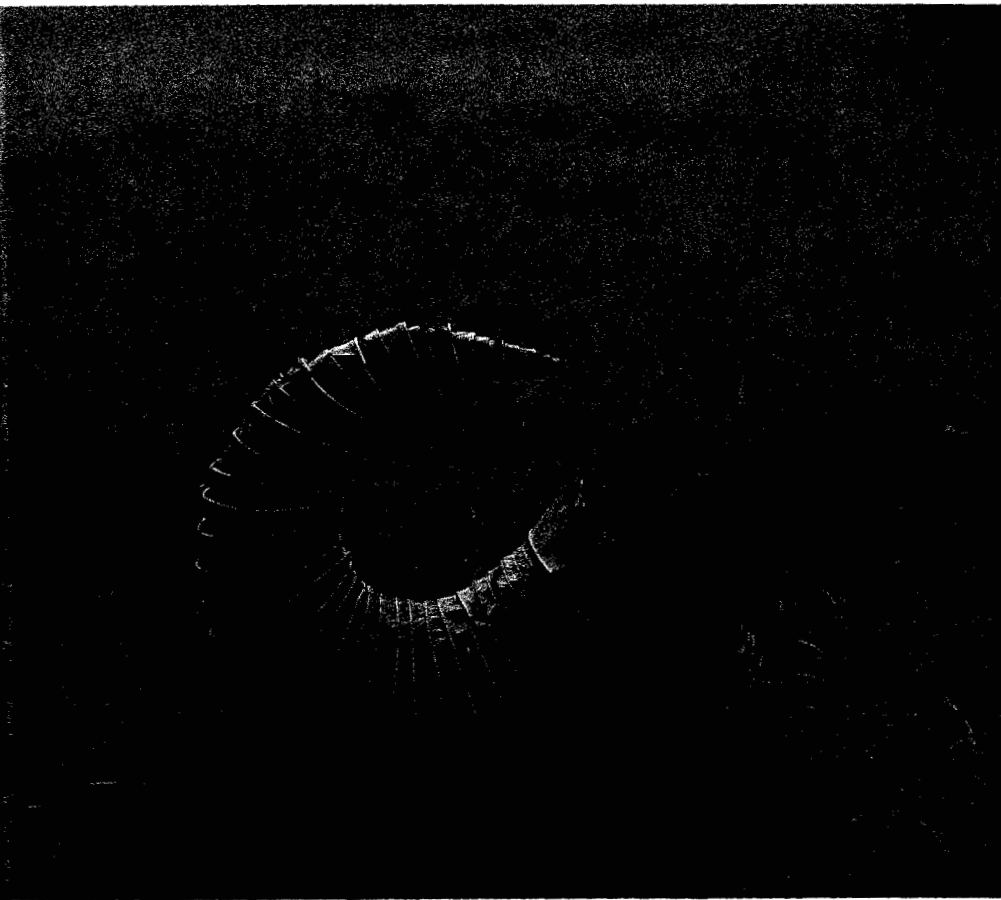
The Ecology of Commerce

A Declaration of Sustainability



Paul Hawken

AUTHOR OF *GROWING A BUSINESS* AND *THE NEXT ECONOMY*

"A daring, urgent vision of a kind of 21st century Canaan that Hawken yet believes we can reach." —*San Francisco Chronicle*

The Ecology of Commerce

Also by Paul Hawken

Growing a Business

The Ecology of Commerce

A Declaration of Sustainability

Paul Hawken

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The author and publisher have agreed to each donate a sum equal to the cost of planting one tree for every tree consumed in the production of this book to the Earth Island Institute, or a similar such nonprofit organization dedicated to forestry preservation.

For Max

Contents

Preface

Books originate in strange moments and places. This one began in the Waldorf-Astoria ballroom. A company I represented had been nominated for the Council on Economic Priorities "Environmental Stewardship Award." Although there are many environmental awards being handed out these days (DuPont, for example, received a Stratospheric Ozone Award from the Environmental Protection Agency that same year), CEP's tough stance on social and environmental responsibility gave our honor some weight. The list of initiatives our company had taken was long, and we weren't surprised to have been nominated, but when George Plimpton announced we'd won, I walked to the podium, looked out at the sea of pearls and black ties, and fell mute. Instead of thanking everyone, I stood there in silence, suddenly realizing two things: first, that my company did not deserve the award, and second, that no one else did, either.

What we had done was scratch the surface of the problem, taken a few risks, put a fair amount of money where our mouths were, but, in the end, the impact on the environment was only marginally different than if we had done nothing at all. The recycled toner cartridges, the sustainably harvested woods, the replanted trees, the soy-based inks, and the monetary gifts to nonprofits were all well and good, but basi-

cally we were in the junk mail business, selling products by catalogue. All the recycling in the world would not change the fact that doing business in the latter part of the twentieth century is an energy intensive endeavor that gulps down resources.

I don't mean to decry the efforts made by companies to reduce their negative impact on the environment. I applaud them greatly. But it was clear to me in that moment that there was no way to "there" from here, that all companies were essentially proscribed from becoming ecologically sound, and that awards to institutions that had ventured to the environmental margins only underlined the fact that commerce and sustainability were antithetical by design, not by intention. Management is being told that if it wakes up and genuflects, pronouncing its *amendes honorable*, substituting paper for polystyrene, we will be on the path to an environmentally sound world. Nothing could be farther from the truth. The problem isn't the half measures, but the illusion they foster that subtle course corrections can guide us to a good life that will include a "conserved" nature and cozy shopping malls. The companies that are changing their ways, reducing pollution, redesigning their products and methods of manufacture, have many different motives. In some cases, they would like to escape regulatory liabilities; in others, they would like to avoid perceived or future liabilities; in yet others, they are trying to change the nature of business and move toward "socially responsible" commerce.

The problems to be faced are vast and complex, but come down to this: 5.8 billion people are breeding exponentially. The process of fulfilling their wants and needs is stripping the earth of its biotic capacity to produce life; a climactic bust of consumption by a single species is overwhelming the skies, earth, waters, and fauna. As Lester Brown patiently explains in his annual survey, State of the World, every living system on earth is in decline. Making matters worse, we are in the middle of a once-in-a-billion-year blowout sale of hydrocarbons. They are being combusted into the atmosphere at a rate that will effectively double-glaze the planet within the next fifty years, with unknown climatic results. The cornucopia of resources that are being extracted, mined, and harvested is so poorly distributed that 20 percent of the earth's people are chronically hungry or starving, The top quintile in developed countries, about 1.1 billion people, currently metabolize 82.7% of the world's resources, leaving the balance

of 17.3% of the resources for the remaining 4.5 billion. Since business in its myriad forms is primarily responsible for this plunder, it is appropriate that a growing number of companies ask themselves, how do we conduct business honorably in the latter days of industrialism and the beginning of an ecological age? Companies are coming to realize that they may succeed according to conventional standards and still be violating profoundly important biological and natural systems. The question is, can we create profitable, expandable companies that do not destroy, directly or indirectly, the world around them?

Many companies today no longer accept the maxim that the business of business is business. Their new premise is simple: Corporations, because they are the dominant institution on the planet, must squarely address the social and environmental problems that afflict humankind. Organizations such as Business for Social Responsibility and the Social Venture Network, corporate ethics consultants, groups such as the Environmental Defense Fund, magazines such as *Business Ethics*, nonprofits including the Council on Economic Priorities and the Coalition for Environmentally Responsible Economics, investment funds such as Calvert and Covenant, and thousands of unaffiliated companies are drawing up new codes of conduct for corporate life that integrate social, ethical, and environmental principles.

Despite all this good work, we still must face a sobering fact. If every company on the planet were to adopt the best environmental practices of the "leading" companies—say, Ben & Jerry's, Patagonia, or 3M—the world would still be moving toward sure degradation and collapse. So if a tiny fraction of the world's most intelligent managers cannot model a sustainable world, then environmentalism as currently practiced by business today, laudable as it may be, is only a part of an overall solution. Rather than a management problem, we have a design problem, a flaw that runs through all business. When this thought came to me on the podium, I felt as if we were getting an award for a breakthrough when all we had done was to solve the tiniest part of a big puzzle.

Although proponents of socially responsible business are making an outstanding effort at reforming the tired old ethics of commerce, they are unintentionally giving companies a new reason to produce, advertise, expand, grow, capitalize, and use up resources. The rationale is that they are doing good. But flying a jet across the country, renting

a car at an airport, air-conditioning a hotel room, gassing up a truck full of goods, commuting to a job—these acts degrade the environment whether the person doing them works for the Body Shop, Greenpeace, or Siemens.

To create an enduring society, we will need a system of commerce and production where each and every act is inherently sustainable and restorative. Business will need to integrate economic, biologic, and human systems to create a sustainable method of commerce. As hard as we may try to become sustainable on a company-by-company level, we cannot fully succeed until the institutions surrounding commerce are redesigned. Just as every act in an industrial society leads to environmental degradation, regardless of intention, we must design a system where the opposite is true, where doing good is like falling off a log, where the natural, everyday acts of work and life accumulate into a better world as a matter of course, not a matter of conscious altruism. That is what this book tries to imagine.

To solve the problem, we need to define it concretely. Chapters 1 through 3 and 6 through 8 address this. These chapters are not mere litanies of environmental disasters; they are necessary prefaces to the solutions. Although I think the problems are actually more severe than we realize, embedded in each one of them is a realizable and crucial design solution.

In order to achieve those solutions, we must begin with a set of objectives. I would start with these.

1. *Reduce absolute consumption of energy and natural resources in the North by 80 percent within the next half century.* This is not as difficult as it sounds. In material terms, it amounts to making things last twice as long with about half the resources. We already have the technology to do this in most areas, including energy usage.

2. *Provide secure, stable, and meaningful employment for people everywhere.* Moving toward sustainability and not addressing job creation will exacerbate economic hardship and further degrade resources. Asking people to reduce consumption without increasing employment will create a world as destructive as the one they would replace.

3. *Be self-actuating as opposed to regulated or morally mandated.* Some people sincerely believe that the rate we're losing life on earth calls for the imposition of higher "rights" than those constitutionally recognized in democracies. Even if we agree that we should put aside cer-

tain human liberties for a greater good, there is still a crucial flaw in this argument. Government has a critical role to play, but that role must coincide with the natural impulses in society. Humans want to flourish and prosper, and they will eventually reject any system of conservation that interferes with these desires.

4. *Honor market principles.* No "plan" to reverse environmental degradation can be enacted if it requires a wholesale change in the dynamics of the market. We have to work with who we are – which includes our strong instinct to shop the market and buy products of comparable quality at the lowest price. We can't just ask people to pay more to save the planet. They won't do it in some cases—and can't in most.

5. *Be more rewarding than our present way of life.* We need to invite people into a world that delivers the goods, not subtracts them; that intrigues without threatening; in which they can participate, enjoy, and create. Present-day limits need to become opportunities.

6. *Exceed sustainability by restoring degraded habitats and ecosystems to their fullest biological capacity.* The dirty secret in environmentalism is that there is no such thing as sustainability. Habitats can endure over millennia, but it's practically impossible to calculate the sustainability of specific fisheries, tracts of land, and actual forests. We have also probably already passed the point where present planetary resources can be relied on to support the population of the next forty years. Any viable economic program must turn back the resource clock and devote itself actively to restoring damaged and deteriorating systems—restoration is far more compelling than the algebra of sustainability.

7. *Rely on current income.* Sustainable human communities should act like natural ones, living within a natural ebb and flow of energy from the sun and plants. This doesn't mean being cold and hungry in winter, but redesigning all industrial, residential, and transportation systems so that everything we use springs easily from the earth and returns back to it.

8. *Be fun and engaging, and strive for an aesthetic outcome.* Government, business, and environmental organization cannot create a sustainable society. It will only come about through the accumulated effects of daily acts of billions of eager participants. Some think humans are predatory by nature. I cast my vote with those who feel humans take the shape of their culture, and that shifts in culture can

occur in rare moments with remarkable speed and vigor. Good design can release humankind from its neurotic relationship to absurd acts of destruction, and aim it toward a destiny that is far more "realistic" and enduring. The urge to create beauty is an untapped power, and it exists in commerce as well as in society.

Chapters 4 and 5, and chapters 9 through 11 present specific routes to accomplish these objectives. As you read them, imagine yourself a designer, remaking a world where commerce and environmental restoration are synonymous. What would such a system look like? How would it feel to work in it? What are the obstacles preventing us from doing the right thing? How do we change or remove those barriers?

As you seek your own answers to these questions, keep this critical point in mind: Our human destiny is inextricably linked to the actions of all other living things. Respecting this principle is the fundamental challenge in changing the nature of business.

The Ecology of Commerce

1

A Teasing Irony

I have come to believe that we in America and in the rest of the industrialized West do not know what business really is, or, therefore, what it can become. Perhaps this is a strange remark, given that free-market capitalism is now largely unchallenged as the economic and social credo of just about every society on earth, but I believe it's correct. Despite our management schools, despite the thousands of books written about business, despite the legions of economists who tinker with the trimtabs of the $21 trillion world economy, despite and maybe because of the victory of free-market capitalism over socialism worldwide, our understanding of business—what makes for healthy commerce, what the role of such commerce should be within society as a whole—is stuck at a primitive level.

The ultimate purpose of business is not, or should not be, simply to make money. Nor is it merely a system of making and selling things. The promise of business is to increase the general well-being of humankind through service, a creative invention and ethical philosophy. Making money is, on its own terms, totally meaningless, an insufficient pursuit for the complex and decaying world we live in. We have reached an unsettling and portentous turning point in industrial civilization. It is emblematic that the second animal ever to be

"patented" is a mouse with no immune system that will be used to research diseases of the future, and that mother's milk would be banned by the food safety laws of industrialized nations if it were sold as a packaged good. What's in the milk besides milk and what's suppressing our immune system is literally industry—its by-products, wastes, and toxins. Facts like this lead to an inevitable conclusion: Businesspeople must either dedicate themselves to transforming commerce to a restorative undertaking, or march society to the undertaker.

I believe business *is* on the verge of such a transformation, a change brought on by social and biological forces that can no longer be ignored or put aside, a change so thorough and sweeping that in the decades to come business will be unrecognizable when compared to the commercial institutions of today. We have the capacity and ability to create a remarkably different economy, one that can restore ecosystems and protect the environment while bringing forth innovation, prosperity, meaningful work, and true security. As long as we continue to ignore the evolutionary thrust and potential of the existing economy, the world of commerce will continue to be in a state of disorder and constant restructuring. This is not because the worldwide recession has been so deep and long, but because there is a widening gap between the rapid rate at which society and the natural world are decaying and the agonizingly slow rate at which business is effecting any truly fundamental change.

This turbulent, transformative period we now face might be thought of as a system shedding its skin; it signals the first attempts by commerce to adapt to a new era. Many people in business, the media, and politics do not perceive this evolutionary step, while others who do understand fight it. Standing in the way of change are corporations who want to continue worldwide deforestation and build coal-fired power plants, who see the storage or dumping of billions of tons of waste as a plausible strategy for the future, who imagine a world of industrial farms sustained by chemical feed-stocks. They can slow the process down, make it more difficult, but they will not stop it. Like a sunset effect, the glories of the industrial economy may mask the fact that it is poised at a declining horizon of options and possibilities. Just as internal contradictions brought down the Marxist and socialist economies, so do a different set of social and biological forces signal

our own possible demise. Those forces can no longer be ignored or put aside.

That the title of this book, *The Ecology of Commerce,* reads today as an oxymoron speaks to the gap between how the earth lives and how we now conduct our commercial lives. We don't usually think of ecology and commerce as compatible subjects. While much of our current environmental policy seeks a "balance" between the needs of business and the needs of the environment, common sense says there is only one critical balance and one set of needs: the dynamic, ever-changing interplay of the forces of life. The restorative economy envisioned and described in this book respects this fact. It unites ecology and commerce into one sustainable act of production and distribution that mimics and enhances natural processes. It proposes a newborn literacy of enterprise that acknowledges that we are all here together, at once, at the service of and at the mercy of nature, each other, and our daily acts.

A hundred years ago, even fifty years ago, it did not seem urgent that we understand the relationship between business and a healthy environment, because natural resources seemed unlimited. But on the verge of a new millennium we know that we have decimated ninety-seven percent of the ancient forests in North America; every day our farmers and ranchers draw out 20 billion more gallons of water from the ground than are replaced by rainfall; the Ogalala Aquifer, an underwater river beneath the Great Plains larger than any body of fresh water on earth, will dry up within thirty to forty years at present rates of extraction; globally we lose 25 billion tons of fertile topsoil every year, the equivalent of all the wheatfields in Australia. These critical losses are occurring while the world population is increasing at the rate of 90 million people per year. Quite simply, our business practices are destroying life on earth. Given current corporate practices, not one wildlife reserve, wilderness, or indigenous culture will survive the global market economy. We know that every natural system on the planet is disintegrating. The land, water, air, and sea have been functionally transformed from life-supporting systems into repositories for waste. There is no polite way to say that business is destroying the world.

Having served on the boards of several environmental organizations, I thought I understood the nature and extent of the problems

we face. But as I prepared to write this book, I reviewed much of the new literature in the field and discovered that the more I researched the issues, the more disquieting I found the information. The rate and extent of environmental degradation is far in excess of anything I had previously imagined. The situation was like the textbook illusion in which the viewer is presented with a jumble of halftone dots that reveals the image of Abraham Lincoln only when seen from a distance. Each of the sources I worked with was one such dot, not meaningless in itself, but only a part of the picture. The problem we face is far greater than anything portrayed by the media. I came to understand well the despair of one epidemiologist who, after reviewing the work in her field and convening a conference to examine the effects of chlorinated compounds on embryonic development, went into a quiet mourning for six months. The implications of that conference were worse than any single participant could have anticipated: The immune system of every unborn child in the world may soon be adversely and irrevocably affected by the persistent toxins in our food, air, and water.

A subtler but similarly disquieting development was reported by the *New York Times* in 1992 in an article entitled "The Silence of the Frogs." At an international conference on herpetology (the study of amphibians and reptiles), while 1,300 participants gave hundreds of official papers on specialized subjects, none had focused on the total picture. Pieced together informally in the hallways and in the lunch lines at the conference was the fact that frogs are disappearing from the face of the earth at an inexplicably rapid rate. Even more disturbing was the conclusion that these populations are crashing not merely in regions where there are known industrial toxins, but also in pristine wilderness areas where there is abundant food and no known sources of pollution. The implications of such a die-off go beyond frogs. The human endocrine system is remarkably similar to that of fish, birds, and wildlife; it is, from an evolutionary point of view, an ancient system. If endocrine and immune systems are failing and breaking down at lower levels of the animal kingdom, we may be similarly vulnerable. The reason we may not yet be experiencing the same types of breakdown seen in other species is because we gestate and breed comparatively rather slowly. On complex biological levels such as ours, bad news travels unhurriedly, but it eventually arrives. In other words, something unusual and inauspicious may be occurring globally at all

levels of biological development: a fundamental decline that we are only beginning to comprehend and that our efforts at "environmentalism" have failed to address.

From this perspective, recycling aluminum cans in the company cafeteria and ceremonial tree plantings are about as effective as bailing out the *Titanic* with teaspoons. While recycling and tree planting are good and necessary ideas, they are woefully inadequate. How can business itself survive a continued pattern of worldwide degradation in living systems? What is the logic of extracting diminishing resources in order to create capital to finance more consumption and demand on those same diminishing resources? How do we imagine our future when our commercial systems conflict with everything nature teaches us?

Constructive changes in our relationship to the environment have thus far been thwarted primarily because business is not properly designed to adapt to the situation we face. Business is the practice of the possible: Highly developed and intelligent in many respects, it is, however, not a science. In many ways business economics makes itself up as it progresses, and essentially lacks any guiding principles to relate it to such fundamental and critical concepts as evolution, biological diversity, carrying capacity, and the health of the commons. Business is designed to break through limits, not to respect them, especially when the limits posed by ecological constraints are not always as glaring as dead rivers or human birth defects, but are often expressed in small, refined relationships and details.

The past one hundred years have seen waves of enterprise sweep across the world, discovering, mining, extracting, and processing eons worth of stored wealth and resources. This flood of commerce has enriched capital cities, ruling families, powerful governments, and corporate elites. It has, therefore, quite naturally produced a dominant commercial culture that believes all resource and social inequities can be resolved through development, invention, high finance, and growth—always growth. For centuries, business has been able to claim that it is the organizational key to "unlocking the hidden wealth of creation for distribution to the masses." By and large that has been true. But now, rather than distributing the wealth of the present, we are stealing the wealth of the future to enrich a society that seems nonetheless deeply troubled about its "good fortune." While democratic capitalism still emanates an abundant and optimistic vision of

humankind and its potential, it also retains the means to negate this vision in ways that are as harmful as any war.

It is lamentable to extinguish a species by predation and killing, whether the perceived gain is leather, feather, pelt, or horn. But how will we explain that the disappearance of songbirds, frogs, fireflies, wildflowers, and the hundreds of thousands of other species that will become extinct in our lifetime had no justification other than ignorance and denial? How will we explain to our children that we knew they would be born with compromised immune systems, but we did nothing? When will the business world look honestly at itself and ask whether it isn't time to change?

Having expropriated resources from the natural world in order to fuel a rather transient period of materialistic freedom, we must now restore no small measure of those resources and accept the limits and discipline inherent in that relationship. Until business does this, it will continue to be maladaptive and predatory. In order for free-market capitalism to transform itself in the century to come, it must fully acknowledge that the brilliant monuments of its triumph cast the darkest of shadows. Whatever possibilities business once represented, whatever dreams and glories corporate success once offered, the time has come to acknowledge that business as we know it is over. Over because it failed in one critical and thoughtless way: It did not honor the myriad forms of life that secure and connect its own breath and skin and heart to the breath and skin and heart of our earth.

Although the essential nature of commerce has not altered since the very first exchange of coin for corn, the power and impact of corporate capitalism have increased so dramatically as to dwarf all previous forms of international power. No empire—Greek, Roman, Byzantine, British, or any other—has had the reach of the modern global corporation, which glides easily across borders, cultures, and governments in search of markets, sales, assets, and profits. This institutional concentration of human energy and creativity is unparalleled in history.

But if capitalism has pillaged, it has also delivered the goods, and in quantities that could not have been imagined just two generations ago. Providing that abundance is one of the central goals of doing business, and those who believe in capitalism believe that goal must be facilitated at every opportunity. Government is key to this strategy.

The conservative view of free-market capitalism asserts that nothing should be allowed to hinder commerce. Sacrifices might be called for here and there, but in the end, the environment, the poor, the Third World will all benefit as business more fully realizes its potential. In the new world order of the post-communist age, free-market capitalism promises to be the secular savior, echoing theologian Michael Novak's homage: "No system has so revolutionized ordinary expectations of human life—lengthened the life span, made the elimination of poverty and famine thinkable, enlarged the range of human choice—as democratic capitalism." This view of business was fervently embraced by the recent Republican administrations, who found in Novak's words an unimpeachable affirmation of many of their programs of deregulation.

Invoking the sanctity of the free market to prove that present business practices are sound and constructive, and using it to rebut every charge of ecological malfeasance is, at its heart, dishonest. Historically, we have given industry great latitude for its miscalculations because there was no science sufficiently developed to inform society of industrialism's effects. One hundred years ago, industrial cities were coated with grime and cut off from the sun by permanent palls of smoke; the citizens were beset by disease; the very conditions under which workers toiled and died were inhumane and exploitative. These conditions had their analog in the industrial processes of waste and despoliation, and were the direct costs of the Industrial Revolution. It took many decades before an appreciation of the social and environmental damage spread beyond a small circle of Marxists and muckrakers to society as a whole. Today, businesspeople readily concede the abuses of the early days of this Revolution, but they do not wholly and genuinely acknowledge the more threatening abuses perpetuated by current practices. Troubling untruths lie uneasily within a colossal economic system that denies what we all know while it continues to degrade our world, our society, and our bodies. Business economists can explain in detail the workings of the modern corporation, its complex interrelation with financial markets, how its holdings might be valued on a discounted cash-flow basis, or the dynamics of global competitive advantages. These pronouncements and equations promise hope but they cannot explain—much less justify—the accelerating extinction of species, the deterioration of human health, the stress and anguish of

the modern worker, the loss of our air, water, and forests. In short, they cannot explain the consequences of their actions.

Why, then, do we accept the excuses? Why do we hand business a blank check and exempt enterprise from the responsibility for maintaining social values? One reason might be that like the conferees, we have only a piecemeal view of events. We have no hallways to congregate in and so accumulate the overall image of cumulative destruction. Furthermore, their actions are defended—I daresay *have* to be defended—because most of us are dependent upon them for our livelihood. Even a declining General Motors still employs nearly 600,000 people. A supermarket chain such as American Stores employs 200,000 or more. The 400 companies profiled in *Everybody's Business Almanac* employ or support one-fourth of the U.S. population. The largest 1,000 companies in America account for over sixty percent of the GNP, leaving the balance to 11 million small businesses. The average large business is 16,500 times larger than the average small business. And since much of the population is now employed by these large corporations, they naturally see their interest as being linked to the success and growth of their employers. Such fealty resembles the allegiance that sustained feudal baronies; the vassal serfs believed that the lord who exploited them was better than the uncertainty of no lord at all. But in the competitive world of modern commerce, loyalty to the system prevents an objective examination of how market capitalism can also work against those who serve it.

Tinkering with the system will not bring species back to life, profit-sharing schemes do not restore our wetlands, donating money for a new production of *Don Giovanni* will not purify our water, nor will printing annual reports on recycled paper save us. The dilemma that confronts business is the contradiction that a commercial system that works well, by its own definitions, violates the greater and more profound ethic of biology. Succeeding in business today is like winning a battle and then discovering that the war was unjust. Of course, the discovery that a loyalty which has served so well can betray so badly is a troubling concept for any culture.

From my observations, most people involved with commerce who are also educated about environmental issues care deeply about commerce's effects. At the same time, such people feel anxious about their jobs, the economy, and the future in general. The environment

becomes just one more thing to worry about. It looms in the future at a time when we are beset with many other, more immediate, concerns. It is like being a single parent when the dog has run away, the children are fighting, the dinner is burning, the babysitter hasn't shown up, we are late for the PTA meeting, and have just spilled gravy on the carpet when someone doing a survey knocks at the door and wants to know how we feel about the proposed landfill at the edge of town. Although the landfill will affect our lives in the future, we are afflicted with pressing problems today. Similarly, when environmental issues are presented to businesspeople as one more cost and one more regulation, "doing the right thing" becomes burdensome and intrusive. And the way our economy is organized today, businesspeople are right: Doing the right thing might indeed put them out of business.

We should not be surprised, then, that there is a deep-seated unwillingness to face the necessary reconstruction of our commercial institutions so that they function on behalf of our lives. Business believes that if it does not continue to grow and instead cuts back and retreats, it will destroy itself. Ecologists believe that if business continues its unabated expansion it will destroy the world around it. This book will discuss a third way, a path that restores the natural communities on earth but uses many of the historically effective organizational and market techniques of free enterprise.

The act of doing business carries with it ethical import, so given the dominance of business in our time, we must ask the question: How do we want our principal economic organism to conduct its commerce? Is it to be as a marauder, high on the food chain, pinning its prey with ease? If business is based on the notion that it can call upon nature without constraint to submit to the objectives of commerce, it will destroy the foundation on which rests the society it has pledged to serve. Though "nothing seems foul to those that win," the cultures that have been previously harmed and the lands we have forfeited must now be reincorporated into the body economic. Business must judge its goals and behavior, not from inherited definitions of the corporate culture, but from the perspective of the world and society beyond its self-referential borders.

If business is prepared to reexamine its underlying assumptions and listen to ecologists, botanists, toxicologists, zoologists, wildlife management experts, endocrinologists, indigenous cultures, and victims of

industrial processes, without the selective filter of its internal rationale and biases, it will not only fulfill its own agenda of contributing to society by providing products, jobs, and prosperity, but also initiate a new era of ecological commerce, more promising and ultimately more fulfilling than the industrial age that preceded it.

While business teaches us effective forms of human organization, environmental science reveals that those forms do not necessarily preserve the natural resources that are the basis of our well-being. While business teaches how to gain financial wealth, ecological understanding demonstrates that wealth to be ultimately illusory unless it is based on the principles and cyclical processes of nature. The dialogue reconciling these dichotomies will be the fundamental basis for economic transformation.

In order for this dialogue to succeed, business needs a new language, a new role, a new way of seeing itself within the larger environment. Business parlance is a specific, rarefied, and, for most of us, borrowed language. It is useful when it describes the mechanics of commerce, but fails when we try to connect it with biology, society, or feeling, yet this specialized dialect has established itself as the planetary lingua franca. In the language and accounting of classical economics, resources do not technically exist until they are drilled, extracted, pumped, or cut; in biological accounting, the principle is reversed. Business language reduces living transactions to costs and exchange value. From this semantic strait emerges the talk of trade-offs and compromises between growth and conservation, jobs and ecology, society and biodiversity, American competitiveness and resource pricing.

The language of commerce sounds specific, but in fact it is not explicit enough. If Hawaiians had 138 different ways to describe falling rain, we can assume that rain had a profound importance in their lives. Business, on the other hand, only has two words for profit—gross and net. The extraordinarily complex manner in which a company recovers profit is reduced to a single numerically neat and precise concept. It makes no distinctions as to how the profit was made. It does not factor in whether people or places were exploited, resources depleted, communities enhanced, lives lost, or whether the entire executive suite was in such turmoil as to require stress consultants and outplacement services for the victims. In other words, busi-

ness does not discern whether the profit is one of quality, or mere quantity.

It is understandable that a more meticulous language has not developed in this area because, until relatively recently in history, business has not been central to how societies and cultures defined themselves. In fact, its hegemony is still debated, especially by politicians who cling to the outdated vanity that government is in control. While governments still retain the power to wage war, defend territory, and issue currency, they can do little to create wealth except to work with business. Given that power, the modern corporation needs to expand and widen its vocabulary to become more environmentally accurate and culturally enduring. Without this new vocabulary, capitalism will become the commercial equivalent of the Holy Roman Empire: an amorphous global-corporate state taking what it needs and forcing smaller governments into financial subjugation, since no governing body can retain political legitimacy without money, credits, investment, and the sanction of the international business community. Biologically speaking, such unbalanced dominance will precipitate the demise of global capitalism, just as it brought down Rome.

Free-market purists believe that their system works so perfectly that even without an overarching vision the marketplace will attain the best social and environmental outcome. The restorative economy is organized in a profoundly different way. It does not depend upon a transformed human nature, but it does require that people accept that business is an ethical act and attempt to extend to commerce the interwoven, complex, and efficient models of natural systems. Current commercial practices are guided by the promise that we can stay the way we are, live the way we have, think the thoughts of old, and do business unburdened by real connections to cycles, climate, earth, or nature. Restorative economics challenges each of these assumptions.

The economics of restoration is the opposite of industrialization. Industrial economics separated production processes from the land, the land from people, and, ultimately, economic values from personal values. In an industrial, extractive economy, businesses are created to make money. Their financing and ability to grow are determined by their capacity to produce money. In a restorative economy, viability is determined by the ability to integrate with or replicate cyclical systems, in its means of production and distribution. The restorative

economy would invert many fundamentals of the present system. In such an economy, there is the prospect that restoring the environment and making money would be the same process. As in nature, business and restoration should be part of a seamless web. Environmental protection should not be carried out at the behest of charity, altruism, or legislative fiats. As long as it is done so, it will remain a decorous subordinate to finance, growth, and technology.

Business has three basic issues to face: what it takes, what it makes, and what it wastes, and the three are intimately connected. First, business takes too much from the environment and does so in a harmful way; second, the products it makes require excessive amounts of energy, toxins, and pollutants; and finally, the method of manufacture and the very products themselves produce extraordinary waste and cause harm to present and future generations of all species including humans.

The solution for all three dilemmas are three fundamental principles that govern nature. First, waste equals food. In nature, detritus is constantly recycled to nourish other systems with a minimum of energy and inputs. We call ourselves consumers, but the problem is that we do not consume. Each person in America produces twice his weight per day in household, hazardous, and industrial waste, and an additional half-ton per week when gaseous wastes such as carbon dioxide are included. An ecological model of commerce would imply that all waste have value to other modes of production so that everything is either reclaimed, reused, or recycled. Second, nature runs off of current solar income. The only input into the closed system of the earth is the sun. Last, nature depends on diversity, thrives on differences, and perishes in the imbalance of uniformity. Healthy systems are highly varied and specific to time and place. Nature is not mass-produced.

Many industries are now trying to re-source their raw materials to take into account sustainability, methods of extraction, means of processing, and impact on local cultures and ecosystems. For example, Herman Miller, the Knoll Group, and Wal-Mart have all committed themselves to paying higher prices for sustainably produced timber. They join many thousands of businesses, most much smaller, in recognizing their responsibility to initiate an ecological commerce. They should not have to pay more for raw materials that are produced in a sustainable manner. They should pay less. It should be possible to

secure sustainably produced raw materials without the extraordinary expense and effort that is required today. Preserving life should be the natural result of commerce, not the exception.

In order to accomplish this, we need to rethink our markets entirely, asking ourselves how it is that products which harm and destroy life can be sold more cheaply than those that don't. Markets, so extremely effective at setting prices, are not currently equipped to recognize the true costs of producing goods. Because of this, business has two contradictory forces operating upon it: the need to achieve the lowest price in order to thrive if not survive in the marketplace, and the increasingly urgent social demand that it internalize the expense of acting more responsibly toward the environment.

Without doubt, the single most damaging aspect of the present economic system is that the expense of destroying the earth is largely absent from the prices set in the marketplace. A vital and key piece of information is therefore missing in all levels of the economy. This omission extends the dominance of industrialism beyond its useful life and prevents a restorative economy from emerging.

Despite that disadvantage, the restorative economy is beginning to prosper. In the United States alone, an estimated 70,000 companies are already committed to some form of environmental commerce that competes with businesses that are not willing to adapt. The impulse to enhance the economic viability of life on earth *through* the recognition and preservation of all living systems is one that is becoming increasingly central to religion, science, medicine, literature, the arts, and women. It should be the dominant theme of generations to come.

Because the restorative economy inverts ingrained beliefs about how business functions, it may precipitate unusual changes in the economy. As will be discussed in later chapters, the restorative economy will be one in which some businesses get smaller but hire more people, where money can be made by selling the *absence* of a product or service, as is the case where public utilities sell efficiency rather than additional power, and where profits increase when productivity is lowered. Corporations can compete to conserve and increase resources rather than deplete them. Complex and onerous regulations will be replaced by motivating standards.

Author Ivan Illich has pointed out that the average American is involved with his or her automobile—working in order to buy it,

actually driving it, getting it repaired, and so on—for sixteen hundred hours a year. This means when all car mileage in a given year is divided by the time spent supporting the car, the average car owner is traveling at an average speed of five miles per hour. To attain the speed of a bicycle, we are devastating our cities, air, lungs, and lives, while bringing on the threat of global warming. It is the restorative, not the industrial economy, that can and will address such aberrations. Restorative entrepreneurs may not be as mediagenic as Wall Street tycoons, because their companies will be smaller, quieter, and less glamorous. However, it is the former who challenge the economic superstitions and fantasies that determine our concept of what a business should be.

A business works best when it has a positive vision, good morale, definite standards, and high goals. Such an organization is receptive to ideas that reinforce corporate growth as it is currently defined, but may be hostile to ideas that are critical of the basic system. After all, a successful business is in effect an advertisement that so much *is* working, that so many people have done a good job. This intolerance of seemingly irrelevant advice and information allows a company to concentrate single-mindedly on carving out market niches, but it also creates a yawning chasm between business economics and good ecology. If corporations were to take worldwide environmental degradation as seriously as they take demographic changes in consumer tastes, they would discover that the remedies for their depredation are more profound and transformative than the measures currently proposed by a few businesses, or even by many of the large environmental organizations. Perhaps that is why they have not delved more deeply.

On the other hand, it is important to understand that we consumers are accessories before and after the fact. We create businesses just as much as businesses create our wants. We have been enthralled by the opportunities, wealth, image, and power offered by business success. We like our comfortable lifestyles if we have them and want them if we don't. Business has intrinsic flaws, but they are created and reinforced by our own desires. "However destructive may be the policies of the government and the methods and products of the corporation," writes essayist and farmer Wendell Berry, "the root of the problem is always to be found in private life. We must learn to see that every problem that concerns us ... always leads straight to the

question of how we live. The world is being destroyed—no doubt about it—by the greed of the rich and powerful. It is also being destroyed by popular demand. There are not enough rich and powerful people to consume the whole world; for that, the rich and powerful need the help of countless ordinary people."

The restorative economy comes down to this: We need to imagine a prosperous commercial culture that is so intelligently designed and constructed that it mimics nature at every step, a symbiosis of company and customer and ecology. This book, then, is ultimately about redesigning our commercial systems so that they work for owners, employees, customers, and life on earth without requiring a complete transformation of humankind. Much has been written linking our environmental crises to everything from patriarchal values to a spiritual malaise that has accompanied industrial riches. But we may be trying to accomplish too much. Science does teach us that everything is interdependent: the respiration of the blossom of a lily in the backwaters of the Rio Negro in the Amazon basin affects the weather in New York. However, if we are to be effective in our lives, we have to find workable techniques and programs that can be put into practice soon, tools for change that are easily grasped and understood, and that conform naturally to the landscape of human nature.

If this scenario sounds dreamy and Arcadian it is because we assume that economic forces only exploit and destroy. *The Ecology of Commerce* will try to demonstrate that while this has been largely true up until now, and will continue to be true for some time in the future, this behavior is not the inherent nature of business, nor the inevitable outcome of a free-market system. It is merely the result of the present commercial system's design and use. The human matures from a state of grasping ego gratification to some degree of ethical awareness. Our species is not perfect, but is certainly not depraved, either. Like individuals, societies also mature, albeit more slowly and haltingly. America ended institutionalized slavery, for example, but is only now beginning to address its many forms of racism. I believe our economic system can also mature in a similar fashion.

In *The Merchant of Prato,* Iris Origo's recent account of a fourteenth-century Tuscan merchant, Francisco di Marco Datini, we recognize in Datini all the anxiety and daily vicissitudes of a contemporary businessman. Datini was worried about his investments, taxes, and penalties. As

his successes grew, so, too, did his insecurity. He devoted increasing amounts of his riches to acts of piety, from penance to munificent acts for the church, but largess could not alleviate Datini's guilt and *maninconia* (the stress of constant worry and doubt). Datini sounds like every modern businessperson who, approaching death, ponders not the deals that got away, but the humanity and society forsaken in the rush to profit.

Annie Dillard recounts a story with a similar moral in *Pilgrim at Tinker Creek*. A 19th century French physician, having perfected the first procedure to remove cataracts safely, traveled throughout his country restoring sight to people blinded from birth. He witnessed two distinct reactions when people saw the world for the first time: some were appalled at the squalor and ugliness (one person blinded himself in order to forget what he had seen and return to what he imagined the world to be); the greater number were overwhelmed by the beauty, vastness, and colors of the world, their senses flooded with the newness and variety of a creation that had heretofore lacked its most beautiful dimension.

We who are in business today are like these fortunate French men and women. Scientists, naturalists, essayists, and poets are offering us vision, a means with which to see and understand the splendor and sacredness of life. They help us understand that we, as Whitman wrote, "are nature, long have we been absent, but now we return." Will we tear out our eyes, ignore what we are being shown, and continue commercial practices that demean the earth and hasten that day when everything we hold precious has been destroyed? Will we die burdened with Datini's many regrets, or will we exult and exclaim, grateful for the possibilities, the newness, the knowledge offered us to transform our world and our relationship to it?

Many believe that it is too late, that at this moment in our history we cannot be redeemed through existing institutions. It is true that in our lifetime we cannot restore felled ancient forests, vanished wetlands, ghostly strip mines, or the ruined lives of toxic waste victims. Contemporary events support Goldsmith's longstanding declaration, "Honor sinks where commerce long prevails." It takes a serious leap of faith to imagine a transformed Fortune 500, a restorative sustainable economy that will offer full employment, more security, better education, less fear, more stability, and a higher quality of life. But I believe this will happen because prior forms of economic behavior no longer

produce the desired results. Even though the GNP of the United States grew considerably during the 1980s, three-fourths of the gain in pretax income went to the richest one percent. The majority of Americans had less money and lower incomes than they did when the decade began. Primarily, what growth in the 1980s produced was higher levels of apprehension, violence, dislocation, and environmental degradation.

Gordon Sherman, the founder of Midas Muffler, once wrote: "There is a teasing irony: we spend our lives evading our own redemption. And this is naturally so because something in us knows that to be fully human we must experience pain and loss. Therefore, we are at ceaseless effort to elude this high cost, whatever the price, until at last it overtakes us. And then in spite of ourselves we do realize our humanity. We are put in worthier possession of our souls. Then we look back and know that even our grief contained our blessing."

Ironically, business contains our blessing. It must, because no other institution in the modern world is powerful enough to foster the necessary changes. Perhaps during the many battles between environmentalists and businesspeople we have been asking the wrong question all these years. As generally proposed the question is "How do we save the environment?" As ridiculous as it may first sound to both sides, the question may be "How do we save business?"

Business is the problem and it must be a part of the solution. Its power is more crucial than ever if we are to organize and efficiently meet the world's needs. This book contains quite a few horror stories perpetrated by large, respected, well-managed businesses. I do not cite them to demonize corporations, but to lay the foundation and basis of understanding that will allow us to re-create these companies. Commerce can be one of the most creative endeavors available to us, but it is not worthy of business to be the convenient and complicit bedfellow to a culture divorced from nature. While commerce at its worst sometimes appears to be a shambles of defilement compared to the beauty and complexity of the natural world, the ideas and much of the technology required for the redesign of our businesses and the restoration of the world are already in hand. What is wanting is collective will.

2

The Death of Birth

Whenever a disturbance or perturbation such as a road violates an established ecosystem, aggressive and invasive weeds like thistle and broom take over bare ground and spread quickly, establishing temporary primacy. These opportunistic species are suited to what are sometimes called "immature" systems. The plants compete for sunlight in order to capture the maximum available energy while trying to cover the raw earth as quickly as possible. In such a system, energy is wasted, diversity is minimal, and the plants are generally of lower quality and usefulness. Their life cycles are short, being mostly annuals; while their output is prodigious, their use of resources is not very efficient. As anyone who has observed, day by day, the changes on a patch of land cleared in the spring knows, this colonization can happen within weeks.

The constant transformation of ecosystems by organisms is the subject of ecology. Plants and organisms do not simply occupy an environment; they alter and transform it creating increasingly varied and complex forms of organization. The second law of thermodynamics informs us that as energy is dissipated, systems tend to descend into reduced states of organization and ultimately to chaos and entropy. Only life prevents entropy from extending to all things in nature: the intricate, mysterious interaction of organisms that captures

sunlight and evolves into higher levels of order and complexity. This state of organization and succession, the opposite of entropy, is called negentropy. It is this evolving order that should humble us respectfully before nature. While the origins and "meaning" of life may be unknown, the way nature transforms the non-living to the living, the simple to the complex, the inefficient to the efficient, is better known and understood. All industrial systems and designs pale when compared to the efficiency of natural systems of production. Nothing does more with less. This knowledge makes nature the logical exemplar for an increasingly evolved form of commerce.

An ecosystem evolves from pioneering, immature states that emphasize growth, through several intermediate stages, until it evolves into mature systems that are highly efficient and resource-conserving. Mature, climax systems comprise an association of organisms that reach a state of equilibrium which leaves the habitat largely unchanged from year to year. Because no environment remains unchanged, even climax communities do not last forever, but they are the most diverse, stable, and complex of communities, and are thus more resilient to disturbances in the greater environment.

Through their complex interchanges of nutrients, gases, and information, mature systems create the greatest amount of biomass with the least amount of resources. Pioneer systems create the foundation for more mature ecosystems because they stabilize the soil, check erosion, bring trace elements up from the subsoil, and prevent further deterioration of the area. Once a pioneer state is established, the initial colonizers are succeeded by increasingly complex organisms and relationships. This process continues until the most adapted system the setting will allow is reached. The differences between pioneer and climax systems are instructive. In immature systems, most energy is used to create new growth, so that bare soil is quickly covered. In a climax system, the greater part of energy is devoted to the continuation of the existing plant and animal communities, since all of the ecosystem is, in fact, colonized and inhabited. All present agriculture, whether it is slash-and-burn or sod-breaking, involves the reversion of a climax system to a pioneering one. We exchange stability and sustainability for short-term abundance and production.

In ecological terms, our present industrial economy is an immature ecosystem. Environmental scientist David Wann states this bluntly

when he says: "It may not be flattering to our national concept, but the present American culture is still the bare field full of colonizing weeds, struggling toward something more sophisticated, interwoven, and permanent. Until now we've consistently chosen the resource-hungry path of least resistance." At the dawn of the Industrial Revolution, a vast new world of apparently unlimited natural resources became available for the taking. By constructing an economy that demanded ever-increasing supplies of all resources, but particularly energy—specifically, sunlight stored in the form of timber, plants, and fossil fuels—humans successfully mimicked the processes of a newly formed ecosystem. Like pioneer plants, we were aggressive and competitive. We emphasized untrammeled growth and didn't worry about efficiency, conservation, or diversity. In technical terms, we set up a "linear" industrial ecology of low information quality.

Less than two centuries later, the environment for economic growth changed dramatically, for that vast array of natural resources is dwindling. We have watched economic indexes climb, as measured in gross national product, but we have not yet formulated a nationally accepted index of what that progress is costing on the environmental side. Despite the fact that environmental issues are now accepted internationally as the most pressing problem of our age, the institutions that embody and guide our economic progress have hardly responded at all.

To change this state of affairs, business will have to deal directly with the three issues of what it takes, what it makes, and what it wastes. This chapter deals with our methods of taking.

A business is similar to an organism insofar as it takes food and energy from the environment. However, creatures in their natural habitat consume only renewable resources: leaves, nuts, seeds, grass, water, berries, insects, fungi, bark, fish. Companies consume renewables, too, in addition to nonrenewable resources, including oil, coal, and natural gas. While use of renewables can theoretically be sustained perpetually, resources such as fuels and minerals are irreplaceable. And renewables, if over-consumed or depleted, can become nonrenewable. The ability to over-exploit the earth's stored-up supply of resources is what we call economic progress. One statistic makes clear the demand placed on the earth by our economic system: every day the worldwide economy burns an amount of energy the planet required 10,000 days to cre-

ate. Or, put another way, 27 years worth of stored solar energy is burned and released by utilities, cars, houses, factories, and farms every 24 hours.

Another measure of our wholesale plunder of the ecosystem is provided by estimating the net primary production (NPP) of the planet, defined as the sum of all photosynthetic production minus the energy required to maintain and support those plants. The annual figure arrived at is in the area of 225 billion metric tons of wood, grass, fiber, and food. Of this total, 60 percent is produced on land and 40 percent in the oceans. An oft-quoted study suggests that our human economy currently utilizes, consumes, converts, burns or clear cuts annually 40 percent of the total NPP on land. In short, one species—our own—out of 5 to 30 million species (no one is sure how many there are) is directly and indirectly claiming 40 percent of the earth's production for itself. This fact alone should give businesspeople pause when they think their taking of water, forests, land, or minerals has minimal impact. If, as predicted, our population doubles sometime in the next forty or fifty years, we will usurp 80 percent of the primary production of the planet, assuming no increase in the standard of living. If our standard of living doubles in the next forty years—the accepted projection—we will quadruple our impact, a physical impossibility.

In fact, we may have already reached the diminishing point. We are already seeing many dangerous signs of this usurpation of planetary production, foremost of which is the loss of other forms of life—extinctions. Before we reach 60 or 70 percent utilization of the NPP, we will witness an ecological crash. Hundreds of thousands of species will vanish, because they will not be able to compete with us for food. These newly depleted ecosystems will be reduced to soil substrates into which we will have to force increasing amounts of chemicals to grow decreasing amounts of food.

Every natural system in the world today is in decline. In the past twenty years, the world's forests have been reduced by 120 million hectares (296 million acres). In 1991 alone, 17 million hectares were cut or destroyed, the highest rate of reduction in the history of humankind. The burning associated with the clearing of tropical forests placed 52 trillion kilograms of CO_2 into the atmosphere last year, an amount that is equal to 40 percent of all industrial emissions. According to the United Nations Environment Programme, since

1945, we have been losing 108 million acres of productive agricultural land to degradation yearly, a total of 4.85 billion acres worldwide. Since 1950 world agriculture has tripled its use of irrigation, a practice that depletes groundwater and also decreases long-term fertility because of the excessive buildup of salts in the soil. Despite surpluses in industrial nations and isolated increases in the Third World, overall world production of food is declining in relation to world population. Grain production per person has peaked in every area of the world except for Asia, where it has slowed substantially. Much of the increase witnessed in grain production from 1950 until 1984 was the result of a ninefold increase in the use of fertilizer. But as every farmer knows, constant increases in fertilizer usage do not produce equal gains in production, for a point is reached where additional increments produce little or no benefit. Worldwide crop losses due to pollution are already estimated at between 5 and 10 percent and continue to rise.

There are many other examples—locally, regionally, and globally—where demand is exceeding supply, causing a deterioration of the living systems that provide our present standard of living. We are drawing down resources that took millions of years to create in order to supplement current consumption. This is the ecological perspective of the industrial age; we cannot hold onto it indefinitely, in fact, industrialism itself may not last for even one more human lifetime. At present, to compensate for the limitations placed on production by the carrying capacity of the environment, we are speeding up the rate at which we fish, farm, deforest, and extract. In other words, rather than facing the creative challenges posed by ecosystem limits, we are temporarily bypassing the problem by harvesting resources more rapidly, by driftnetting, mechanical deforestation, and factory farming. Science and common sense both dictate that such extravagance must eventually lead to disaster. It not only borrows from the future, thus threatening human societies in the long term, but it also puts intense pressure on other species in these ecological niches which depend on the same resources. As a consequence, habitats are destroyed, species become extinct, and in the process, the productive health of the environment is compromised and decreased.

Human populations are already being severely affected by damage to the environment due to depletion and degradation of resources. For decades, scientists and experts such as Robert Heilbroner, Paul

Ehrlich, and Jessica Tuchman Matthews have predicted that resource shortages would engender widespread social discord, but there were no studies to support or refute those views. Recently, however, a team of thirty researchers, assembled under the auspices of the University of Toronto and the American Academy of Arts and Sciences, formed the Project on Environmental Change and Acute Conflict. This group examined a number of societies and countries where resource shortages were already occurring, and their findings were disturbing: "Scarcities of renewable resources are already contributing to violent conflicts in many parts of the developing world. These conflicts may foreshadow a surge of similar violence in coming decades, particularly in poor countries where shortages of water, forests and, especially, fertile land, coupled with rapidly expanding populations, already cause great hardship." Land shortages in Bangladesh, for example, have led to mass migrations to India involving as many as 15 million people. These migrations have in turn led to fierce ethnic clashes. To those who discount such theories by arguing that resource conflicts have been an enduring element of human history, the authors warn: "We maintain ... that renewable-resource scarcities of the next 50 years will probably occur with a speed, complexity and magnitude unprecedented in history. Entire countries can now be deforested in a few decades, most of a region's topsoil can disappear in a generation, and acute ozone depletion may take place in as few as 20 years."

Because resource supplies are declining, we as a species are exceeding our "carrying capacity"—the uppermost limit on the number of species an ecosystem or habitat can sustain, given the supply and availability of nutrients. In island systems, where ruminants browse and graze, grass, leaves, and berries might be the chief limiting factor to carrying capacity. In the Sahel desert, brushwood used for cooking might be the limiting factor on the human population. The industrialized world has more extensive needs and wants, so a larger number of resources can become limiting factors. Not only food, but fuel, water, electricity, and cars—the "food" of our industrial civilization—can serve as limits to carrying capacity. What is most dismaying about our political and commercial unwillingness to examine such limits on a global level is that there is absolute agreement on what it means on a local level. Range management experts can properly assess grazing limits that maximize yield while preserving the health of a habitat. In

a pasture or range, one can temporarily increase herd size and output, but it is a short-lived phenomenon that eventually results in lower production and eroded soil, requiring a long period of recovery. Estimating carrying capacity of fisheries and other large, complex systems is difficult, and not always accurate, partially due to inexperience and lack of concerted effort. Transnational corporations, the World Bank, and politicians have not yet determinedly integrated the processes involved with the estimation of carrying capacity into the act of development. Exceeding carrying capacity does not prove that carrying capacity does not exist, but merely that we know how to evade it temporarily, further damaging the sustainable yield of a given habitat.

Natural and human history are full of examples in which animals or humans exceeded carrying capacity and went into steep declines, or extinction. A haunting and oft-cited case of such an overshoot took place on St. Matthew Island in the Bering Sea in 1944 when 29 reindeer were imported. Specialists had calculated that the island could support 13 to 18 reindeer per square mile, or a total population of between 1,600 and 2,300 animals. By 1957, the population was 1,350; but by 1963, with no natural controls or predators, the population had exploded to 6,000. The original calculations had been correct; this number vastly exceeded carrying capacity and was soon decimated by disease and starvation. Such a drastic overshoot, however, did *not* lead to restabilization at a lower level, with the "extra" reindeer dying off. Instead, the entire habitat was so damaged by the overshoot that the number of reindeer fell drastically below the original carrying capacity, and by 1966 there were only 42 reindeer alive on St. Matthew Island. The difference between ruminants and ourselves is that the resources used by the reindeer were grasses, trees, and shrubs and they eventually return, whereas many of the resources we are exploiting will not.

Until recently, declines or wipe-outs of species were largely local or regional problems because carrying capacity was a local phenomenon. Today, industrial civilization has increased the reach of human beings, at least the wealthier peoples, far beyond their own lands to the entire world. Tropical forests in Brazil have been razed to grow soybeans which are fed to cows in Germany that produce surplus butter and cheese that is piling up in refrigerated warehouses. This artificial ecosystem has "increased" Germany's carrying capacity, but drastically *lowered* it for the one million displaced forest settlers

now disenfranchised and living in squalor in Rio de Janeiro and other urban centers.

Because the richer northern countries do not see or experience the impact they have on their poorer southern nations, we do not realize what a powerful and destructive impact our demand on carrying capacity is having. In the time it takes to read this page, one hundred people will have succumbed to pesticide poisoning: 48 per minute, 25 million every year. In some Third World countries, pesticides kill more people than do major diseases. Because we have globalized our capacity to draw from an expanded environment, our world appears to be more secure and stable. While, for example, food surpluses from one region can be shipped to drought-stricken areas, preventing starvation and disease, such succor can be maintained only if the *overall* impact by humans is less than the *overall* carrying capacity. This, in fact, is the opposite of what is occurring.

Defenders of the status quo sometimes cite the Book of Genesis, in which God grants dominion over the planet and over all the creatures to mankind. We can take what we want because it has been given by God who likewise endowed us with special gifts and genius. So when we "take" entire species, extincting them, business ideologues may ask, "So what?" They argue that a high percentage of all the species that have ever lived are extinct. The process of which human activity is part is the natural order, and thus, they argue, extinctions caused by human activity are part of that evolution.

This syllogism sounds logical enough, but the logic is wrong and disingenuous, because a key point is conveniently omitted: Excluding the five previous mass extinctions such as those that occurred in the Final Permian and Cretaceous periods, past extinctions opened new opportunities for greater speciation. These mass extinctions were caused by extraordinary, catastrophic events, such as a meteorite strike. Today, we are experiencing the first mass extinction in the 3.8 billion year history of life forms caused by another organism—homo sapiens. The general rate of species extinction today is 1,000 to 10,000 times greater than the "background" level of extinction that has existed for the past 65 million years of the Cenozoic Age. Human activity *is* part of the natural world, in the largest sense, but human activity ignores the means-and-ends, give-and-take factors that are inherent in any maturing ecosystem. The most radical example of such ignorance is a

nuclear explosion; less dramatic but also devastating is the clear-cutting of rain forests and the mismanagement of wetlands. Ecologically, the only difference among these three intrusions is how much we pay now or how much we pay later.

The ecologist who fights for the preservation of bowhead whales, Oregon silverspots, snail darters, Gooding's nodding onion, and periwinkles does so not just for their intrinsic value, but because he or she respects the fact that we remain largely ignorant of how the infinitely complex interconnections between different biotic communities affect the well-being of all species, including human beings. When species disappear, we can delude ourselves that human life exists independently of grackles and goatfishes, but that is only true to a limited extent. What concerns ecologists is that extinctions are a direct indication of ecosystem health, which bears directly on our own survival.

Biological diversity, in the end, is the source of all wealth, and with a developed and practiced knowledge of nature, it could be even more so. These "pilgrims of evolution," species that have embarked upon a 3.4 billion year journey, are still largely unknown, unexamined, and unnamed. Thus far, we have identified only 1.41 million life-forms, a figure that was once considered equivalent to 28 percent of the species on the planet. The estimate of 5 million kinds of organisms might have endured for many years were it not for the experiments of Terry Erwin of the National Museum of Natural History. In 1983, Erwin and his team of entomologists on a windless early morning fumigated a single tree in the Panamanian rain forest with a deadly insecticide. The gasses not only caused the insects to move out from their crevices and hiding places, but it killed them quickly enough so that they fell to the ground where 1 meter funnels over solutions of 70 percent alcohol were ready to collect them. Based on Erwin's count of 163 distinct beetles exclusive to this one species of tree, he calculated that the 50,000 distinct tree species in the rain forest may well contain over 8 million new species. Taking into consideration that beetles constitute about 40 percent of the population of insects, spiders and other types of arthropods, and that the number of species in the rain forest canopy is approximately twice the number found on the ground, Erwin calculated that there may be as many as 30 million different species of these groupings alone. Although it is highly extrapolated, it has led scientists to conclude that the closest estimate of the

range of possible species that exists on the earth is within a factor of ten, from 10 to 100 million species.

Because every species contains a vast amount of information about the world, how it evolved, how it continues to develop, and how we may find a harmonious place within it, the loss of a species is the loss of a biological library. A tropical forest does not resemble Levittown; it is thousands of times more complex than the Mall of America. Biota crawls, swims, swoops, and slithers; it buzzes, bores, and burrows; it rots and oozes through forest floors, and estuaries; it takes wing, and is submerged in rich black gumbo soils; it permeates, devours, and is fecund. But this life has no voice other than our own because extinction is silent and mute. The lost tamarins of Brazil's Atlantic clear-cut forests cannot speak to us through the tropical plywood paneling in a mobile home; cannot explain that our new habitat wiped out their own. They will not be heard from again. The poet and essayist Gary Snyder writes: "The ending of the lines of so many creatures with whom we have traveled this far is an occasion of profound sorrow and grief. Death can be accepted and to some degree transformed. But the loss of lineages and all their future young is not something to accept. It must be rigorously and intelligently resisted. Defend all of these plants, bugs, and animals equally? Little invertebrates that have never been seen in a zoo or a wildlife magazine? Species that are but a hair away from one another? It isn't just a case of unique lineages but the lives of overall ecosystems (a larger sort of almost-organism) that are at stake. Some archly argue that extinction has always been the fate of species and communities alike. Some quote a Buddhist teaching back at us: 'all is impermanent.' Indeed. All the more reason to move gently and cause less harm. Large highly adapted vertebrates, once lost, will never return in the forms we have known them. Hundreds of millions of years might elapse before the equivalent of a whale or an elephant is seen again, if ever. The scale of loss is beyond any measure the planet has ever known. 'Death is one thing, an end to birth is something else.'"

Despite the explosion of scientific knowledge in this century, we have no idea how many species exist on earth today. The biologist E. O. Wilson has suggested that we mount an effort to record the entire spectrum of biological diversity on the planet, a taxonomic undertaking that would allow us to fully develop and apply evolu-

tionary biology on a global scale. If 10 million species were classified, the effort would require 25,000 professional lifetimes and would create two-fifths of a mile of shelved books. Were we to recognize that our long-term interests rest in preserving biological diversity, such an inventory would be an investment of the highest order. Because we are losing 27,000 species a year, seventy-four per day, one every twenty minutes, due in no small part to the 500,000 trees that are cut every hour in tropical forests, a large-scale biological survey should take precedence for federal funding over underground nuclear testing and at a fraction of the cost. A project like this would offer us a means to understand what is happening with life on earth, as well as a way to measure our impact upon it.

Despite our exagerrated dependence on them, we use or currently derive benefit from only 1 percent of all the species known to us. As food crops, we use, one way or another, only 7,000 of the some 75,000 known edible plants. Besides edibles, thousands of insects, yeasts, bacteria, and fibers may have unknown potential for bettering our lives, providing natural oils, fuels, pollinators, medicines, restoration materials for degraded environments, and countless other useful products. But as matters stand now, we seek progress not by responsible interactions with biological diversity, but by its elimination.

At the present rate of extinction—estimates range from 20,000 to over 100,000 species every year—we may lose 20 percent of all the species on the planet within the next twenty to forty years, most of these in the tropical rain forests. In the United States, if present global warming projections are correct, we will face losses of 20 percent of our 20,000 plant species. It's also worth noting that many species, even though not yet at risk of completely disappearing, are being so severely depleted genetically that their ability to reproduce and adapt is increasingly impaired. The loss of evolutionary potential is being called the "death of birth." This is tantamount to marching backward through the Cenozoic Age, losing millions of years of evolutionary development in a matter of decades. We will face what naturalist Jack Turner calls the "final loss"—that point in the not-too-distant future when environmental degradation on the planet will no longer require our active participation.

An illustrative example of this principle is a pond when it begins to receive large run-offs of phosphate-containing detergents. Ordinar-

ily, as fish create waste and die, detritivores decompose the waste into inorganic products that feed the algae population and invertebrates, that become in turn food for the stable fish population. When phosphates drain into a pond, the influx causes the algae to bloom faster than it can be consumed by the slower-breeding fish. As the algae dies, the decomposition uses up much of the available oxygen, causing a die-off in the oxygen-deprived fish. The dead fish are more waste, creating more algae, since the fish are not consuming it. The increased levels of decomposition lower the oxygen levels even further and what was once a carefully constructed and balanced closed system collapses under the burden of rapid and accelerating growth. Today, we face similar prospects on a global level. Because of potential interactions and feedback loops within the global climate system, a global warming cycle, once begun, may well progress on its own, regardless of whether we continue to combust fossil fuels or not due to the release of methane gasses in the Arctic tundra.

Commentators sometimes draw the distinction between economists who take the "moral" position that human life is superior to natural life and environmentalists who take the opposite position. This is not a useful polarization. We can't turn our backs on the web of life that sustains us, and live in a biological vacuum engineered by technology. Even if God did grant us dominion over life, I do not believe she had in mind the kind of stewardship we are practicing today. In the Old Testament, Eliphaz the Temanite admonishes a caterwauling old man by the name of Job: "Have you listened in at God's keyhole and crept away with his plans?" Job did not have a convincing reply. Neither do we.

In the past thirty years—since the birth of the current environmental movement with the publication of Rachel Carson's *Silent Spring*—people who have tried to present the concept of ecological drawdown have been marginalized and depicted as a doom-oriented, splinter sect of radicals fixated on the "Chicken Little" syndrome. Good-willed scientists and observers have been depicted as hortatory and shrill. Business has viewed problems with the environment as largely remote and extraneous. Government regulations, well-intended but nevertheless complex and difficult, have been fought in the courts and resisted by industry every step of the way. Although this pattern is changing quickly and dramatically in some corporations, there is still a

yawning gulf between the kind of friendly "green" environmentalism that business wants to promote—one that justifies growth and expansionary use of resources—and the kind that actually deals with the core issues of carrying capacity, drawdown, biotic impoverishment, and extinction of species. Business, despite its newly found good intentions with respect to the environment, has hardly changed at all.

In the early days of environmental regulation, it was as if the corporate ship of state, having sailed magnificently to postwar ascendance, was suddenly having its electrical wiring nibbled by mice. Environmental lobbyists, pressure groups, competing scientific studies, and politicians became a nuisance; their evidence was specific on present problems but frustratingly vague regarding the future. Was industry supposed to turn its back on "growth" and "progress" because the eggshells of raptors were thinning, or because an obscure species of fish would be wiped out by a hydroelectric project? Why should it spare the few remaining native forests to save the spotted owl when jobs and prosperity were at stake? Business missed the point.

Industry responded by invoking its duty to protect shareholders, markets, and profits. Efforts to clean up were expenses that came straight off the bottom line. Regulations were attacked as regressive, reducing competitiveness. This contention is still given credence despite the fact that our two most successful competitors, Japan and Germany, both have less access to resources, pay more for them, and charge higher energy taxes to encourage conservation. These restrictions have produced economies which are significantly more efficient and less wasteful than our own, improving their competitiveness at our expense, although in other respects their impact on the world environment is as damaging as our own. We should not be surprised that *no* major piece of environmental legislation has ever been supported by corporate America.

Today, because business has refused to face and confront environmental issues, there are tens of thousands of environmental groups in the world trying to abate or at least ameliorate the destruction of the world by commerce. As important as their gains have been, this battle cannot be won, because commerce and industry are growing faster than nature. No amount of isolated actions will transform the system. We're still operating under commercial rules, placing the reputed needs of humankind above the health of the planet.

When business does acknowledge ecological issues, as it is increasingly forced to do, it proclaims unbounded optimism in the power of technology. When scientific data foretell resource depletion, toxic contamination, or detrimental impacts on human communities, these predictions are overridden by a religious belief in the ability of humankind to devise new technologies for offsetting the hazards of the old technologies. Common sense advises us to doubt this logic, which not only requires faith in technology, but—predictably—rationalizes the further unshackling of industrial capitalism to use more of the earth's resources to fuel future ingeniousness.

Technology *has* dramatically expanded the boundaries of various systems—crop yields from farm land, for example. However, increasing technology and exploitation in the hope of further overcoming such boundaries does not work, for the simple reason that every system has a final limit. Human society has already collided with this outer limit in the realm of fisheries, ozone depletion, and possibly the capacity of the atmosphere to absorb carbon dioxide without causing the greenhouse effect. As author Dennis Meadows explains it, "Economists assume the future will be much like the past. Since markets and technology have avoided catastrophe in the past, we can count on them to do the same in the future. Ecologists believe they see unique problems in the future, which will demand solutions outside the capacity of our present market mechanisms. Economists tend to see evolution as a series of continuous reversals: problems leading to solutions, new problems leading to new solutions. Ecologists are worried about irreversibilities. When species are lost, no change in price or technology will bring them back."

The global economy has already exceeded carrying capacity—that point beyond which further growth will decay and effectively destroy its host. If our planet—its land and sky and oceans—were growing 2 percent a year, we could posit sustainable economic growth of a similar rate. But the earth is stable. It does not grow. The input of the sun likewise remains constant, while much of the wealth derived from that input, stored over tens of millions of years in fossil fuels, has already been consumed in less than two centuries. No technology in the world can alter this equation.

If capitalism has one pervasive untruth, it is the delusion that business is an open, linear system: that through resource extraction and

technology, growth is always possible, given sufficient capital and will. In other words, there are no inherent limits to further expansion, and those who wish to impose them have a political agenda. This cornucopian paradigm asserts that the limits before us are irrelevant, that finiteness is a Malthusian misconception, and that economic growth can be extended indefinitely into the future. Such a position would be analogous to the reindeer on St. Matthew Island having a leader who proclaimed, when the population hit 4,600, "We've proved the ecologists and doomsayers wrong: We've doubled the estimates given by the limits to growth crowd and are continuing to grow."

This counter myth of "no limits" is so powerful that it appears ironically to be gaining ground, in a reflexive, psychological reaction of denial, even as knowledge of the carrying capacity of the earth becomes more evident. Ever-expanding abundance is not a theory based on science, or history, or nature. It is based solely on self-interest. Whether willfully ignorant or unabashedly hypocritical, at some point we must ask business to look candidly at the real world and see the skull-and-crossbones posted alongside ecological pathways, so that we can begin to create real solutions instead of illusory techniques of evasion.

Business often invokes the Darwinian maxim of "survival of the fittest" to defend its competitive actions. The phrase is, in fact, a misinterpretation of Darwinism. Darwin did not speak of survival of the fittest; rather, he described those who survived as *fittest for a specific ecological niche.* There is a big difference between those two ideas.

But this is the way of industrialism—"the survival of the fittest" as it has been incorrectly interpreted. The "winners" are the companies that consistently overstep and exceed carrying capacity. Corporate capitalism recognizes no limit; has no habitat. General Electric initially produced light bulbs. It now also sells bonds, makes jet engines, and produces the "Today" show. DuPont made its fortune selling gunpowder and is now producing biogenetically engineered crops that are resistant to its own brand of chemical herbicides. Corporations have been more intent on reorganizing the world to make it more habitable for themselves, rather than the other way around.

The idea that the economy must respect limits and that everything is not for the taking is not reflected in the competitive world of business because our economic institutions measure success only by scale

and garner capital through growth. "Moral outrage should result from the dawning realization that we are destroying the capacity of the Earth to support life and counting it as progress, or at best as the inevitable cost of progress," writes Herman Daly, economist at the World Bank. " 'Progress' evidently means converting as much as possible of Creation into ourselves and our furniture. 'Ourselves' means, concretely, the unjust combination of overpopulated slums and overconsuming suburbs. Since we do not have the courage to face up to sharing and population control as the solution to injustice, we pretend that further growth will make the poor better off instead of simply making the rich richer. The wholesale extinctions of other species, and some primitive cultures within our own species, are not reckoned as costs. The intrinsic value of other species, their own capacity to enjoy life, is not admitted at all in economics, and their instrumental value as providers of ecological life-support services to humans is only dimly perceived. Costs and benefits to future humans are routinely discounted at 10 percent, meaning that each dollar of cost or benefit 50 years in the future is valued at less than a penny today."

Businesses do not need to recognize sustainability in order to succeed. They don't have to take into account that their present demands on resources are tantamount to stealing from the future, or that selling today's wants is at the expense of tomorrow's needs. Nor does business have to acknowledge the devastating legacy of toxins and waste it is passing off to future generations. In fact, businesses are usually "better off" ignorant of these facts and principles if they intend to prosper in the present economic system. Conversely, setting out to redesign or start up a business so that it does maintain a holistic relationship between economy and ecology, the ethical entrepreneur is handicapped financially since he bears the costs of the additional responsibilities he's assumed and which his competitors have shunned. Thus, the commercial acts that would lead us away from runaway economic devastation, although sound in the principles of nature, are unsound by the standards of the economy.

In our pursuit of growth at any cost, we have mimicked an immature ecosystem with unlimited resources. A mature economic system would appreciate an ancient forest or undisturbed grassland as the ideal for qualitative growth—fecund, abundant, and dynamic, mature but

highly evolved. Developers and business interests who can always earn headlines by expressing outrage that a species of freshwater clam might stop the construction of another dam must now address the essential question implied whenever a species disappears: How are we going to stop the loss of our genetic heritage? Every threatened species potentially plays the role of the canary in the coal mine, signaling not merely its own demise, but possibly our own.

Business must change its perspective and its propaganda, which has successfully portrayed the idea of "limits" as a pejorative concept. Limits and prosperity are intimately linked. Respecting limits means respecting the fact that the world and its minutiae are diverse beyond our comprehension and highly organized for their own ends, and that all facets connect in ways which are sometimes obvious, and at other times mysterious and complex. If our economy is "limited" by inclusion as part of the greater closed system of nature, those limits are no more necessarily constricting to a sound economy than a blank canvas was to Cézanne or a flute to Jean-Pierre Rampal. The natural world of sunlight, rainfall, and photosynthesis, of topsoil and coral reefs, of raptor birds and tropical fishes, of stamens and pistils and genes is a limit which can be circumvented only at the cost of the world itself. It is precisely in the discipline imposed by the limitations of nature that we discover and imagine our lives. It is only in the fullest context of the world as it is presented to us, and not as we manipulate it, that we may celebrate our humanity and create true prosperity. Such perspectives can lead us to a very different type of economy and way of doing business, one that will be healthier for all species, not only the butterfly and the owl, but our own.

3

The Creation of Waste

It is not surprising that, in the process of taking too much, we waste too much. Industry releases chemicals into the air, discharges effluents into waterways and the ocean, and injects toxins deep into the ground or into concrete-lined drums and landfills. Sometimes it just washes them down the sink. Every American consumes about 136 pounds of resources a week, while 2,000 pounds of waste are discarded to support that consumption. This waste consists of everything from paper to CO_2, from agricultural wastes to effluents, from packaging material to nitrous oxides. The world uses 4.1 billion pounds of pesticides a year, all of which is classified as waste as soon as it is deployed because it remains in the environment. In 1986, according to the EPA's Toxic Release Inventory, the waste created by the top fifty products of the chemical industry was 539 billion pounds of toxins and hazardous substances discharged into the environment. Unlike nature's "waste" (which is really not waste at all), business wastes have no value to other species or organisms and may be fatal to them. The environment can absorb waste, redistributing and transforming it into harmless forms, but just as the earth has a limited capacity to produce renewable resources, its capacity to receive waste is similarly constrained. Its capacity to accept highly toxic waste is practically nonexistent.

After Earth Day, 1990, industry created new myths about environmental waste in order to change its image. These myths illustrate the gap between the mindset of industrial economics and biological knowledge. The critical myth is the assumption that we can "clean up" our environment. In other words, we can admit that industry was a little sloppy in the past, while being assured that it can do better in the future. With spit, polish, technology, and enough landfills, we can stop releasing pollutants into the environment. This strategy is often dubbed "end-of-pipe" clean-up. It is an attractive idea because it mimics what we do in our own households: put waste into a bag and set it out for the municipality to haul off and worry about. The analogy is not sound. We can transfer our household waste from one small, "artificial" environment to the larger environment, but where, then, does the larger environment, the natural world, transfer the accumulated mountains of waste? The biosphere represents our source of wealth. It is the capital which we draw down to support our lives. Whenever we pollute or degrade that system with toxins or waste, we are destroying our natural capital and reducing our ability to sustain our civilization. It is that simple.

Nothing is more basic to the argument of this book than the proposition that disposal of hazardous wastes is *not* the root problem. Rather, it is the root symptom. The critical issue is the *creation* of toxic wastes. Hazardous wastes are the result of a linear system in which the end products of resources and energy inputs are neither cycled nor returned. Nature is by definition cyclical; there is virtually no waste in the natural world that does not provide food for other living systems. If there were waste, we wouldn't have survived four billion years of evolution, because linear systems use up and exhaust resources. In the natural world, all processes, directly or indirectly, result in food for other species. Rot, rust, ants, worms, skunks, toads, pikas, voles, bats, moles, mites, alder, gentian, lichens and several thousand other plants, invertebrates, birds, reptiles, and mammals make up a forest. Each benefits in some way from the life of the others. In the natural forest, there is a competitive yet yielding relation among species. The lodgepole pine, when it becomes aged and unproductive in its growth, puts out an audible noise, a call, one might even consider it a song. This signal can be heard by the mountain pine beetle, which then begins to eat and break down the tree,

creating humus for the next generation of trees. Forests are constantly thinning themselves, and there is much evidence that tells us that we could prudently be thinning our own forests for millennia if we attended to its rhythms and patterns.

Instead, we send in the Marines. We unleash a linear economic system. We clear-cut the forest. We trash the trees that have no "economic" value, pulp the ones suitable for paper, and mill the species that can be sold for framing and finish wood. When the original, multi-species, mixed-age trees are cut down, we replace them with a single species, planted for either pulp or timber. In this ghostly monoculture, where we reduce weeds by aerial spraying of herbicides, there is a vast reduction of activity and biota. It is not a "tree farm," as forest companies would have us believe, but an abstraction of the original forest, an attempt to produce several generations of uniform even-aged trees in the shortest possible time. Something exquisitely complex and beautiful becomes the first casualty of linear methods of extraction and production. Ironically, when we harvest the wood in such an efficient way that these interlocking systems of plants and animals are broken or destroyed, we have less wood, less forest, and less life around us. As we take the wood and process it into pulp for packaging and annual reports that employ a dioxin-creating bleaching process, we have taken an ancient cyclical process and converted it into a linear one.

The natural human reaction is to avoid waste, an instinct which protects us not only from our own offal, but from that of others. We wrinkle our nose, step aside, recoil. We know instinctively that waste is not good for us. Industrial society also strives to segregate and avoid its own waste, but its methodologies are no longer acceptable. In a way, the ozone holes, oil spills, closed beaches and assorted episodes of degradation may be of some ultimate benefit, because they force us to face the facts. For example, the oceans show signs of rapid deterioration, with a "rash" of die-offs, epidemics, and new diseases in marine mammal and turtle populations. Birds and turtles perish from plastic and polystyrene ingestion. More and more trash litters seas and the beaches, which must be closed when yet another garbage slick rolls in with the tide. Thousands of dolphins and seals killed by viral and bacterial infections wash ashore around the world every year. Baseball-sized tumors are found in turtles in the

Gulf of Mexico and Indonesia. PCBs and mercury are regularly found in the nation's seafood and formerly rich fishing grounds are closed for periods of time by nations with even rudimentary public health standards. In the Gulf of St. Lawrence, a dead beluga whale, now classified as a toxic waste, has to be handled with gloves and protective clothing because of the amount of toxins its body contains. The number of tumors found in St. Lawrence belugas is "unheard of in any marine mammal on the planet." On the ocean floor, crabs with nervous systems deranged by chlordane runoff attempt to mate with alluring rocks.

If our waste problem were confined to plastic diapers, polystyrene cups, and other relatively benign household trash, we would be in good shape. As senseless as it is to create a packaging that lasts four hundred years to keep on a shelf for two months a product that we eat in two minutes, the most troubling and serious waste problem we face is one that we rarely see. The story begins with brine, humble saltwater, a harmless substance until we get our hands on it. If the bond between its component sodium and chlorine molecules is broken by using electrolysis, chlorine gas is created. Although every user of bleach and swimming pools is familiar with chlorine, the element rarely exists in free form in nature: It is man-made. It is also extremely unstable and volatile, easily recombining with other elements. When combined with hydrocarbons and other chemicals, chlorine produces a bewildering number of molecular compounds that are almost universally poisonous to invertebrates, plants, animals, and humans. Some of these toxins make X rays and gamma radiation seem benign by comparison.

This combination of chlorine and hydrocarbons is known as the organochlorine family of compounds. It is presently sold and used in great quantities throughout the commercial world. Although most organochlorine compounds are produced intentionally, they can also be produced unintentionally. Dioxins, one of the most deadly family of compounds known to man, are created when chlorine bleaches are used to treat lumber or pulps, and also during incineration of other compounds. The family of organochlorines includes many famous chemicals now banned or restricted, such as DDT, chlordane, Mirex, Dieldrin, Heptaclor, all the PCBs, and the ozone-disrupting CFCs as well.

Organochlorines do not break down easily. They are remarkably persistent and long-lasting. Studies show that organochlorine compounds can last for decades, hundreds, even thousands of years. Hundreds of millions of pounds of these substances are released into the environment annually, usually in the form of a "product." Biologically speaking, these solvents, fungicides, pesticides, and refrigerants are waste from the very moment they are manufactured. They cannot be incorporated into the life cycle of any organism on earth. They are not biologic, but "toxilogic." They are building up in the environment and steadily accumulating in our water, food—and in our bodies. Because organochlorines do not break down in water, they accumulate in the fatty tissues of organisms. Because they are not metabolized, they are not excreted. If you need any proof of the ubiquity of organochlorines, know that, with every breath, you exhale between ten and twenty types of these compounds into the air. Species that are higher on the food chain, such as humans and whales, accumulate organochlorines to a far greater degree than might be anticipated by their exposure. Biologically speaking, our metabolic processes have little or no effect in rendering these substances into more harmless forms, because whales, swordfish, polar bears, and human beings have never in their evolutionary history encountered chemicals similar to organochlorines. The only commonly occurring organochlorine is made in the oceans, a simple compound called chloromethane that seems to play a vital role in atmospheric ozone regulation.

Because of the slow maturation of human beings, we have not had sufficient time since the introduction of such chemicals to understand the multi-generational health consequences of exposure to organochlorines. However, we do know that these compounds play havoc with human physiology, with effects that include cancer, infertility, immune suppression, birth defects, and stillbirths. In July 1991, a multidisciplinary conference was convened in Wisconsin to explore a little-known phenomenon: Organochlorines and other compounds, including some heavy metals, cause damage to the human body by disrupting the endocrine system which in turn interferes with the proper functioning of the immune system. The endocrine system is a network of ductless glands that secrete tiny amounts of hormones into our bloodstream and lymphatic system. It is a marvelously complex, informational network that is, in effect, the hands and feet of the nervous sys-

tem, the means by which it regulates our bodily functions. The hormones secreted act as molecular messengers, governing the growth of individual cells within the body. Breakdown or malfunctioning of the endocrine system affects growth, metabolism, and reproduction, including the health of a fetus. What has troubled scientists for some time is that certain man-made compounds, particularly in the chlorinated hydrocarbon family, are mistakenly "recognized" by the human body as these hormone messengers, thereby signaling the wrong information to cells and bodily functions, information that is confusing to the body, sometimes disastrously so.

The Wisconsin conference had taken on a certain urgency because evidence was clear that although patterns of disruption by these substances had been observed and analyzed in wildlife communities, in some cases as far back as several decades, similar problems appear to be showing up in human populations as well. What was so disturbing to the participants was that many of these compounds had been studied only for their carcinogenic and toxilogic properties, and now scientists were discovering equally insidious effects at far lower concentrations.

Because the compounds in question mimic the actions of natural hormones, binding to receptor sites in the body, they can alter the embryonic development of the organism in ways that are irreversible, although the effects may not be experienced until maturity. When symptoms and diseases do occur, there is no way to trace their specific cause since no symptoms presented themselves in childhood. (This pattern is similar to the action of the synthetic estrogen DES [diethylstilbestrol], given to pregnant women from the late 1940s until 1971 to prevent miscarriage. These mothers reported no serious side effects, but their daughters suffer today from high rates of cervical and vaginal cancer, abnormal pregnancies, and changes in the immune system.) Although scientists do not have proof, many believe that the dramatic but unexplained worldwide drop in sperm count and density among men may be an effect of endocrine-disruptor compounds. The decline in male fertility, which has been called "remarkable" by Professor Niels Skakkebaek of Copenhagen University, is based on the review of sixty-one papers and studies covering 15,000 men around the world between the years 1938 and 1990. Professor Skakkebaek suspects the cause to be environmental factors, because the drops have been

accompanied by an equally dramatic increase in genito-urinary abnormalities and testicular cancer. In wildlife, these chemicals cause decreased fertility, behavioral abnormalities, compromised immune systems, and monstrous defects, such as fish born with both male and female sex organs but incapable of reproduction. They may eventually silence many other creatures besides frogs.

There is every reason to believe that concentrations of these compounds in wildlife and humans will continue to increase as they move up the food chain. But while their effects may already be present in the population, there is not sufficient evidence at present to predict how widespread they may be. Sterile men and women may be the first generation of victims, but because the embryo is extremely vulnerable to such disruptors, and because we are continuing to place more and different chemical disruptors into the environment, it is increasingly difficult to determine which series of compounds may be the causal agent. Human studies might have to be generational, in order to definitively establish an embryonic connection. Thus it will take many years to "prove" to the satisfaction of the chemical industry that its products present a threat, and the proof may be inconclusive even then because there will be no control populations of human beings who have not been exposed. It would be akin to trying to study the effects of tobacco smoking in a population where every person smokes. Industry might not have its conclusive proof regarding the organochlorines until we have all become *de facto* guinea pigs. If the tobacco industry can still assert that there is no proven link between cigarette smoke and cancer, although every life and health insurance company mocks this claim with their discount rates for non-smokers, the chemical industry can likewise procrastinate for decades regarding the much more insidious organochlorines. Like cigarettes, the "justification" can be found in the math. A pesticide that costs $2 per gallon to manufacture can be sold for fifty times that price to a farmer.

The implication of recent studies on effects of these compounds on human development is that we have within the human race a biological ozone hole, a series of chemical compounds whose effect will expand throughout the entire world population for decades, even if all such compounds ceased being manufactured today. Tests show that these compounds have effects in very low concentrations, and because of their widespread use and ubiquitous presence, we face continuous

reexposure over our lifetime. At present, human exposure to such substances in the United States is well within the tolerances where hormonal disruption can occur. An accumulation of forty years' worth of such substances in the environment may require only a few minutes in the body at a critical time to cause genetic changes that are permanent and irreversible. The most disturbing suggestion of the research in this area is that because organochlorines clearly react with and disrupt sexual hormones, both androgens and estrogens, they can alter the function of the brain, and thus affect behavior, thought, and intelligence.

In business as in science, the most important thing to know is what you don't know. Admitting one's ignorance can be a powerful inducement to caution. We do not know how long we can continue to create molecular-level toxic garbage that floats in the air, seeps into our water, lodges in the fat, targets our genes, and interacts with biological evolution, before life as we know it is irrevocably altered. It may be happening now, it may happen far into the future. No one knows, but when we do, it may be too late.

Organochlorines are just one among dozens of cautionary tales concerning man-made poisons in the environment. Downwind from the British Petroleum refinery and chemical plant in Lima, Ohio, local residents have formed Allen County Citizens for the Environment (ACCE) to monitor the biggest polluter in their state. Among the compounds the company has released into the air and water are benzene, acrylonitrile, formaldehyde, ethylbenzene, methyl ethyl ketone, and carbon tetrachloride. According to former President and ACCE member Norine Warnock: "I have health problems and my four-year-old daughter has serious respiratory problems. Maybe those problems are not connected to BP but maybe they are ... The guy across the street has cancer. The woman down the street has brain cancer. The woman around the corner has brain cancer. The woman who lives next door to my child's friend has cancer. The woman on the next block has breast cancer. They guy next door to her has cancer. And so does the woman next door to him. Those are just the houses I can see when I am looking out my own front door."

Industry's only answer is to clean it all up—or to try to. But what does that mean? How do you throw away a toxic molecule? To celebrate the environmental clean-up sector of the economy as a "growth industry," is worse than ignorant. We might as well celebrate cancer

treatment as a growth industry, rather than take cancer epidemics as a warning about the hundreds of toxic chemicals loosed in the environment. Business must *add* value to the economy and the society in order to make a positive contribution. "Environmental" companies that limit the damage done to the environment and to human beings by other companies, strictly speaking, do not add value. Reducing the harm caused by "growth" is a self-cancelling contribution at best, no more a factor in real economic growth than the rescue of a man who has been thrown overboard is an act of mercy.

The concept of "environmentally sound" landfills and toxic waste incineration is attractive to industry because it requires the least amount of change and preserves the status quo with respect to industries' goals and ambitions, while boosting the waste disposal industry. By focusing on the immediate problems involving the disposal of waste, industry is able to say that it is responsive to rising public concern. What it is actually doing is avoiding the fundamental issue, which is the *creation* of waste. This narrow focus also ignores the fact that industrial degradation of the planet is no longer a regional problem, a woe specific to a time and a place, and therefore theoretically controllable. Pollution is no longer restricted to industrial centers like Pittsburgh or Nagoya, but affects every forest, ocean, and continent, as well as the whole of the upper atmosphere. What were once regional pools of pollution have spilled over into greater lakes of trouble, and even non-toxic substances such as CO_2 have, in their sheer enormity, overwhelmed self-regulating atmospheric systems, to produce the potential beginnings of a predicted global warming. A recent study published in Germany showed that 88 percent of the conifer forests in Eastern and middle Europe are threatened by pollution; 84 percent of the deciduous forests in Eastern Europe and 50 percent in middle Europe are also severely damaged. Some of these forests are hundreds of miles from the nearest serious polluter.

The folly of the present approach to pollution is best exemplified by the 1,200 (of an estimated 90,000 hazardous waste sites in all) toxic sites in the United States that have been designated as priority cleanup areas under the Superfund law. Organochlorines are part or all of the problem at most of the locations, and although there is a great deal we can and should do to improve these sites, the remedies that exist merely contain, cap, enclose, and label the poisons, guarding (suppos-

edly) against future leakage and contamination. For example, when dioxins, which are the most dangerous member of the organochlorine family, are stored in a corroding barrel, can the site where they are stored be considered clean? Is the neighborhood bordering the site clean? When the barrel starts to leak, will someone be around fifty years from now to place the poison into a new barrel? What does it even mean to "clean up" a chemical so toxic that one such barrel is sufficient to kill a nation? In Hanford, Washington, the site of a nuclear weapons research facility managed for the U.S. Government by General Electric, there are enough wastes stored there to cover all of Manhattan with a radioactive lake forty feet deep. Some of these wastes are stored in underground tanks. The tanks are leaking.

Until you have visited a toxic waste dump, it is difficult to imagine the devastation there. Nothing can live at some of these sites. Even if the priority toxic waste sites are "cleaned up," this will not solve the problem of toxicity. Existing proposed techniques essentially take an unruly "mob" of delinquent chemicals and lock them into a prison that must be guarded for hundreds, even thousands of years. We know how to extract mercury from cinnabar, to mine lead, to free up chlorine gas so that it combines with carbon molecules, but we do not know how to put the genie back into the bottle. At present, there is no known means to completely detoxify and render harmless most of these substances. We have no idea how to place or recycle them back into the environment in such a way that they become harmless and safe.

What about incineration, the method of choice for dealing with most other forms of waste? First, keep in mind that the incinerator industry rose from the "ashes" of the nuclear industry. As costs and safety concerns began to erode nuclear power's allure, the companies that had most benefited from building the plants—Bechtel, Westinghouse, Combustion Engineering, and Babcock & Wilcox—got into the "resource recovery" business, also known as "trash to cash." But the energy resource recovered through burning trash to run steam turbines is a minute fraction of the total energy required to make the trash in the first place.

Incineration does not eliminate garbage or waste, it merely changes its form. Emissions are spread downwind across towns and country, which is why they have tall smokestacks. One study in New Jersey showed that a state-of-the-art incinerator consuming 2,250 tons

of household garbage daily would annually emit 5 tons of lead, 17 tons of mercury, 580 pounds of cadmium, 2,248 tons of nitrous oxide, 853 tons of sulfur dioxide, 777 tons of hydrogen chloride, 87 tons of sulfuric acid, 18 tons of fluorides, and 98 tons of particulate matter small enough to lodge permanently in the lungs. Most important, incinerators turn out to be dioxin generators. The lignin from paper and wood combines with chlorine gases to form the 210 different dioxin compounds.

For every 100 tons of trash, incinerators produce 30 tons of fly ash, a granular substance that contains most of the toxins from paint and plastic, as well as mercury, lead, cadmium and other heavy metals. The fly ash is then trucked to a landfill where it has to be enclosed in plastic liners for many thousands of years. The plastic presently used in fly-ash landfills is guaranteed for only 20 years, and landfills containing toxic fly ash in New York and New Jersey have reported leaks within months after installation.

Waste incineration is not an environmental solution, and the cost is enormous. For example, to incinerate the waste from its top fifty products produced in 1986, the chemical industry would have to pay the going rate of approximately $100 per ton, a total cost to the industry of $20 billion dollars, eight times the profits made by the companies in that year. In other words, the chemical industry would be unprofitable if it had to clean up its wastes on a yearly basis, or it would have to raise its prices considerably—not a bad idea as a way to discipline the industry, as I will discuss in a later chapter. The way the system works now, however, is that incineration is often subsidized by taxpayers, whose city councils and county commissioners issue tax-free industrial development bonds for construction. Incinerator companies usually require long-term contracts requiring cities to pay for preestablished amounts of garbage. If those levels of trash are not achieved because of recycling or other conservation measures, the cities must still pay for the phantom garbage. Incinerators do generate some electricity through the use of steam turbines, but utilities are required to purchase this power at "avoided costs," which is the highest rate they pay.

Since 1970, the United States has spent over $1 trillion to monitor, litigate, contain, and curb pollution and hazardous waste. Despite that, the environment is more polluted today than it was two decades

ago. Efforts to limit toxins and emissions did control many pollutants, but those efforts have been subsumed by an overall increase in the manufacture and distribution of waste by industry due to rising demand for products that create toxic and hazardous waste, i.e., pesticides, plastics, and automobiles. We would be worse off today were it not for the $1 trillion expenditure, but in sum, we are worse off than when we started. Thus, we face a dilemma. If we do not redouble our efforts to cut back or eliminate poisons from our waterways, wetlands, croplands, foodstuffs, and wildlife, we will suffer continued if not greater ill effects in the form of birth defects, cancer, and lung diseases. But at the same time, the costs to control industrial pollution effectively are wasted because they do not add value to the economy or society. They purchase nothing but the absence or partial absence of poison. In short, we gain nothing of true value when we spend, but we lose a great deal of value if we don't. And in economic terms, we will eventually slide backward, because any incremental growth in GNP will be spent to protect us from the dangers of that growth.

Undeterred, business claims that we need to grow economically in order to pay for all the clean-up costs. From the point of view of the corporation the logic of growth is unassailable. It derives from the observation that, if a business declines, loses market share, and experiences price erosion, environmental efforts will have to be shunted aside in favor of mere survival and capital preservation. In other words, in the corporate version of Abraham Maslow's hierarchy of needs, environmental concerns are a "higher" need that can only be acted upon in a condition of rising affluence. As long as the environment does not detract from or restrict growth, environmental needs are admissible. This logic assumes that human welfare and environmental health can be factored separately, divorcing the "good life" of cars and televisions from clean air and water and available resources. Today, every toxin, every heavy metal, every organochlorine has a champion, a company or an industry that fights fast and furious for its sake. Industry marshals arguments about cost-savings, job loss, and other "evidence" to forestall regulation, postpone action, further commercial development, and delay or prohibit the onset of any societal change that would impede its business. Oftentimes, an industry will even form a trade group or an "independent" foundation, such as the

International Lead Zinc Research Organization, Inc., whose explicit purpose is to further the life of or promote a toxin or heavy metal.

The logical response to our current predicament would be to design or to redesign manufacturing systems so that they do not create hazardous and biologically useless waste in the first place. Instead, today a revisionist movement asks us to revise our chemical and toxic standards. Lobbyists for food and chemical companies believe that we have set our tolerances for exposure to toxins too high, and that human beings can "safely" absorb greater quantities than those established by current regulations. A popular argument put forth by chemical companies is that there are already naturally occurring carcinogenic compounds in foods—proteins and naturally occurring toxins manufactured by plants to resist infestation from predators, as well as chemicals produced in the processing or pickling of foods. Foods that fall under this category are peanuts with aflatoxin molds, cloves, pepper, brown mustard, dried squid, sake, smoked meats, and dark, sugar-based alcohol products. Since some of these compounds are carcinogenic when fed in large amounts to laboratory rats, chemical companies reason that synthetic pesticides pose no more severe a problem, particularly when they are ingested in equal quantities. Furthermore, there are many foods that act as powerful anti-carcinogens, including cabbage, broccoli, garlic and green tea. The scientists who make these claims, however, do not address critical differences between natural carcinogens and synthetic carcinogens, including the fact that natural compounds are rarely persistent, do not bioaccumulate, are not stored in the fatty tissues of the human body or in mother's milk, and rarely cause hormonal imbalances or disruption of the endocrine system. Furthermore, the human body has had many centuries to become accustomed to these compounds.

Independent scientists who have devoted their careers to the study of the effects of organochlorine compounds, particularly pesticides, have a different view of the problem than do industrial chemists. According to Dr. Theo Colborn, Senior Fellow of the World Wildlife Fund:

> Evaluating the hazards from exposure to hormonally active chemicals in the environment will continue to be impossible unless data regarding production and distribution of chemicals of this nature are made public information. The difficulties associated with determining exposure are exacerbated by the large

number of products on the market, the large quantities used, the number of possible exposure pathways and events, the seasonality of use, and the global distribution of many of the products. Persistence and long range atmospheric and aquatic transport of exported, banned/restricted/unregistered pesticides also contribute to the difficulty of assessing hazard.

In essence, the companies that manufacture and defend the use of pesticides decry epidemiological studies done on mice and rats as inconclusive, but will not disclose production and use data that would allow scientists to better evaluate the actual effect exposure to these chemicals is having on human populations because it is "confidential business information." Nevertheless, we do know that farmers who use herbicides have six times greater risk of contracting certain types of cancer, and that children in homes that use pesticides have a seven times greater chance of contracting some form of leukemia.

Because industry insists that poisonous compounds are economically vital, it compares the "need" for toxins with the "cost" of the estimated number of fatal forms of cancer that will result from human exposure. Companies claim that the cost of saving lives has become prohibitive. A study completed in 1991 by the Office of Management and Budget attempted to estimate the cost of preventing the premature deaths that are attributable to present restrictions. Although the study was subjective and impossible to verify by its nature, it provided insight into how the argument has progressed between those who would ban toxins and those who believe their presence is acceptable. For example, the cost of drinking water standards controlling trihalomethane levels is $200,000 for every premature death averted. Benzene exposure limits for workers cost $8.9 million per death avoided. Arsenic exposure limits cost $106.9 million per premature death prevented. The debate has been further complicated by recent studies that demonstrate that the rat and mice studies used to determine tolerances may not accurately predict the effects of certain toxins in the human population.

These arguments present a truth and a fiction. The truth is that present regulatory standards and methods are an expensive hornet's nest of problems that cannot be solved by additional regulations, studies, and money. Business would assert that the problem is with the reg-

ulations. Environmentalists would counter that industry has brought these woes upon itself. Either way, the proliferation of man-made compounds being introduced into the world is far greater than the rate and capacity at which they can be researched or understood. The fiction is that since we do not know the actual tolerances wherein these compounds pose a threat to human existence, and since economic calculations show that many of the regulations are expensive when measured in terms of premature deaths averted, we should relax a regulatory policy that almost everyone concedes works badly.

The underlying assumption is that we will continue to need increasing amounts and different types of poisonous chemicals in order to live in a "healthy" and civilized world, a belief whose ironies are rarely addressed by industry. But it is industry and its particular technologies that require more toxins, not human beings or wildlife. The idea that we can "manage" our increasingly toxic environment through the careful marshaling of even more toxins by using statistics, inspectors, and gas chromatography is both chilling and arrogant. What science on both sides of the issue reveals is that we still do not know the answer to the critical question: How much man-made toxin can the human body tolerate before mortality, disease, behavior, and genetics are affected? The way industry poses the question is upside down and backwards. Rather than trying to see how much poison we can absorb before the cost of a premature death exceeds $1 million or $5 million dollars per person, we should be questioning why we aren't rethinking our industrial systems of production to minimize the amount of toxins required to provide citizens with decent and sustainable lives. A simple computer exercise calculating the number of potential synergistic and biologic interchanges involved with 5.8 billion people, millions of other species and the over 100,000 chemicals and toxins introduced into our environment tells us that it will take an astronomical amount of research to assess what exposures and problems we may have unleashed to date. It is not merely the environment that is being overwhelmed by toxins, it is our capacity to understand and study them. Any time a system creates by-products that harm rather than further life, it is a form of waste, and by definition, it is uneconomical. An enduring and true economy does not create waste.

Those who assert that we need to stoke the engine of industrial

growth in order to garner the resources to clean up our environment do not see that the industrial system itself is flawed in both its design and emphasis. If economic growth is founded on an ever-increasing reliance on chemicals, toxins, poisons, and energy by-products, then we will choke on the growth that is supposed to save us. The solution is not to put better filters on our effluent pipes, or line the settling ponds with thicker plastic, or fire the incinerators fifty degrees hotter. We need a different kind of growth, one that reduces and changes the inputs of raw materials and energy, and simultaneously eliminates the outputs of waste. We will have environmental success as a nation when we have eliminated most if not all toxic substances. When planes still swoop down and aerial spray a field in order to kill a predator insect with pesticides, we are in the Dark Ages of commerce. Maybe one-thousandth of this aerial insecticide actually prevents the infestation. The balance goes into the leaves, into the soil, into the water, into all forms of wildlife, into ourselves. What is good for the balance sheet is wasteful of resources and harmful to life.

One of Sweden's leading cancer researchers addresses the problem of man-made toxins at the cellular level. Dr. Karl-Henrik Robèrt has been educating Swedish citizens and leaders for many years by creating consensus on the root cause of environmental damage. His process, called the Natural Step, begins with cellular biology, because it is the basis for all life: "The cell is only concerned with the conditions necessary for sustaining and propagating life. It also reminds us that we are inescapably a part of nature: There is much less difference between the cell of a human and that of a plant than is commonly understood. And if we compare our cells with those of other animals, we must go to the molecular level in order to perceive the differences that do exist. The basic structures and functions of our bodies are nearly identical to those of eagles and seals, all the way down to the molecular level."

Not only are our bodies the creation of natural cells, but almost all of the resources we rely upon for our health and well-being are similarly derived. Robèrt's point is that cells grew and evolved over billions of years through self-sustaining cycles wherein all waste was constantly cycled back to other forms of life. Indeed, cyclical biological activity can be the only source of life because all linear systems are, by function and definition, limited and short-lived. Whenever we

introduce synthetic toxins into the biological process, regardless of the intent or original application, we are changing a cyclical process to a linear one. It doesn't matter if dried squid or moldy peanuts cause esophageal cancer in laboratory mice, because nature's toxins—and there are many of them—have evolved over millennia as a part of complex, cyclical, life-giving cycles. Even if we imperfectly understand their purpose, in nature these compounds do not break the cyclical pattern of growth and evolution. Our man-made poisons, toxins, and chemical wastes have no such history. Not only are they "new" to biology, but "life" has no place to put them. They cannot be taken up and incorporated by the normal metabolic processes of cellular life.

Robèrt's approach is an attempt to sidestep the endless question about how much a given toxin will be how poisonous to which animal over what time span. Because of their need for a precise methodology, scientists will never agree about broad toxicological questions, which involve too many variables, too many unknowns, too many disciplines. Because of my interests, I receive catalogs from specialty publishers advertising their latest offerings: *Advances in Health Risk Assessment for Systemic Toxicants and Chemical Mixtures,* or *Renal Effects of Petroleum Hydrocarbons,* or *Mammalian Cell Transformation by Chemical Carcinogens.* There are thousands of these dense, cautious volumes of research. Robèrt looks at the debate that gives rise to such material and sees it as discussions over dead leaves on a tree. Rather than looking at the branches, trunk, roots, and soil, we are picking over each leaf in an attempt to trace down the cause of its demise. Rather than posing specific questions about the ultimate effect of a given mutagen or carcinogen, Robèrt uses the Natural Step to ask systemic questions that are not only easier to respond to, but that elicit surprisingly consensual agreement, from Greenpeace and unions to industry and religion. For example, in the case of dioxin or any persistent toxin, Robèrt believes there are six questions to be asked: *Is dioxin natural? No. Is dioxin stable? Yes. Does it degrade into harmless substances? No. Does it accumulate in bodily tissues? Yes. Is it possible to predict the acceptable tolerances? No. Can we continue to place dioxin into the environment?* No, not if we want to survive.

In his address to the World Economic Forum in 1992, Vaclav Havel, then President of Czechoslovakia, spoke to the frustration felt

by many trying to grapple with the problems of social and biological degradation:

> We all know civilization is in danger. The population explosion and the greenhouse effect, holes in the ozone and AIDS, the threat of nuclear terrorism and the dramatically widening gap between the rich north and the poor south, the danger of famine, the depletion of the biosphere and the mineral resources of the planet, the expansion of commercial television culture and the growing threat of regional wars—all these, combined with thousands of other factors, represent a general threat to mankind. The large paradox at the moment is that man—a great collector of information—is well aware of all this, yet is absolutely incapable of dealing with the danger. Traditional science, with its usual coolness, can describe the different ways we might destroy ourselves, but it cannot offer us truly effective and practicable instructions on how to avert them. There is too much to know; the information is muddled or poorly organized; these processes can no longer be fully grasped and understood, let alone contained or halted.

The Natural Step is trying to achieve a level of discourse that arrives at truths that are valid for everyone so that viable policy and action can result, policy and action that can be almost universally supported and embraced. But how do we then move ahead to create a commercial system that is based on natural principles? How can we create a society and culture that support the profound and lengthy transition from an industrial to a restorative society? Business requires more than criticism. It needs a plan, a vision, a basis—a broad social mandate that will turn it away from the linear, addictive, short-term economic activities in which it is enmeshed and trapped.

The transition from immature to mature ecosystems is called ecological succession. What we must now create is commercial succession. Rather than argue about where to put our wastes, who will pay for it, and how long it will be before toxins leak into the groundwater, we should be trying to design systems that are elegantly imitative of climax ecosystems found in nature. Companies must re-envision and re-imagine themselves as cyclical corporations, whose products either literally disappear into harmless components, or whose products are so specific and targeted to a specific function that there is no spillover effect, no waste, no random molecules dancing in the cells of wildlife, in other words, no forms of life must be adversely affected. If Dow,

Ciba-Geigy, and Henckel think they are in the synthetic chemical production business, and cannot change this belief, they and we are in trouble. If they believe they are in business to serve people, to help solve problems, to use and employ the ingenuity of their workers to improve the lives of people around them by learning from the nature that gives us life, we have a chance.

4

Parking Lots and Potato Heads

A friend recently said that running a business with a conscience is like driving with the brakes on. I suspect that he was referring to a state where he became aware that business, culture, and the biosphere are inseparable and whole. Today, however, it satisfies corporate America that ecosystem health can be defined separately from business and jobs. I don't mean to imply that business acts without principles. But sooner or later, we must recognize that despite the protestations of industry, it is completely lacking in ecological principles, and that what is good for business is almost always bad for nature. However formal and resolute the corporate principles of honesty and fair dealing, once one understands the chasm between how we act in our corporate life and what is happening to natural life, commerce is revealed for what it is: a system of production and distribution that left biological life out of its equation.

Business is such an efficient form of human endeavor, with so many positive attributes, that it is difficult to comprehend how it has become so destructive—how, in effect, it has written an unnatural history of the world. It is not enough to say that business should be more ethical, or that we should use recycled materials and encourage van-

pooling. What is required is a total redesign of what it means to be in business at the latter stages of the twentieth century, when science can tell us clearly and without doubt that our present course of action is extinguishing life on earth.

If this book has one main purpose, it is to imagine and describe the ways business can act that are restorative to society and the environment. Restoration is not a business term. But then, neither is degradation. Restore has many definitions, all with one theme. The act of restoration involves recognizing that something has been lost, used up, or removed. To restore is to bring back or return something to its original state. This can involve rebuilding, repairing, removing corruptions and mistakes; it allows for the idea of bringing a person or place or group back to health and equilibrium; it can mean returning something that originally belonged to someone else, whether it is returning lands taken from other cultures, or dignity stolen by bureaucratic regulations and officialdom; it encompasses the idea of reviving and rejuvenating connections, relationships, and responsibilities. Honor can even be retrieved. It can be as simple as replacing what has aged and died away. Above all, it means to heal, to make whole, to reweave broken strands and threads into a social fabric that honors and nurtures life around it. To restore is to make something well again. It is mending the world. People have to believe there will be a future in order to look forward.

To live in that future, we require a design. To pay the bills from the past, we need a means. To act we need a way to serve. For those who say that times are tough, that we can ill afford sweeping changes because the existing system is already broke or hobbled, consider that the U.S. and the former U.S.S.R. spent over $10 trillion on the Cold War, enough money to replace the entire infrastructure of the world, every school, every hospital, every roadway, building, and farm. In other words, we bought and sold the whole world in order to defeat a political movement. To now assert that we don't have the resources to build a restorative economy is ironic, since the threats we face today are actually *happening*, whereas the threats of the post-war nuclear stand-off were about the *possibility* of destruction.

Aristotle made a key distinction on this issue over two thousand years ago. The philosopher of scientific categorization and observation distinguished "oikonomia" from "chrematistics." In *For the Common*

Good, John Cobb and Herman Daly explain: "*Oikonomia,* of course, is the root from which our word 'economics' derives. *Chrematistics* is a word that these days is found mainly in unabridged dictionaries. It can be defined as the branch of political economy relating to the manipulation of property and wealth so as to maximize short-term monetary exchange value to the owner. *Oikonomia,* by contrast, is the management of the household so as to increase its value to all members of the household over the long run. If we expand the scope of household to include the larger community of the land, of shared values, resources, biomes, institutions, language, and history, then we have a good definition of 'economics for community'"

Despite our use of the word "economy," industrial societies currently practice chrematistics, without understanding what it means to manage our household. People want things to change. Most businesspeople want to act in responsible ways. Employees want to experience self-worth, security, and meaning in their work. The citizens of undeveloped countries want to feel honored and respected, to be treated with dignity, and to improve their lives. What we have instead is systematic industrial malfunction abetted by theoretical apologies offered by academicians, few of whom have stood in the desolation of a desertified ex-forest, few of whom have run a business, met a payroll, or tried to apply their own theories to everyday life. This massive failure of a supposed science was attacked most pointedly by Nobel Prize–winning economist Wassily Leontief, who once analyzed the contents of the *American Economic Review* and found that only 1 percent of the articles represented studies based on data the author participated in gathering. Half of the studies were mathematical models based on no data whatsoever. In another journal, *Science,* Leontief wrote, "Year after year economic theorists continue to produce scores of mathematical models and to explore in great detail their formal properties; and the econometricians fit algebraic functions of all possible shapes to essentially the same sets of data without being able to advance, in any perceptible way, a systemic understanding of the structure and the operations of a real economic system."

We have received a nearly unpayable bill from the industrial world for its past and ongoing excesses. But economy as we know it is not an inevitable form, growth does not necessarily mean more waste, prosperity does not have to be described by kilowatts used, autos pro-

duced, hamburgers flipped and consumed. Value is what we ascribe. Prosperity is what we make it to be. So what will it be?

To answer this question wisely, we must forget the standard economic indices and reconsider everything we make and how we make it. We often hear about business "standards" and "principles," but perhaps a better idea for the restorative economy is *practices.* I am drawn to the word not only for its "practical" sense, but because it implies that there is something to be learned, and that through consistent and applied practice, one improves one's ability, gets better at a skill, strives for understanding. "Practice" seems a more humble word than "principle," a word behind which it is easy to hide, and which often leads to some sort of failure. You can betray a principle, but you can always keep on practicing.

And businesses need a lot of practice. They have a long way to go before they become organizations that truly contribute to both the environment and society. I say that not to condemn, but in the spirit of realism. To move ahead to a restorative economy, the industrial corporations of the world must change to meet the world's needs, not the other way around. In this chapter and one that follows, I address specific means of restoration to large corporations, but small businesses are not exempted from responsibility or change. Small companies must pay careful attention to larger corporations, if for no other reason than that they often tend to become their homunculi, parroting and striving to take on the behavior of their larger cousins as soon as they can afford it. The seeds of corporate dysfunction reside in the nature of business, not in the size of the enterprise.

Many individuals and companies, including most large corporations, have already come to the conclusion that they must clean up and change. The archetype of industrial hygiene in this country is the 3M Company. In 1975, Joseph Ling, head of 3M's environmental department, developed a program called Pollution Prevention Pays (3P), the first integrated, intracompany approach to designing out pollution from manufacturing processes. The plan created incentives for the technical staff to modify product manufacturing methods so as to prevent hazardous and toxic waste, and to reduce costs. By reformulating products, changing processes, redesigning equipment, and recovering waste for reuse or recycling, 3M has been able to save $537 million. During the fifteen-year period, it reduced its air pollution by

120,000 tons, its wastewater by 1 billion gallons, its solid waste by 410,000 tons. Over 3,000 separate initiatives have contributed to the cause, and the key to the whole enterprise was a strong mandate from the top management of the corporation, linked with on-going support and assistance to line employees. In 1986, 3M expanded the scope of the program with a goal to eliminate 90 percent of all emissions by the end of the decade, and to achieve zero emissions sometime after. Now known as 3P Plus, the plan requires the incorporation of environmental issues on all levels of business planning and is used as a factor in employee performance reviews. The 3M program is an example of making money from preventing waste, which for most companies is the first step to becoming more socially and environmentally responsible.

One of the most comprehensive proposals toward sustainable industrial methods is being called "industrial ecology." The term was first coined by Robert Frosch and Nicholas Gallopoulos in 1989 in a *Scientific American* piece entitled "Strategies for Manufacturing." Recognizing that industrial processes that harm and waste are, by definition, less economic and therefore more costly in the long run, companies and industries are trying to dovetail their material and waste flows, attempting to eliminate pollution by tailoring manufacturing by-products so that they become the raw materials of subsequent processes. This philosophy goes well beyond the hygiene of curtailing waste; it entails using waste so that it is no longer waste at all. Not only does this prevent material from entering the wastestream, it garners sales and therefore income for what was once an expense.

Industry has a natural prejudice against environmentalism because it seems to prevent activity, to slow down innovation, and to restrict growth. Businesses see themselves as problem-solving institutions, or, in the words of Hardin Tibbs, a pioneer in the concept of industrial ecology, "essentially optimistic and forward looking, with a preference to action and a willingness to accept measured risk." They are also creative and independent, with a strong bias to objectivity, technology, and measurable standards. Industrial ecology provides a positive means for corporations to address environmental needs while also working within their own natural predilections. The proponents of industrial ecology argue that this nascent but increasingly popular idea offers the most realistic means for corporations to change.

It is important to note that there are assumptions within industrial

ecology that run counter to what some economists and biologists believe. For example, industrial ecology implies that resource shortages may have technological fixes, such as biotechnology, or that degraded ecosystems—soil, oceans, forests—can be restored through market mechanisms to former levels of activity, while the world economy continues to grow. Ecologists aware of the extent of worldwide degradation would call that optimistic. Yet, industrial ecology provides for the first time a large-scale, integrated management tool that designs industrial infrastructures "as if they were a series of interlocking, artificial ecosystems interfacing with the natural global ecosystem." For the first time, industry is going beyond life-cycle analysis methodology and applying the concept of an ecosystem to the whole of an industrial operation, linking the "metabolism" of one company with that of others.

A prototype of industrial ecology and cooperation is in place right now in Kalundborg, Denmark. In Kalundborg, a coal-fired power plant, an oil refinery, a pharmaceutical company specializing in biotechnology, a sheetrock plant, concrete producers, a producer of sulfuric acid, the municipal heating authority, a fish farm, some greenhouses, local farms, and other enterprises work cooperatively together. The Asnaes Power Plant started this process off in the 1980s by recycling its waste heat in the form of steam. It had formerly condensed the steam and returned it as water to a nearby fjord; now it sends the steam directly to the Statoil refinery and the Novo Nordisk pharmaceutical company. It also provides surplus heat to greenhouses, a fish farm owned by the utility, and the residents of the local town, allowing 3,500 oil-burning heating systems to be shut off.

The Statoil refinery produces surplus gas, which was not used prior to 1991 because it contained excessive amounts of sulfur. The refinery installed a process to remove the sulfur, so that a cleaner-burning gas is sold to Gyproc, the sheetrock factory, as well as to the coal-fired utility (saving 30,000 tons of coal); the sulfur that is being retrieved is sold to Kemira, a chemical company. The process that removes the sulfur in the smokestacks of the Asnaes Power Plant also yields calcium sulfate, which they will be selling to Gyproc as a substitute for mined gypsum. The fly ash from coal generation is used in road construction and concrete production. Waste heat from the refinery is used to warm the waters of a fish farm that produces 200 tons of

turbot and trout sold into the French market, while its fish sludge goes to local farmers as fertilizers. Meanwhile, Novo Nordisk has developed a process to make the sludge generated in its fermentation process useful for local farmers through the addition of chalk-lime and processing at 90°C for an hour to kill any remaining microorganisms.

This synergy is remarkable because it happened "spontaneously," without governmental regulation or law as the prime motivating factor, and because some of the relationships between outputs and inputs were serendipitous or unplanned at the outset. Hardin Tibbs writes:

> It is significant that none of the examples of cooperation at Kalundborg was specifically required by regulation, and that each exchange or trade is negotiated independently. Some were based strictly on price, while others were based on the installation of infrastructure by one party in exchange for a good price offered by the other. In some cases mandated cleanliness levels, such as the requirement for reduced nitrogen in waste water, or the removal of sulfur from flue gas, have permitted or stimulated reuse of wastes, and have certainly contributed to a climate in which such cooperation becomes feasible. The earliest deals were purely economic, but more recent initiatives have been made for largely environmental reasons and it has been found that these can be made to pay, too.

Geographical proximity of the industries was critical to some of the exchanges (heat, water, steam), but fly ash is exported out of the area. While the success of 3M in preventing waste speaks to what a company can accomplish "in-house" and with no great sacrifices, the Kalundborg success speaks to the wealth of exchanges that are possible between industries, without design or preplanning. Imagine what a team of designers could come up with if they were to start from scratch, locating and specifying industries and factories that had potentially synergistic and symbiotic relationships.

Tibbs's view of industrial ecology, however, goes far beyond the mere complementary siting and interaction of industrial processes. Besides adjusting the internal metabolism of industry to minimize the input of energy and the output of waste, Tibbs proposes that industrial ecology recalibrate its inputs and outputs to adapt to the carrying capacity of the environment, the first time in the history of industrialism that such a sensible and reasonable recommendation has been

made. To accomplish this, industrial design would emphasize "dematerialization," using less material per unit of output; improving industrial processes and materials employed to minimize inputs; and a large-scale shift away from carbon-based fuels to hydrogen fuel, an evolution already under way that is referred to as "decarbonization."

Dematerialization of the economy has roots in Buckminster Fuller's vision of a material civilization that would "ephemeralize" through design and use of increasingly lightweight materials, the application to product design of his "more is less" principle. Look at every durable good that you presently own and use—the refrigerator, the television, the car, even the house—and then remember what the same product was like ten, twenty, or forty years ago. In most cases, it weighed more, used more material, and employed greater amounts of embedded energy in its manufacture. For example, in 1915, the U.S. used .95 tons of petroleum to produce $1,000 (in constant dollars) of Gross National Product. Today, that figure is closer to .40 tons per $1,000. Similarly, cars weighed 20 percent less in 1985 than they did in 1975. Between the years 1972 and 1982, redesign of American cars resulted in annual savings of 250 million tons of steel, rubber, plastic, aluminum, iron, zinc, lead, copper, and glass. Ephemeralization and dematerialization are only positive qualities, however, when they are the result of good design. Houses in South Miami that were made of lightweight, composite materials were destroyed by Hurricane Andrew in 1992. Those structures were neither built to code nor designed for the winds that accompanied Andrew.

Ten years ago, I wrote in *The Next Economy* that dematerialization had already been established as a permanent feature of the economic development because of rising resources prices, particularly energy.

> During the growth of the [industrial] economy, we used continually more energy to run our economy and produce our goods. Since using more energy, whether directly or indirectly, makes goods more expensive and therefore less available, we will have to use less energy to produce the same or better goods if we are to maintain our standard of living.... What the economy and the greater environment are telling us is to move to a more evolved economic structure. In the "next economy," virtually every product, process, and service will be completely redesigned and newly constituted....

To do this, the amount of information per unit of production must increase correspondingly. Remember that we are defining information here as design, utility, and durability, or to put it another way, the application of the knowledge of how to best make or accomplish something ... to make a better product, using fewer resources as well as less energy and work ... Whatever methods of improvement are chosen, the goal is the same: to produce more using less.

Although the price of energy has fallen since then, the real cost in terms of the damage and long-term effects to the environment is continuing to climb.

Tibbs argues that in order for industrial ecology to become a reality, "it will certainly need to be backed up by innovative new policies that coherently align financial, economic and regulatory score-keeping on an international basis." There are currently two main proposals that are being tried out that align environmental policy with governmental and business objectives. The first is the imposition of green or Pigovian taxes (named after economist Nicolas Pigou) on emissions, products, or activities that are to be discouraged. This strategy is discussed fully in later chapters.

The second is the issuance of pollution permits, credits that are auctioned off or granted to industry that allow a given amount of atmospheric discharge per credit bought and sold. For example, in order to reduce sulfur dioxide emissions, one of the main causes of acid rain, from coal-fired utilities, the EPA is issuing vouchers to the 110 dirtiest plants that will allow them to emit 2.5 pounds of sulfur dioxide per million Btus of heat generated. By January, 2001, the plants will only be allowed to emit one half the amount, regardless of new electrical demand or energy generation. The plan is to gradually reduce the number of permits issued, creating greater and higher price incentives for industries to reduce or eliminate their emissions over time. Since these credits would be tradeable, a market would be established giving the utilities the ability to sell or lease the permits, allowing an overall self-regulatory approach within the industry. Proponents of tradeable pollution permits would like to institute them on a worldwide basis, assigning each nation an allocation of emissions, including those of carbon dioxide. New power plants coming on line would be designed to reduce emissions, allowing them to sell their permits to

older plants in other countries, in effect reducing the costs of establishing a more environmentally sound infrastructure.

The problem with pollution permits is that they do just that—permit pollution. Illinois Power Company, which had been building a $350 million scrubber to remove sulfur dioxide at its plant, has decided to scrap the scrubber and buy pollution permits instead. In fact, it was practically forced to because a state law requires the utility to meet emission standards in the least expensive manner possible. By purchasing pollution credits, it can save $250 million over a 20-year period, and continue to buy high-sulfur coal from Illinois.

At this writing, the United States is just reaching the twentieth anniversary of the "energy crisis" of 1973–1974. It was abundantly evident then and in the two decades since that the industrial world needed to thoroughly reexamine its dependence on energy, imported oil particularly, and that we in America required a national energy policy that had, at the very minimum, a vision of future energy strategies. During those twenty years, other economies, most notably the Japanese, radically redesigned their industrial systems to reduce their need for energy, while in the United States, although some progress was made, proposals to establish energy self-sufficiency and conservation were derided, opposed, fought, and derailed by industry, at nearly every opportunity. In other words, American business did not show leadership and vision. In 1993, when the first suggestions of an energy tax were proposed in the form of a Btu tax, companies in the petroleum, chemical, and manufacturing industries almost without exception lined up against it.

Energy is a critical component of a comprehensive environmental approach required by business. While Japanese industry has already completed through MITI (Ministry of International Trade and Industry) their hundred-year blueprint to become world leaders in all aspects of environmental business, Mobil Oil is running op-ed advertisements in the *New York Times* chastising the government about energy taxes. The question stands: How and when will business rise up and accept its responsibility for both the degradation of the environment and the potential for its restoration? Industrial ecology, as presently envisioned, does not call for any changes in how we live, and thus, if adopted in principle, may inadvertently serve as a long-term smokescreen for business as usual. That wouldn't be all bad if behind

the screen a sustainable economy were being constructed. But if the drawdown of our global resources is proceeding at an exponential rate while industry is changing at an arithmetic rate, it will be a case of too little, too late.

A fundamental proposal for industrial reorganization and waste management comes from Dr. Michael Braungart and Justus Englefried of the Environmental Protection Encouragement Agency (EPEA) in Hamburg, Germany. By proposing an "intelligent product system," Braungart and Englefried propose bypassing waste management altogether by fixing the source of the problem. Their concept of a completely cyclical economy goes further than industrial ecology in that it eliminates waste altogether. Braungart and Englefried divide products into three categories: consumables, products of service, and unsaleables. Under their proposal, almost everything industry produces would eventually fall under one of the first two classifications.

Consumables are products that are used and consumed, usually only once, and then become waste of one sort or another. In order for a product to qualify as a consumptive product, its waste must be wholly biodegradable, capable of transforming itself into food for another organism with no toxic residue that would cause harm or be accumulative. In essence, it would have to be capable of turning back into dirt, with no harmful intermediary process inherent in its decomposition. Most food falls into this category, although food tainted with persistent pesticides does not. Many products that do not currently fall into this category could. For example, most clothing contains a number of chemicals as well as certain metals. Silk blouses and ties are impregnated with zinc and tin to give them their "hand," the heavy draping that gives people the impression they are getting a more valuable fabric. Shoe leather is tanned with chromium and contains toxic dyestuffs. Although shoes are technically a toxic waste as presently manufactured, there is no reason that they and other apparel could not be made so that when they are ultimately discarded, they could break down into food for other organisms. (The idea of degradable products has been around for some time. During the Depression, a Farm Chemurgic Council, including members Henry Ford and George Washington Carver, tried to apply farm products to industrial uses. In 1941, Ford designed a prototype car which had a body made of soybean plastic, was powered by ethanol, and ran on tires made from

goldenrod. Confident that oil prices would rise after the war, Ford believed that we would soon be "growing" our cars.)

Products of service are primarily what we call durables, although they also include non-durables such as packaging. What we want from these products is not ownership per se, but the service the product provides: transportation from our car, cold beer from the refrigerator, news or entertainment from the television. Under the intelligent product system, these products would not be sold, but would be *licensed* to the purchaser, with ownership retained by the manufacturer. When you bought a refrigerator, a VCR, or car, you would buy the license to use and operate it. The license would be transferable, so that if you wanted to give or sell it to a friend, you could. But the product could not be thrown away or disposed of. It must be returned by the final user, or in the case of large appliances, picked up by the manufacturer or retailer. Retailers of consumer products would become "de-shopping" centers where we would drop off the products we no longer needed and obtain newer ones. At present, most of these types of products are not recycled at all, but rather are down-cycled, reduced to scrap, melted down to yield paper, glass, aluminum, and plastic. In an intelligent product system, products of service would be designed for complete and easy disassembly for reuse, remanufacture, or reclaiming. When you buy a television today, you are purchasing some 4,000 chemicals, 500 to 600 grams of lead, and an explosive vacuum tube. There is no safe place to dispose of a television. If you transport twenty televisions in a truck, you are technically required to be licensed by the EPA as a toxic waste hauler. A television is not toxic waste, however, if you return it to Sony to be assembled into another television. In the intelligent product system, those are the only options because, like individuals, manufacturers cannot dispose of their "waste" products.

Under the "products of service" concept, manufacturers would view both the materials and the methods of production in an entirely new way, since they would always have to imagine how they would reuse and reclaim the product upon its return. This calls for entirely novel principles of design that mimic what nature tells us: waste equals food. Instead of thinking of the value of the product only as it goes out the door, the manufacturer has to consider its value when it comes back in the door. This plan favors those companies and designs that

most elegantly employ materials and components in ways that they can be most efficiently rearranged, changed, reused, or reclaimed.

A certain amount of embedded energy is required to manufacture every product. By careful design and construction, much of that energy can be saved. Today, every time we make a TV or car, we literally go back to the well—the oil well—and start over. Under the intelligent products concept, our products of service are created and recreated in increments that extend their life far into the future. It does not obviate changes in technology, but it does require technology to weigh carefully the comparative advantages of a new feature against the energy and material demands that would result from reusing and reclaiming materials. By designing products so that they can be disassembled and remanufactured, we will require more labor, a cost that will ultimately be paid for by using less waste and energy. This is one example of how, in the restorative economy, productivity can go *down,* employment up, and profits increase. I don't think there is any question that, if we imitate natural systems in our economy, we will create more well-paying jobs for people. And manufacturers themselves will benefit from customer loyalty, since people turning in "old" products may develop product loyalty.

Finally, there are what Braungart and Englefried call unsaleable products: toxic chemicals, radiation, PCBs, heavy metals, and the like. There is no "cycle" to these products within the environment, no continuous or cyclical process into which they can be integrated that will not cause harm. An intelligent product system works toward designing unsaleables out of consumables (i.e., using mercury fungicides on seeds), and, eventually, from all products of service. In the meantime, unsaleables must be gradually phased out and replaced, which means that safe and effective storage methods must be sought out and created. Braungart and Englefried propose that unsaleables be stored in what they call "parking lots," sites that are owned by the state or other public authorities but that are then rented to the polluter. It has been demonstrated that the only way a toxic chemical can be stored so that it does not spontaneously combust or so that it cannot be released in gaseous form, is in a secure container as a liquid. With the exception of radioactive products, these conditions can be met for all toxic chemicals and waste products. Today, we have more chemicals to store than we know how to dispose of. Despite the fact that we

have not been able to create satisfactory methods of detoxifying and recycling these chemicals, we should not force ourselves to burn or disperse them for lack of a permanent solution.

Under the parking lot concept, storage charges would be the responsibility of the manufacturer of the toxin, who would pay for the service in perpetuity, or until the industry or some other agency devised a safe method of detoxification. As a result, local communities would only have to deal with organic waste in their landfills. But the chief advantage of the parking lot is that it ties the manufacturer to the waste. As storage costs rise, strict enforcement of the "polluter pays" principle gives industry incentives to devise alternatives to the use of these chemicals in the first place, and to devise new technologies for the detoxification of what they have already made.

The parking lot concept could be extended through the use of molecular markers. Selected chemicals—those that are persistent, bioaccumulative, and toxic—would be required to be molecularly tagged so that they could be identified by the manufacturer that produced them. While companies could continue to make these products, they would be responsible for them in perpetuity. Thus, if toxins show up in habitats they do not belong to or were not used in, it would be the responsibility of the maker to retrieve them. If my well water became contaminated with organochlorines from Occidental Petroleum, it would be their problem, not just mine. Our current system is based on the fascinating reversal of responsibility and accountability. If my dog gets loose and bites someone, I have to pay, but if a corporation's chemicals get loose and poison groundwater, rivers, fish, and ultimately humans, it is we, the victims, who pay. Rockwell International was charged by the government with intentionally polluting Rocky Flats, Colorado, with plutonium wastes. While the company was fined $18.5 million, a fraction of the money that will be required to clean up the site, the company was given "performance bonuses" by the Department of Energy during the last three years it ran the plant totaling $22.6 million.

The concept of lifelong "ownership" was broached in March 1993, when the town of Sanger, California, won a $15 million settlement from three chemical companies, Dow Chemical Co., Shell Oil Co., and Occidental Chemical Corp., for DBCP contamination of its drinking water wells. Although the pesticide DBCP (dibromochloro-

propane), used for killing nematodes, was banned in 1977, it has continued to migrate through the sandy soils into the aquifers in the San Joaquin Valley. Because the chemical is known to cause sterility and cancer (1,000 workers in Honduras became permanently sterile due to DBCP contamination in banana plantations), the city of Sanger wanted to recover the money it would need to clean its water supply for public consumption. This was the first time that a chemical company had been held responsible for contamination caused by "normal" farming practices, a legal precedent that essentially established ongoing responsibility for the effects of a toxin even when used as prescribed.

In today's industrial economy, standard thinking is cradle-to-grave: Companies who make chemicals should work with end-users so that wastes are properly and safely disposed of. This methodology is an improvement over the "no-deposit, no return" mentality that preceded it, but it remains, in essence, a license for industry to persist in manufacturing toxins. In addition, the "final" disposal solutions available today are unacceptable—all of them—including deep-well injection, incineration, and fly-ash storage. Today, when many people's bodies in industrial nations are, technically speaking, too toxic to be placed in landfills, it is time to establish a pathway to eliminate the poisons, a chain of actions and consequences that energizes business, that stimulates innovation, that preserves employment, and restores the environment. A cyclical, restorative economy thinks cradle-to-cradle, so that every product or by-product is imagined in its subsequent forms even before it is made. Designers must factor in the future utility of a product, and the avoidance of waste, from its inception.

If this proposal sounds radical, it is, because it gets down to the root causes of pollution and toxicity. Responsibility belongs to the maker, not merely the user, and certainly not with the victim. In the linear, non-cyclical system of today, responsibility is blurred or in some cases nonexistent. By placing both the responsibility and the cost of mitigation with the originator of the problem, vast and compelling incentives are created for companies to redesign, even reimagine, their business and processes.

In the United States, there are proposals afoot that would radically redefine the issue of responsibility for waste. As most Americans know, the careful sorting and curbing of household trash is, if not pleasurable, at least satisfying, in that one does his small part for the environ-

ment. The problem is that as recycling programs have accelerated and grown, they have burdened municipalities with their high costs, and monies that could be used for schools or hospitals are being diverted to collect and sort empty Pepsi cans, unwanted junk mail, and newspapers. Because the United States does not have a severance tax on virgin resources, the price for recyclables does not cover the cost of collection. Under legislation that is being considered by Senator Max Baucus of Montana, head of the Senate Environment and Public Works Committee, producers and makers of packaging, printed material and advertising circulars would be forced to absorb some or perhaps all of the cost of collection and recycling. According to Baucus, "Anyone who sells a product should also be responsible for the product when it becomes waste."

In the German auto industry, BMW has built a pilot disassembly plant to recycle its older cars. Newer models are being designed with disassembly in mind. Parts are bar-coded to identify type of materials and instructions on reuse; the number of different types of plastics are reduced so they can be melted down and reused for a number of applications; the number of component materials is being reduced, and design modifications hope to yield 100 percent reusability. German and Japanese drivers have an additional incentive to scrap and recycle their own cars: Tipping fees at their landfills average $300 to $400 per ton, as compared to America's $20 to $30 per ton.

In Japan, legislation requires that eventually all manufacturers or durable goods label parts as to their recyclability, while newly passed legislation in 1992 requires manufacturers to establish resource recovery centers. Now that the responsibility to reuse and reprocess materials is reverting to the manufacturer, Japanese companies are scrambling to redesign their products, building in recycled materials, changing product and material composition, and designing for disassembly. Matsushita's new washing machines can be completely disassembled with a single screwdriver.

The German and Japanese experiences prove the obvious: Only when the incentives to continue the manufacture of waste are removed, and only when the risks and costs far outweigh the gains and profits, will designers, engineers, chemists, and investors turn their attention to safer alternatives. We use wasteful methods today because they are the "cheapest" solution. The best way to discover alternative

materials and technologies is to have a compelling economic reason to look for them. In a restorative economy, the least expensive means of manufacturing a product should also be the most environmentally benign and constructive means. Until this is so, there is an inherent design flaw in business: being "economic" and being sustainable remain in conflict and at odds.

5

Pigou's Solution

If the free market is so efficient, why, as it affects the environment, is the overall economy so inefficient? The answer is simple: Markets are superb at setting prices, but incapable of recognizing costs. Today we have free markets that cause harm and suffering to both natural and human communities because the market does not reflect the true costs of products and services. The proposals outlined in this and in the preceding chapter are all designed, in one way or another, to address this flaw in the free-market system as it is now constituted.

Despite the endless arguments about the strengths and weaknesses of the free market, markets operate beneficially to humankind only when they reflect real costs, and quite detrimentally when prices are artificially low, and falling. For example, the movement toward automobile efficiency that began in the energy shortages of 1973–1974 and that was extended in 1979–1980, was derailed in the 1980s as energy prices began to fall to their pre-embargo levels, when measured in constant dollars. With the United States paying $1 a gallon and the Europeans and the Japanese paying $3 to $5 a gallon for gasoline, the latter have far exceeded our fleet mileage (the U.S. has the lowest of any country in the world) and they virtually dominate the high-mileage segment of our car industry, with the Honda Accord traditionally being

the No. 1 best-selling car in America (although the Ford Taurus won in 1992, thanks to last-minute discounting). Further, industry in Japan and Germany runs at almost twice the energy efficiency of our own.

Gasoline is cheap in the United States because its price does not reflect the cost of smog, acid rain, and their subsequent effects on health and the environment. Likewise, American food is the cheapest in the world, but the price does not reflect the fact that we have depleted the soil, reducing average topsoil from a depth of twenty-one to six inches over the past hundred years, contaminated our groundwater (farmers do not drink from wells in Iowa), and poisoned wildlife through the use of pesticides. When prices drop, effectively raising real income, people don't need to think about waste, frugality, product life cycles, or product substitution. When prices rise, people have to reconsider usage patterns. This may be painful at first, but it generally results in innovation and creativity.

Markets arise spontaneously, separate from philosophy or religion or political belief, as the perfect mechanism for fostering trade everywhere in the world. One of the reasons we like the term "market economy" is because we picture the agora, the market square, farmers and craftspeople—the smells, scents, and tastes of the piazza and the souks and bazaars of ancient cultural history and tradition, where economic fairness and competition resulted in a vibrant, human atmosphere. The market is Pike Place in Seattle, Les Halles in Paris (before it was moved to the outskirts of the city), or the nearby farmer's market. One of the favorite destinations of travelers is the local market. Whether in Bhutan or Belize, they are remarkably similar to each other and to the swap meet at the drive-in on Sundays. In the marketplace you can compare, see quickly what the competition is, taste a wedge of pear, smell a bunch of roses, drop an olive on your tongue, receive a baker's dozen from the farmer from whom we've been buying tomatoes for many summers. Such pleasures are deeply embedded, richly satisfying, universally observed. They also propose and enforce an honesty, or at least a rigorous pragmatism, on the part of all participants, sorting out fraud and abuse, regulating supply, adjusting prices, improving quality, distributing information as producers shop one another. When the romantic word "market" is appended to the technical term "economy," we get the satisfying feeling that there are forces in the world that function properly and effectively without government interference.

It is difficult to argue with markets; Marxism tried and failed. Although trading and markets are supremely non-ideological, they are also so efficient that political systems have been built around the idea of unfettered markets, equating the rapid adaptability of the marketplace with a healthy polity. When someone questions whether the market economies guiding the modern corporate world are equitable or truly "efficient," there arises a squall of indignant protest and angry rebuttals. The promise of the free market is enshrined worldwide as the direct route to wealth and riches. Jeremy Seabrook, in his book *The Myth of the Market,* goes further by calling the market a spiritual cult. The market was the home of Ceres, the goddess of abundance and fertility, who ensured prosperity and health. The vibrancy and health of the marketplace was providential, a gift from God and proof that he looked kindly upon the lives and work of a region; conversely, times of famine and drought were signs that God was punishing the faithless.

Today, our emporia are in malls, downtowns, and shopping centers, ever abundant with a cornucopia of goods from all over the world. We flock to them for orgies of spending and acquisition, signaling with our clothes, cars, and purchases how "blessed" we are. And now that the socialist economies are turning to free-market economies, the world worships together, speaks a common mercantile language, and shares a common destiny. But regardless of the piety, the warm associations, or the visionary attributes ascribed to the free market, we embrace it for one supremely important reason: It is better at creating wealth than any other system known.

The concept of freedom is so vital to the American psyche that we often dismiss the missteps of corporations as aberrations. We know there can be greed, venality, and raw power at the heart of corporate America, but we hope that the equilibrating forces of the marketplace will sort out the winners and losers in such a way that our own freedoms are not impinged upon, and our own riches remain unscathed. The free market is our friend, guided by Adam Smith's invisible hand and our own in such a way that our world evolves for the best. Because the market seems so beneficial in its plenitude, we persist in believing that corporations can be humbled by the marketplace, despite their overwhelming power. Questions of politics, equity, fairness, or distribution of that wealth are generally swept aside in the face of the free market's overwhelming capacity to produce goods, innova-

tion, and technological change. We have not been able to imagine a system of production superior to free market capitalism. Until or if we do, questions about how it harms and dislocates, questions about its inefficiencies, are treated as secondary.

In maintaining these beliefs, we fail to take account of the dissimilarities between the local market of our memories and the global markets of today. The marketplace of old was consigned to a specific place within a town, it was conducted on certain days, on others not at all. But most importantly, it occurred within the context of daily life, to be observed, experienced, and modified. A high degree of social interaction prevented the market from becoming a monopoly, from becoming unfair, from becoming anti-social. The market of today is free, but in an entirely different way, because its freedom is partially immune to community accountability.

The primary freedom of the modern, global marketplace is to grow unremittingly, regardless of the consequences to the environment or to society. Once the products of the marketplace became commoditized by the Industrial Revolution, the economic rewards of scale became increasingly pronounced. Beginning with textiles, we have seen all types of production submit to the economies of scale over two centuries of industrialism. The advantages of scale in the textile industry, in terms of cost and efficiency, were obvious and apparent to the Adam Smiths, but how could anyone have predicted that local newspapers, bookkeeping, care of the infirm, farming, and hot snacks would also be industrialized—by Gannett, the Big Five accounting firms, Humana Corp., Conagra, and McDonald's, respectively? Or consider WMX, Inc. (formerly Waste Management, Inc.), the largest trash hauler in the world. WMX has dumped PCBs in lagoons, mixed PCBs with waste oil and resold it as heating oil, and contaminated groundwater with chemical and nuclear wastes. The legal entity and a number of its executives have been convicted of bid-rigging, fined for price-fixing, fined for conspiracy against trade, fined by the EPA numerous times for numerous violations of environmental laws, and jailed for bribes. All the while, WMX continues to grow nicely, returning 20 percent pretax profits that have made its top executives rich. It has paid approximately $45 million in fines and settlement costs to resolve litigation in the last ten years. But the legal costs can be written off against profits—essentially, as a cost of doing business.

In other words, the freedom of the outsized global marketplace means that corporations are even free to break the law, especially when the penalties and litigation fees are far outstripped by the material advantages gained by illegal practices.

Free has come to mean big and powerful but not necessarily accountable. Do we, as citizens, gain any advantage, economic or otherwise, by having WMX move into our counties and take over family-operated businesses with roots in our communities, businesses that may make the same mistakes as WMX, in some cases, but that are accountable to local authorities, not corporate politics? What freedoms have we lost by sanctioning the immense freedom of corporate capitalism? How do we regain control of our lives and communities and land?

The answer cuts right through abstract political philosophy: We cannot return to the era of local markets, but we can regain control of the larger markets by enforcing the payment of costs—total costs.

Markets are the place at which production becomes consumption, but at present they do not recognize the destruction and waste caused by that production. Because markets are a price-based system, they naturally favor traders who come to market with the lowest price, which often means the highest unrecognized costs. For example, in an economic study of the costs associated with cigarette smoking borne by Californians, the University of California at San Francisco identified $7.6 billion in yearly expenses, mainly in lost wages and higher health care costs. This was equivalent to $3.43 for every pack of cigarettes sold in the state. Even though individuals smoke, society shares the cost. And this is true for almost all production/consumption systems, whether they involve the steel in your car, the wood in your house, or the food on your table. The problem is that these costs are shared unevenly, just as the profits from selling them are garnered disproportionately.

Market-based economics assumes that any extraction of capital resources can be regarded as the equivalent of current income, and this is assumed despite the fact that every businessperson knows that on a corporate level it is the sure path to bankruptcy. For example, a market cannot distinguish between a piece of wood harvested sustainably from a forest and one harvested from a clear-cut that has destroyed habitat and future productivity. But in fact, capital consumption is *not* income,

as anyone who has had to live off savings knows. Over many hundreds of years, the Western commercial system was built upon the capacity of the greater and more trading nations to subjugate cultures and extract resources in other parts of the world at the lowest possible cost. This pioneering exploitation "works" until resources begin to diminish. Classical economics teaches that, in such a situation, commodity prices rise, reflecting their relative scarcity, thereby regulating demand and prompting resource substitution. And yet, in the 1980s, the prices of most commodities went down to Depression-level lows, while demand grew and the population expanded. According to classical theory, these low commodity prices argue against the idea that we are running out of resources.

But looking more closely, what classical economics leaves out of its equation is time, or more specifically, the rate of extraction and consumption. Worldwide, whether in forests, mines, or fisheries, there is intense economic competition to garner hard currencies. Desperate for foreign trade, countries wind up producing too many products for the world markets at too low a price. It is a vicious cycle, the industrial equivalent of the tragedy of the commons. There are too many steel mills, too many car makers, too many chip makers, too many oilseed producers, etc. So while we are awash in cars, steel, and material goods, we are depleting the underlying resources at extraordinarily rapid rates, and the prices of products do not reflect diminished supply because there is an apparent but temporary surplus on world markets. In other words, the rate of extraction is increasing worldwide; this short-term intensification lowers prices while simultaneously increasing the damage to the environment. Our means of forestalling the feedback from our environment is to take over other environments (changing tropical forests into farms as an example) as a way to increase our drawdown of resources.

Theory has a great appeal to business, especially when that theory enforces its own primacy. Free-market economists read the prices on the commodity exchanges and pronounce the patient well, ecologists read the deterioration of living systems and warn of perils ahead. In order for any type of commercial ecology based on market principles to function, it will require that resources be available on a sustainable basis, that is, using the resources to supply the needs of one generation in a manner that does not compromise the ability of future generations

to fulfill those same needs. What does it matter if an industrial system is operating "optimally" if the forests, soil, and water around it are deteriorating?

The analogies used to describe ecological depredation are a bit trite but true nonetheless. We are told we are eating our seed corn, that we are the prodigal consumer charging to our credit cards unpayable future expenses. The common element is the idea that we are borrowing if not stealing from the future in order to finance present overconsumption. While this is certainly true, I have also come to think of our plight differently. I believe customers and buyers are getting incomplete information, because markets do not convey the true costs of our purchases. When customers start receiving proper information—the whole story—things will change. If industrial methods of extraction and production under a free-market corporate system are destroying life around us—and there is no credible evidence to suggest otherwise—then the question is this: Can we imagine a market system that achieves exactly the opposite result, that creates, increases, nourishes and enhances life on earth? Can we imagine competition between businesses that improves living and cultural systems? Can we construct a public-private partnership in the economy that reverses the incentives so that economic success is tantamount to biological success? I believe we can.

Business argues that the mechanism for achieving these goals is already in place, that companies now recognize that cleaner, less wasteful, more efficient manufacturing methods result in lower costs, greater savings, and increased productivity while enhancing workplace safety. Monsanto, for example, has made a pledge to cut its emissions by 90 percent, and eventually to zero. While laudable, its effort addresses only one of the costs of doing business. The other two are the environmental and social impact of the raw materials it uses (oil, gas, toxic chemicals) and of the products it manufactures (pesticides, herbicides, and other toxins). It is precisely these other costs, commonly referred to as external costs, that must also begin to be integrated into the price of a product. We require political, environmental, and business communities—everyone—to join in incorporating external costs into the market system. The solution to many of the problems raised thus far in this book is as simple (and as difficult) as that.

Of course, free marketeers will argue that whenever government sets prices, markets become inefficient. Indeed, it will be a long time before the world forgets the demise of the Soviet system and its conceit that trading and prices could be mediated by government. But what a government can and must do is set the conditions of the market in order to enforce the payment of costs. We no longer sell human beings in the free market, and yet all were "legitimate" market-based commodities in the previous century. Government did not wait to abolish the injustice of slavery until the market "regulated" itself for the simple reason that it could not wait. Where harm and suffering exist because of market dealings—when the real costs of that market are not factored into the price of goods and services—we require the government as representative of citizenry to step in to prevent those abuses, one way or another.

One of the most effective ways for government to accomplish that task is with cost/price integration. The pioneer for this idea was A. C. Pigou, an English economist who published *The Economics of Welfare* in 1920. Pigou argued that competitive marketplaces would not work if producers did not bear the full costs of production, including whatever pollution, sickness, or environmental damage they caused. Pigou's solution was to impose a "tax to correct maladjustments" on producers, a tax that would be comparable to the avoided cost or unborne expense. Pigou cited prematurely peeling paint on a house near a coal-fired mill as an example of an external cost that should be paid by the producer. He theorized that when the producer was forced to bear full costs, it would have incentives to reduce its negative impact, thus lowering those costs. He envisioned an economic system that "improved" as costs were reduced, rather than a system that degraded over time, as we are witnessing today.

There are two types of costs that need to be internalized. The first is the actual damage caused by one production system to another system, person, or place. It is what economist Herman Daly calls the "spillover effect," perhaps unintended but harmful nevertheless. For example, effluents from a chemical plant kill or poison fish downstream from the plant's discharge pipe, causing loss of income to those who harvest the fish and sickness to those who eat them. The second type of cost, harder to measure but equally important, is the cost to future generations, as in the case of global warming, deforestation,

erosion, and depletion of groundwater. Not surprisingly, most environmental harm—such as the harm caused by radiation, persistent pesticides, and clear-cutting—cuts across the two categories.

Some environmentalists dismiss Pigovian (named for Pigou) taxes as a type of "sin" tax: The polluter would be forced to pay for his harmful actions, but he would still be able to do them. These critics insist that such harmful actions should be regulated and monitored according to scientific, aesthetic, and moral principles. But in its assumption that Pigovian taxes are not sufficient to induce changes in behavior, this critique may underestimate the dynamics that operate within a business. The purpose of integrating cost into pricing is not to provide a toll road for polluters, but a pathway to innovation. The incentive to lower costs is the same one that presently operates in all businesses, but in this case the producer's most efficient means to lower them is not externalizing these costs onto society, but implementing better design.

Economists of the status quo also assert that externalities are hard to measure, but they overlook the fact that trying to measure the costs is better than ignoring them altogether. Economic critics claim that any forced integration of cost and price would lower productivity, reduce economic output, cause greater costs to be passed on to the consumer, lower real income and slow economic growth, and insinuate government further into the economic arena. Some parts of this gloomy scenario may have been true in 1920, when cost-integration proposals were first aired. The steel mills of Sheffield, England, had no alternatives for cleaner fuels if their coal was inordinately taxed. Today, conditions have changed remarkably. We have options. Also, the concern about higher costs to consumers ignores the fact that we consumers are already paying the costs in the form of higher health costs, both individually and through higher insurance premiums; in the form of mitigation costs to clean up toxic waste sites; in the form of lost economic output; and in the form of environmental degradation, which drives up the cost of resources. Integrating cost with price does not "raise" the over-all expenditures of the consumers of the society, but rather places them where they belong, so that the consumer and producer can respond intelligently.

For example, the nuclear power industry for many years argued that it could provide a clean, safe, and inexpensive form of energy.

Critics of their claims asserted that the industry did not include in its cost estimates of the expense of decommissioning those plants or the thorny, expensive problem of how to store, guard, and protect nuclear waste for a period longer into the future—in the case of plutonium, over 200,000 years—than that encompassing the whole past history of civilization. Who has been proven correct in their prediction?

Similarly, coal-fired electricity has been even cheaper than nuclear-generated power. But as Henry Caudill, a lawyer and activist in Kentucky, has convincingly argued, the coal companies also destroyed land, ruined the health of workers, poisoned streams and rivers, polluted wells, crippled communities—and all the while turned a profit. Throughout American history, the mining of coal has been marked by a massive shift of wealth from what are some of the poorest areas in the nation to a few corporations. The beneficiaries of this laxity and license, companies who, in the words of Wendell Berry, left the state of Kentucky with the "mark of ruin," include Kentucky River Coal, Occidental Oil, Gulf Oil, Ford Motor, U.S. Steel, Royal Dutch Shell, National Steel, Koppers Corporation, Tennessee Valley Authority, Harvard University, Diamond Shamrock, and International Harvester. Henry Caudill calculated that the coal corporations were paying 1/10th of a cent in taxes for every $100 of asset value, a mere fraction when compared to the taxes borne by their underpaid employees.

One can only speculate how the coal companies would have acted if their prices also reflected spillover costs. Although there were, then and now, better ways to mine coal and treat coal miners, they were rejected as not being cost-effective. Because all the companies had to compete on the world market, they had to try to extract their veins of coal as efficiently as possible. Efficient, in this case, became synonymous with destructive. Even if producers had been forced to take into account their destructive effects on their immediate environment and communities today, none of the producers are held accountable for the effect coal is having on the atmosphere—the prospect of global warming. The result? Planet Earth is having a once-in-a-billion-years carbon blow-out sale, all fossil fuels priced to move, no reasonable offer refused. And when this eon's hydrocarbons are sold, they're gone, never to be seen again.

But of course, they are not quite gone. Most of the coal, oil, and gas mined and pumped from within the earth will have been placed

into the atmosphere in the form of CO_2. The design of the earth's atmosphere is nothing if not resilient, but our sudden combustion of hundreds of millions of years of carboniferous plants over a period of decades is unprecedented. Wisdom is the capacity to know what we don't know, what Wes Jackson of the Land Institute calls "ignorance-based thinking." When it comes to the long-term effects of our fossil-fuel close-out we are in the dark because it simply isn't "knowable"—yet. We are 99 percent certain that rising carbon dioxide levels will alter climatic conditions on earth, but there is far less certainty what these new conditions will be.

Because our automobile exhaust is fairly clean if not invisible, it is difficult to conceive of carbon dioxide as a pollutant. After all, we all exhale carbon dioxide; it is food for our plants. Another way of imagining the scale of the carbon dioxide problem is by removing its two oxygen molecules. Looked at that way, every time you fill up and use a tank of gas in a medium-sized American car, you are depositing in the atmosphere the equivalent of a 100-pound sack of pure carbon, 5.6 pounds for every gallon of gasoline. Now try to imagine the 450 million automobiles on the road today, the railroads and trucks, the tractors and heavy equipment, the chainsaws and motorcycles, the diesel fuel for the ships, the jet fuel for airplanes, and to them add the oil- and coal-fired steam turbines generating 1 million megawatts of electricity, the thousands of steel works fed with coke, the natural gasoline flared at petroleum wellheads and burned on our stovetops. When the year is over, not counting the 1 to 2 billion tons of carbon placed into the air from burning forests and grasslands, every person in the world will have placed 2,363 pounds of carbon into the atmosphere, a total of 5,854,000,000 tons, three and a half times as much as we emitted thirty years ago.

Carbon dioxide is remarkable because relatively small amounts in the atmosphere provide an exceedingly effective means to trap heat. It comprises only one-three hundredths of the atmosphere, a molecular trimtab that plays a powerful regulating role on our climate. In higher concentrations, carbon dioxide can prevent the planet from cooling at its present rate, or conversely, can bolster its ability to retain heat. The dilemma we face is that we don't know how much carbon dioxide will be required before this change in temperature will occur, or whether it is is happening already. We do know this: As things stand, it

is inevitable. Everyone knows how efficient double-glazed windows are at keeping houses warm. At present rates of carbon emission, we will change the earth from a single-glazed planet to a double-glazed one sometime in the next century.

The engaging images of warmer winters, orange groves in Idaho, and beaches in Arizona are whimsical compared to the actual prospects posed by global warming and carbon dioxide buildup. We may in fact have set off a series of feedback loops that will magnify and reinforce the greenhouse effect. Warming may cause methane release from the Arctic tundra, and methane is ten times as efficient as carbon dioxide as an agent of global warming. Rising temperatures will cause the retreat of the temperate forests, reducing the amount of oxygen-producing, carbon dioxide-absorbing plant life. The demise of our forests will then allow ever more carbon dioxide to be released into the atmosphere, the beginning of what Randy Hayes of the Rainforest Action Network calls a "biological meltdown," a die-off of extraordinary magnitude that, in itself, will have subsequent second- and third-order effects that cannot be predicted with certainty. The degradation of our habitat could include the drying up of traditional bread baskets, rapid desertification, empty reservoirs, collapsing coastlines, hurricane winds of three hundred miles per hour, increased pestilence, famine, and droughts.

A number of climatologists assert that we cannot predict definitively the effect a doubling of greenhouse gases will have. And that is true. Skeptics go further and say global warming won't occur at all because of the planet's self-regulating mechanisms. Warming may, for example, cause increased vapor to rise from the world's oceans, increasing the cloud cover and reducing overall solar radiation. Changing ocean currents could cause higher absorption rates of carbon, and increased carbon dioxide could increase the rate and lushness of plant growth, which would act as a brake on carbon dioxide build-up. And indeed, there have been periods when the earth *was* as warm as it is predicted to be in the next century. The difference then and now is that previous epochs occurred over hundreds or thousands of years, and the earth was able to adapt slowly to the changes. With carbon dioxide buildup occurring so quickly, we simply don't know how, if, or when temperatures will rise, forests withdraw, rivers fail, and whole ecosystems change, or even disappear, taking with them polar bears,

monarch butterflies, Bengal tigers, and walruses—and perhaps us. Dr. Thomas Lovejoy, of the Smithsonian Institution, comments: "I fail to see that there's any conclusion to draw from all of this other than that there will be massive extinction no matter what we do in the way of conservation. Therefore, the only logical conclusion is to prevent as much of the climate change as possible." What we do know is that if we burn most of our remaining coal, oil, and gas reserves over the next five hundred years, we will increase carbon dioxide not by a factor of two, but by a factor of ten, and scientists *do* have a description for this level of global warming: Venus.

So, as we were asking before: How much does it really cost to burn coal? It may be an incalculable cost, but it is certainly greater than the 3 to 4 cents per kilowatt hour utilities presently charge. Perhaps we will never be able to accurately predict the external costs of any one process, but we can at the very least assign a cost to *inaction.* Not doing anything will only accelerate global warming and potential environmental destruction. It is reasonable to assert that coal is more "expensive" than a competing and clean technology that does not cause global warming, acid rain, leaching, and black lung disease. Since Pigou's time in 1920, we have invented, tested, and applied a vast array of alternative energy-producing technologies, including wind energy, hydropower, geothermal, bio-mass, solar hydrogen gas, tidal energy generators, polycrystalline thin-film and amorphous silicon photovoltaics, and a host of other conservation technologies that effectively create energy. We have them in the ready and we can measure their environmental impact when compared to that of coal, which may be, along with nuclear, the most damaging form of energy production known.

It stands to reason that coal should be the most expensive form of energy, not the least expensive. The only reason that it is now the cheapest is that the newer technologies, to one degree or another, more accurately internalize their costs to the environment and future generations. Thus for many applications they are considered an uneconomic or uncompetitive alternative. We are thus substituting noxious coal for intelligent design and engineering. As I will discuss in detail in the final chapters, there is no question that we could introduce a steady, incremental phase-in of a carbon tax on coal, one that would eventually tax coal out of business in two decades' time. This plan

would reduce employment in some areas, but would greatly increase employment overall. The new technologies, industries, and businesses would, by some estimates, be three to four times as labor intensive as existing energy strategies.

As coal wanes, human beings wax. And this formula would hold true in many sectors of the economy, were we to assign real costs to marketbasket prices. It is ironic that we define productivity as the elimination of labor in the manufacturing process, when it is human activity that can bring life back to our fields, forests, watersheds, and even our factories. In the energy industry, we continue to place our money on the wrong horse—fossil fuels. Well, not really we, but those people who control capital flows and who have huge stakes in coal, oil, and gas. And it appears that the owners will do practically anything, including doping, paying off track officials, rigging the parimutuel, and hobbling the competition, in order to get us all to believe that the nag with the rich owner can win. Nonrenewable energy has senators, CEO's, nonprofit institutes, television, economists, newspapers, and the largest chunk of the United States economy (in the form of several hundred billion dollars of assets) to cheer it on and make sure it wins.

We have a long political tradition in this country of arguing for the cheapest price for everything, decrying any regulation or law that would inflate prices as being punitive to the "little guy." Like many political axioms, the truth is probably the opposite. By suppressing prices, we may have dampened invention, innovation, and job creation while at the same time strengthening large corporations, the concentration of wealth, and the disenfranchisement of the little guy. Because pricing and costs are divorced in the marketplace, we have an economy in which businesses that are vastly more efficient than their competitors are unable to compete with less worthy enterprises.

The energy business is one clear example. When windpower first started as a serious source of alternative energy in California in the 1970s, it benefited from both federal and state tax credits, earning the somewhat derisive moniker of "tax farms" instead of windfarms. And indeed, some windmills were put up that had little to recommend them other than their writeoffs. But companies like U.S. Windpower persisted, and today, without benefit of any tax credits, they are generating power at rates competitive with those of nuclear power. If, at the

outset, they had been competing on a price basis without the tax credits, they would have failed because their competitors not only do not integrate the full costs of nuclear waste into their prices, but also have been subsidized by billions of taxpayer dollars through the Departments of Defense and Energy since World War II.

Here's another example of an inefficient market: An organic farmer who builds up soil quality, who does not use pesticides or herbicides and does not pollute groundwater, who uses less energy to produce his crop, who does not exploit migrant labor, who does not leave half-filled tins of organophosphate pesticides in unmarked dumpsites, and who maintains and furthers genetic diversity in his seedstock cannot come to market as cheaply as a factory farm. Another case in point are the Menominee Indians, who carefully select and cut woods sustainably from their forest. Starting in the 1850s with 1.2 billion standing board feet, the Menominee tribe has harvested 2 billion board feet and today still have standing a diverse, healthy, forest containing 1.5 billion board feet. They understand that resource usage must revolve around cyclical patterns where negative feedback loops guide short- and long-term decision making. The Menominees have retained what we have lost, a cultural relationship to resources that sees a sustainable-yield harvest plan as the proper way to create a stable and healthy way of life. Their forest teems with life, especially when compared with the cut-over, slashed and burned landscapes of some of their competitors, but they can compete in part because they take low wages and do not replace their equipment as often as they should.

A restorative economy tries to achieve a market in which every transaction provides constructive feedback into the commons, as opposed to what we know today, when virtually every act of consumption causes degradation and harm. And businesses must—*must*—be able to make money sustaining living systems, or global restoration will never happen. Pioneer restorative companies have survived to this point because of dedicated and spirited customers who have stubbornly resisted economic tugs and pulls and pay more for their products. Businesses support good causes or actually voluntarily take on costs that other companies externalize, hoping their customers will hear about it and support them for it (as in the case of Ben & Jerry's Ice Cream, which continued to pay its supplying dairy farmers higher

prices for milk after price supports fell, an act that cost them $500,000). This is true in the organic cotton business, where clothing that is made without the use of chemicals, either in the fields or factories, has to be sold at prices higher than those of competing items. In a restorative economy, the chemical farmer of cotton who had to pay the true costs to mitigate the polluting and damaging effects of these practices would most likely come to the market at prices higher than those of cotton that was sustainably produced. The customer could then rely on price as a measure of "efficiency" in the truest sense of the word, giving the chemical farmer every incentive to begin practices that included crop rotation, integrated pest management, soil enhancement, organic enrichment, and intercropping, to name only a few.

Competition in the marketplace should not be between a company wasting the environment versus one that is trying to save it. Competition should be between companies which can do the best job in restoring and preserving the environment, thereby reversing historical price and cost incentives of the industrial system that essentially send the wrong signals to consumers. The ultimate point of cost/price integration is to fully enfranchise all businesses into the process of environmental restoration. It shouldn't be so hard to do the right

6

The Size Thing

Questions of size and scale in the modern industrial economy are implicit if not explicit throughout this and any other discussion of ecological impact and metastasized political power. Size and scale are a major deterrent to establishing green taxes and other features of a restorative economy. The supertanker that requires ten miles to slow down is nothing compared with the massed power and, therefore, inertia of the established way of doing business among the Fortune 500.

In the business debate over whether small is beautiful, there has been a skewing of definition over what constitutes "big" or "small." A "small" business is defined as one that has under $100 million in sales; from there to half a billion is a medium-sized business; beyond that are the large businesses. But, in fact, a $50 million business is, by any practical reckoning, large. Ask anyone who has tried to preside over one, or anyone who has tried to deal with most such companies. Companies larger than that should actually evoke such terms as huge, giant, titanic, gargantuan, behemoth. Business magazines and newspapers touted the proliferation of small start-ups during the 1980s, but they often overlooked an "offsetting" trend: big businesses are not going away. The Fortune 500 companies produced 42 percent of the GNP in 1990.

While the world economy grows at a rate of 2 to 3 percent, the

largest multinational companies as a group are growing at a rate of 8 to 10 percent. While the GNPs of the larger industrial countries continue to rise, the largest corporations in the world are growing at such rapid comparative rates that they resemble, at least in their political and economic power, separate nations without boundaries. The arithmetic is simple: In 1991, the ten largest businesses in the world had collective revenues of $801 billion, greater turnover than the smallest one hundred countries in the world. The five hundred largest companies in the world control 25 percent of the world's gross output while employing .05 of one percent of the world's population.

Some observers go so far as to suggest that multinationals *are* the "nations" of the future. Let us hope not, because there is a grave and crucial difference between a country and a corporation. Whereas the purpose of a corporation, as presently envisioned, is to grow and profit, the constitution of a country rarely begins or ends with such a narrow goal. Governments raise issues of social welfare, but corporations do not if it conflicts with their need to grow. To my knowledge, no corporation has ever asked whether its introduction of consumer goods and brand names to a traditional culture is a good practice. It is unlikely that an American soft drink company questions whether its commercials of hip-gyrating women in bustiers shown on television in rural areas of Buddhist Thailand have a positive effect on local mores.

Business thrives on the idea of competition, believing that competition for consumer markets and capital funds is the surest way to ensure economic efficiency. After all, it is in the name of competition that global markets are created. But what do we mean by competitiveness? In small business, competitiveness means something. If you go to an outdoor market in Oaxaca or Pennsylvania, prices on produce within the market are remarkably similar, although not the same. People are very conscious of what is selling and at what cost. Given constant quality, under-supply will create higher prices, surpluses will create lower prices. There is constant adjustment and attention paid to the pricing process, all fueled by face-to-face competition.

Multinational corporations compete on an entirely different basis. They are competing against one another not only for the sale of products like cars, detergent, or gasoline, but also for money, because their growth is fueled by investment. With regard to both indebtedness and equity, companies attempt to give the best return on investment,

thereby securing for themselves the greatest supply of new capital at the lowest cost possible.

The globalization of money, as much as any other factor, is what marks economic organization today. In his book *The End of Geography,* Richard O'Brien suggests that this global financial integration, fed by information and communication technologies, has rendered the very concept of place irrelevant as far as large corporations are concerned. And since financial capital is at the very heart of corporate capitalism, this geographical amorphousness means that the control and regulation of capital flows is shifting away from nation-states and toward systems organized by the corporations themselves. This leads to a tendency toward conglomeration, mergers, and megacorporations. National differences are no longer competitive factors.

Globalization makes it easier to shift money rapidly around the globe, leveling out interest rates, introducing competition between an AA-rated bond in New Delhi and an instrument of like quality in London or Mexico. Money can seek its "highest and best" return instantaneously from around the globe, and it has round-the-clock liquidity. Money thus acts as a self-propelled force, ostensibly in the hands of institutions and fiduciaries but, practically speaking, in the control of a programmed calculus that constantly reevaluates where it can find the greatest return, in the form of currencies, interest, or equity, or a combination of the three.

By making the entire world economic system exchangeable on a moment's notice, we have in essence set up a new standard against which all economic activity is measured. We have created a common global value system that is measured in monetary terms alone, one that has little or nothing to do with the search for a sustainable future that will support human civilization. What should the world earn on its money? Seven percent? Five percent? Nine percent? The World Bank uses a discount rate of ten percent, which means that when evaluating any project, one dollar's worth of environmental value fifty years out in time is given an equivalent value of 1 cent today. As currencies become integrated and markets become globalized, an investor can pick up the phone and buy German bonds if they pay better than U.S. Treasuries. Why should they be concerned about the use of their money when the money is entirely abstract anyway? Although rates will float and change over time, the world will enforce market-based

rates of monetary return that will greatly preclude regional or national standards.

Most of the financial capital in today's markets is used to finance the growth of multinational corporations. It is this growth and the attendant profits that determine whether investors flock to the company's securities or consider them mediocre. The problem is that social or environmental gauges of the effectiveness of capital are all but absent, and even if they are applied from the outside by other agencies, they do not enter into the consideration of the marketplace. Financial markets, however they are constructed and organized, know nothing about whether corporations support corrupt governments or the local Little League team. They have no feel for habitats or ecosystems; they have no compassion for peoples that are harmed, cultures degraded, or watersheds eroded. Through globalization, they reduce acts of commerce, which always have significant impact on human and natural life, to mere finance, to a decimal, to basis points, to net present value. We are turning over the financing of the world, if we haven't already, to money lenders whose interests and incentives revolve around minute increments gained in the sale of abstracted financial instruments.

What will happen to social and environmental values when they are subordinated to a common discount rate? Let us say a company owns a forest in which it has chosen for many generations to selectively harvest the trees. Because of its prudent management the company has very little debt, but it doesn't earn enormous profits, either. It consistently delivers to shareholders a 9 percent return on equity, considered below average for the forest products industry. Meanwhile, world financial markets have heated up. It is now possible to purchase AAA-rated bonds yielding eleven percent, which couldn't happen at a worse time for the company, due to the fact that home building has declined because of high interest rates. Therefore the price of lumber is 30 percent lower than in previous years. Now our company's return on equity is just 6 percent, and its stock has been hammered by traders who no longer see it as a valuable company to own. With the stock price cut in half, shareholders angry, and analysts baying at the door, management does the "rational" thing. It clear-cuts large sections of timber, raising not only its short-term return on assets, but also investing the surplus funds where it can get a higher return than it did in the forest.

In short, the money the forest represented became more valuable than the forest itself. So the forest is gone, and the money it has earned has entered the international pool of capital, thereby putting just a little more pressure on the owners of another forest to convert their assets on the ground into cold cash. This positive feedback loop is the dilemma faced by all corporations. When long-term value is reduced to, or tantamount to, net present value, the corporation has only one choice if it is to maximize return for shareholders and attain returns greater than the discounted rate of capital growth as expressed in financial markets. Money, and only money, decides what is valuable, and why. Who determines that it is time for an ancient forest that yields only 4 percent on equity to become the flooring for suburban homes, or in the case of virgin timber on the Olympic Peninsula, to become apple crates? No one, really. It is not a social or personal choice. It is a market choice.

We see how this scenario is realized in the language of cost-externalization. Without effective means of cost-internalization—green taxes or their counterpart—companies are required to focus as much of their attention on the manipulation of money as on the production of goods and services. Either way, the sheer size of the largest corporations tends to grant them the political and economic power to externalize costs that should properly be absorbed by the company and therefore be factored into the price it sets for its product. For example, when a forest products company buys logging rights from the Forest Service at pennies to the dollar and then clear-cuts the area, leaving it degraded for the next hundred years, the "profit" from the sale of the wood goes to the corporation, but the cost of habitat and biodiversity is borne by society. Specifically, if the Penan tribespeople of Sarawak experience the utter devastation of their culture and way of life at the hands of logging companies contracted to the Mitsubishi Corporation, nothing happens to Mitsubishi's shares on the Nikkei exchange. Mitsubishi's bonds are not discounted for cultural annihilation. The senior subordinated debentures do not lose a coupon for the destruction of one of the world's last great primary forests. The companies who practice driftnetting, sweeping monofilament nets thirty miles long through the oceans, will never be presented a bill for the decimation of Pacific fisheries.

The measures we use to determine which companies get our

money [redacted] completely removed from how those companies affect human [redacted]d natural life. In fact, if there is a connection, it may be inverse. The more able a company is to externalize its cost of doing business and to be ruthless in its practices, the greater return on capital it may achieve in the short term. While this is not always the case, it is true often enough to substantiate the point that the growth of money and enhancement of human welfare are not coincident.

It is not unusual for a single institution to control assets in excess of $200 billion. Within a decade, that figure may approach $1 trillion. It will be of paramount interest to these giants to eliminate any national laws or regulations that would hinder their flow of transactions, and with it, growth. Countries face the ominous dilemma of losing sovereignty for the sake of remaining internationally "competitive," because if they choose to resist such global integration they will find themselves in economic backwaters, in much the same way that Eastern Europe did. This is precisely what has occured within the General Agreement on Tariffs and Trade (GATT), and thus no consideration of the problems posed by size and scale in the world economy is complete without a close look at this institution.

Since its formation in 1948, the purpose of GATT has been to lower tariffs and trade barriers in order to stimulate international trade. Its origins can be traced to the Bretton Woods conference in 1944, where proposals and draft documents were created that served as the basis of a precursor organiz[redacted]tion, the International Trade Organization. The ITO was original[redacted]designed to be an adjunct institution to the International Monetary [redacted]nd and the World Bank. At that time, and after the war, there wa[redacted]idespread fear that the economic conditions that characterized [redacted]e Depression would return. Many economists traced the pathologies and policies that led up to the war to the Depression and tariff-protected economic isolationism. On both accounts, trade liberalization was seen as a strong and vital remedy. Like the United Nations, the GATT organization was seen as a potent force for multilateralism, although it would be an economic force rather than political. Its strength was that [redacted]was a forum for negotiation and accommodation that prevente[redacted]gal and hostile actions between nations due to trade conflicts. I[redacted]is sense, GATT was an innovative if not a breakthrough institution in world history, having developed dispute-resolving mechanisms that have proven

durable and effective since its founding. From what it learns in this ongoing process of constant negotiation, the GATT Council to the Contracting Parties occasionally proposes "rounds" of talks aimed at further streamlining trade policies and eliminating protective barriers. For example, despite the seven prior rounds of GATT agreements, in 1985 a typical international transaction still required 360 different documents, while during that same year, the U.S. Congress introduced over a hundred pieces of legislation that would place restrictions on imported goods.

GATT, then, is a worldwide homogenization of different trade practices, a standardization of rules that allows products to be traded more freely into any of the 108 participating countries. Up until recently, this has been deemed a worthy objective, and indeed world trade has increased remarkably to $4 trillion since the war, resulting in increased prosperity, overwhelmingly for the industrial nations. Since 1948 there have been eight rounds of GATT talks, each resulting in freer flows of international trade. The most recent of these, begun in 1986 and concluded in 1992, is proposing the most radical changes in the history of GATT, changes that greatly benefit large, multinational companies. It was executives and employees from multinational corporations—including officials from Nestlé, Pepsico, Phillip Morris, Monsanto, and DuPont—that served in an advisory capacity to United States GATT negotiators. There were no representatives from small businesses, farms, churches, environmental organizations, or unions.

Not surprisingly, when the fine print is read on the GATT treaty, it turns out not to be as free as its proponents assert. It is full of loopholes, concessions to special-interest groups, variable tariffs, and outright giveaways to industries that happened to be sufficiently wealthy and strongly represented in the negotiations. In other words, it is not a free-trade agreement, but a "managed" trade agreement. It creates a type of lottery system, where low-wage countries, competing to make products for high-wage countries, hope that by allowing their workers to be exploited by multinational corporations, they, too, can hit the jackpot and eventually become high-wage countries.

The most damaging of the GATT regulations is the principle that countries cannot "discriminate between like products on the basis of the method of production." Although innocent-sounding on its face, this provision essentially prohibits countries from using their own

domestic environmental or social welfare regulations to prohibit or regulate products from other countries. The exception to this is when the legislating state or country could provide scientific justification for its laws or regulations. However, it is not the country itself that decides whether its regulations are scientifically justifiable, but a GATT-paid tribunal that meets in secret. Many consumer groups who have read the provisions in the treaty describing the definition of what is scientifically based decry them as unusually restrictive and narrow. Challenges to United States environmental laws had already occurred under the prior GATT agreement with respect to regulations concerning tuna and dolphin kills. The United States has established rules prohibiting tuna boats from engaging in practices that indiscriminately kill dolphin in their nets. The GATT Council has declared that the U.S. Marine Mammal Protection Act violated international trade rules because it imposed an artificial trade barrier and a form of protectionism, precisely what they attempt to remedy and banish. Under GATT, environmental standards cannot be imposed upon a product group because they are "process" standards that relate to *how* a product is made, and are therefore discriminatory. Ironically, GATT does recognize the right of countries to reject goods made by forced or prison labor, also a process standard. In another case, when Austria proposed to place a 70 percent tax on imported tropical timber, as well as labels identifying the wood as harvested from rain forests, Asian nations were able to prohibit the tariff because it was not placed on wood from temperate forests as well. In other words, woods that are harvested in areas that destroy traditional cultures cannot be discriminated against.

Under the new GATT rules, environmental laws and principles, however carefully designed, are subordinated to international trade treaty. While a given country is free to write its own environmental regulations, a company based in that country is free to bypass those regulations when manufacturing the identical product offshore, in a country with relaxed or no environmental regulations. It could then "import" that product into the country that had restrictive regulations. Transnational corporations are lobbying hard to have these proposals accepted by Congress in 1993.

Free-trade treaties are promoted on the basis that they create jobs, wealth, markets, and exports. But there are in fact no in-depth studies

that actually predict the impact these treaties have or will have. For example, when a U.S. clothing company opens a factory in a Latin American country that pays its workers $2 per day, it will ship bolts of fabric or in some cases cut fabric for sewing. The export of the cloth registers as a U.S. export, the return of the finished garment registers as an import, and all parties congratulate themselves on "increased" trade—except the 1,200 factory workers in San Antonio, who are on welfare after the local jeans company shifted production offshore.

Just as financial capital in the form of money is one way in which corporations reduce the concept of value, GATT regulations also lower the common denominator of value in an economic exchange. For example, while efforts continue in the United States to reduce and wherever possible eliminate synthetic pesticide use and residue on foodstuffs, under current GATT regulations, the U.S. would probably not be able to ban foodstuffs containing levels of residue considerably higher than those allowed in this country. Likewise, unregistered pesticides, the use of which is forbidden here, can enter the country in and on foods.

After passage of the latest GATT treaty, the Congress of the United States assumed a "positive obligation" to bring our laws into conformance with those regulations. The inevitable result of the present GATT treaty is that the rewards of international trade go to the cheapest producer, not the most responsible producer. A company that allowed child labor, that allowed workers to be exposed to unnecessary and dangerous amounts of pesticides, that took few if any measures to mitigate its impact upon the environment, is in a stronger competitive position than a domestic producer that obeyed more restrictive labor and environmental laws. International economic advantage goes to the companies that are best able to externalize environmental and social costs; companies that internalize these costs and take full responsibility for their environmental impact are placed at a disadvantage.

GATT not only makes the world decidedly less safe at home, it worses conditions overseas as well. Taiwan, for example, has proposed laws that would prevent and control the damage from tobacco use. These laws would ban cigarette sales in vending machines, restrict public smoking areas, prohibit all forms of tobacco advertisement and promotion, and would be coupled with a strong educational effort to

convince people to quit or not take up smoking. The U.S. trade representative threatened Taiwan with trade sanctions if these laws passed, even though they affect domestic Taiwanese tobacco companies as much as they would American exporters. American cigarette companies have been remarkably successful overseas, employing creative and sophisticated ad campaigns in foreign countries. In Korea, after bans on foreign tobacco companies were repealed, male teenage consumption rose from 1.6 percent to 8.7 percent. What has happened there and in other countries is that the old government-dominated tobacco monopolies have been forced to adapt the same marketing techniques as the Americans, which even further accelerates tobacco usage and disease. Just as it has with agricultural practices, GATT policies regarding tobacco force the world to devolve to the lowest common denominator of commerce, which is growth of sales, reduction of corporate costs, and enhancement of profit regardless of the impact on local societies or ecosystems.

In 1983, Harry Gray, former chairman of United Technologies, said, "Such barriers as quotas, package and labeling requirements, local content laws, inspection procedures ... inhibit world trade. We need conditions that are conducive to expanded trade. This means a worldwide business environment that's unfettered by government interference." But, of course, government is the primary way that the public can participate in the formulation of policies that protect local peoples and their region from what big business demands.

In a sense, the eighth GATT round is the last and most important goal of hyperindustrialization, as it permanently eliminates local or regional restrictions on corporate behavior. In most cases, it eliminates government export controls as well. A government trying to conserve scarce resources by restricting their export will violate GATT. Conservation measures such as British Columbia's tree-planting program are being claimed as an "unfair" subsidy to Canadian timber companies. Denmark's attempts to require that all beverages be sold in returnable containers was struck down by the European Community because it inhibited free movement of goods. Undeveloped countries will be forced to open their borders to transnationals, providing cheaper food to their people in some cases, but potentially bankrupting local farmers and worsening urban slums as well. Although industrial countries protected their own industries throughout most of the twentieth cen-

tury, those same industries, now grown into corporate behemoths, are demanding that the better capitalized countries of the north be able to compete on their own terms with weaker, indigenous companies in the Third World. As former U.S. Trade Representative Carla Hills put it, "We want corporations to be able to make investments overseas without being required to take a local partner, or export a given percentage of their output, to use local parts, or to meet any of a dozen other restrictions."

Without intending to do so, large-scale ventures seem to reduce ecological richness and human-scale endeavors to trivialities. Because we are caught between the conflicting desires for freedom and order, we are both attracted to and repelled by large organizations. On the one hand, Americans want their individual choices protected and honored; on the other, we are fascinated and obsessed with the security and identity of being the biggest, being No. 1, being the super-something of whatever we do. This is particularly true in economics and business, where economies of scale and exponential growth promise exciting jobs (for some) and lavish rewards to a few. But after a century of big-is-beautiful, we now find ourselves overshadowed by giants in our lives, from the federal budget deficit in the United States and global climatic changes, to sprawling corporations that don't know who we are, don't care who we are, and, despite their protestations, don't or can't really believe in us. It is difficult to think of the large corporations that control much of our commercial activity as less than benign because we depend upon them for so much of what we buy, as well as for jobs and security. It would be easier to see the relationship between large-scale economic activity and environmental degradation if it weren't for the excellent job that corporations do of making us feel at ease with their bigness through advertising images—beautifully photographed scenes of small towns, local community activities, and families. We're all connected and in this together, the ads assure us.

We are not shown the manufacturing facilities, the noise, the dirt. We do not see distribution centers that cover forty football fields, or the massive amount of waste that is generated and discarded. General Motors will exploit the image of small towns near their Kentucky Saturn plant, but not show us the ghettos of Flint, Michigan. Pepsico, the

corporate owner of Kentucky Fried Chicken, will show us a reunion under a chestnut tree where an extended family dips into buckets of the Colonel's esteemed chicken, but we are not shown the mile-long conveyor belt of factory-produced chickens, pumped full of sulfonamides and nitrofurans, being stunned, killed, scalded, defeathered, decapitated, bled, eviscerated, and dismembered at the rate of ninety a minute by low-paid workers who report high rates of repetitive-motion injuries.

It *is* an enormous world. Its 5.8 billion people cannot be served by corner stores. Many arguments are put forth for the contributions of transnational corporations in meeting the needs of all those customers. Those arguments primarily concern wealth, jobs, and growth, while the underlying questions of scale and dehumanization are hardly touched. We in the West are proud of our largest companies, almost as if they were sports teams that can beat the competition. But we are afraid to look at the enormity of their shadow, the rigidity of their thinking, their unbridled power hidden behind lobbyists, PR firms, and ad campaigns.

Enormity, corporate or otherwise, has never been the friend of humankind. Psychologist James Hillman listed in a recent speech at Schumacher College in England some of the enormities of our age:

> The Great Depression and the vast displays of totalitarianism; World War II, its massive battles with thousands of tanks and hundreds of thousands of prisoners; the armadas and invasions. Hiroshima and Nagasaki, Bikini, brighter than a thousand suns. Religious wars in India and Palestine, roads packed with refugees, displaced persons. Superpowers, superhighways, supertankers, supermarkets, superbowls. Olympian spectaculars, the whole world watching TV at once. Urban conglomerates of ten, twelve, fifteen million persons. Extermination of peoples in Biafra, Bangladesh, the Sudan, Ethiopia. Titan missiles, space shots, megatons of thrust. Defoliation, mile-long accelerators, high-energy physics, fission, fusion, and superconductivity. Corporate multinationals. Gigantism in agriculture, in commerce and trade, in architecture. Universities of sixty thousand students. Trillion dollar budgets, and calculators that can chew off and bite these enormities. Mind-expanding drugs, cocaine highs, mushroom clouds and mushroom visions. Decibels of rock. Annual broken records in pole vault and discus and 100-yard dash—higher, farther, faster. Population explosion. Suburbia sprawling, miles and miles of urban squalor, burning cities, burning forests, homelessness and hunger. Gar-

gantuan consumerism. Garbage barges, garbage dumps, dead fish, dead skies, and ageless species extinguished *en masse.*

Big corporations take care of what they know how to take care of, and that is other big things: factories, mass markets, mass production. In this respect, corporations are the opposite of nature. In habitats and ecosystems, we sense how important the small things are. We humans have yet to create anything that is as complex and well-designed as the interactions of the microorganisms in a cubic foot of rich soil. No ecologist would claim to fully understand the workings of an ecosystem, but all praise the minutiae within, the economy that governs, and the wondrously designed interaction and diversity that marks that cubic foot of soil, that produces the maximum amount of life with the absence of waste. The most well-meaning of businesses, whatever its size, cannot restore society or the environment if it neglects the small things that need caring for. In fact, you could almost define the restorative economy as one that turns its attention in a big way to the small things.

Instead, corporations are creating a second world, an environment of deadening commercial strip centers leading in and out of our towns and cities, garbage trains loaded with trash and toxins, and Bhopals where 200,000 people are sick or dead or dying. It is a world where fewer and fewer people benefit from the grosser and more swollen acts of commerce, a world in which the small things, the seemingly inconsequential forms of life, are extirpated with disdain, but to our ultimate peril.

What possible use or meaning could the red-backed vole have for the inhabitants of suburbia who are served and fed on large portions of corporate fantasy? The vole is several inches long. It is rarely seen because it burrows throughout the day and some of the night, eating truffles. But each pellet of vole feces contains 300,000 spores of fungus that the vole deposits on the roots of fir in the Pacific Northwest. Without these and other fungi left by flying squirrels, black-tailed deer, deer mouse, and voles, the trees suffer. They do not grow well and are susceptible to disease and pollution. Figuratively speaking, there are billions, if not trillions, of voles on our earth: fungi, microorganisms, animals, and plants that are acting symbiotically, helping to create trees that we humans use as timber. The giants served so

well by the red-backed vole but nevertheless oblivious to this species' contribution to their well-being are the large timber companies. When forests are clear-cut and replanted as even-aged plantations, the vole disappears, as do hundreds of other species. A restorative economy is one in which the voles, the forests, and the people thrive.

7

Private Lives and Corporate Rights

There is a profound contradiction between the transformative values that America was founded on and the power wielded by corporations. America was created by men and women trying to escape the oppression of governments and organizations in which individuals had no voice, no influence, and no participation. The social unrest that became the American Revolution was preceded by what the authors of the Declaration of Independence called "a long train of abuses." Because of the colonies' distance from England and the relatively new freedoms experienced in what was then a frontier country, colonists could sharply delineate the structural relationship between the crown and the citizenry. Today, the unbalanced and unequal relationship between authority and the governed is being played out within the city-states that we call the modern corporation, and unlike times past, the distinctions between our private lives and corporate rights has become blurred and confused.

The history of corporations goes back at least to the sixteenth century, and since then their essential nature has not greatly changed. Before corporations, debts were transgenerational, passed on to

descendants, some of whom were placed in debtors' prisons to repay the monies. The early state-chartered corporations of Europe and England were established to sponsor exploration of the New World. Those who sailed forth from England to trade for spices in the East Indies took grave risks in the journey, and even graver ones should they lose their precious cargoes. If they did not sail under the charter of a state corporation, they and their families could be ruined for life if bad weather or piracy struck en route. By establishing the corporate form, limiting shareholders to liabilities no greater than their investment, Europeans were able to create a form of commerce that could absorb the hard knocks of trading and exploring, encouraging both risk-taking and speculative investment at the same time. Those early corporations negotiated their charters with the state, which outlined the terms of their rights as well as the monies that were to be repaid to the crown. As a social technology, this was a brilliant invention, releasing the vigor of enterprise in the world.

The charter of limited liability distinguishes a corporation from all other forms of enterprise, because it was (and is) actually a gift of the state—a grant, a covenant, a form of permission that citizens, through their government, delegate to the corporation and its shareholders. In the early years of the republic, the citizens of the United States were keen to prevent any institution, foreign or domestic, commercial or religious, from dominating or suppressing their newly won rights. Early corporate charters were carefully drafted by states to ensure this subordination. At the beginning of the nineteenth century, there were only a few hundred corporations in the United States, and many of these were chartered expressly to build canals, turnpikes, or other public infrastructure. Even then, citizens openly and presciently expressed concern that corporations with specific rights granted under charters would nevertheless become so powerful that they could take over newspapers, public opinion, elections, and the judiciary. Workers had similar fears about their own status within these new corporations. Thus early state charters were detailed and restrictive. They specified limits on profits, the amounts of indebtedness allowed, the overall capitalization, and how much land a corporation could own. The power of large shareholders was limited by scaled voting, so that large and small investors had equal voting rights. Interlocking directorates were not allowed, and in the case of public works projects, corporations

were allowed to retain their original investment with predetermined percentages of profit. When profit projections were reached, the project was turned over to the state. It was the commonly held opinion at that time that corporations were a "creature of the law and may be molded to any shape or for any purpose that the Legislature may deem most conducive for the general good." In many states, clauses of incorporation gave legislatures the right to annul or revoke a charter whenever they chose to, or after a certain period of time (often several decades). Some states even required public votes to *continue* certain charters.

Despite these efforts, legislatures inevitably began to lose their control over big business, state by state. Government corruption became particularly rampant after the Civil War, and with it came a loosening of laws regulating interlocking trusts, factory towns, and sequestered private fortunes. Child labor flourished, along with Pinkerton and other private armies that kept protests in check, workers in line. The Civil War had transferred great amounts of wealth to corporations, and with this concentration of power they began to clamor for "equal rights" and new simplified chartering laws that would treat every corporation equally. (This is the means of incorporation we have today: anyone can do it, and for a nominal fee.)

There quickly followed a wholesale reinterpretation of the Constitution by the judiciary, granting new powers and rights to corporations. The primary thrust behind these precedents was the "due process" clause of the Fourteenth Amendment. This amendment protected the rights of freed slaves, but it was subsequently interpreted to give corporations the same status before the law as that of a natural person. On that basis, judges reversed hundreds if not thousands of state laws controlling wages, working conditions, ownership and corporate tenure.

In the wake of those decisions, American business was transformed. Unions could be interpreted as "civil conspiracies" and could be enjoined from striking. With the reduction of state power, incentives were reversed and states such as Delaware began attracting business by having the simplest and most lax incorporation procedures and regulations, driving other states to compete by lowering their own standards. The marriage of business and government also undermined—turned upside down, in fact—The Bill of Rights. The First

Amendment, guaranteeing the right of every citizen to engage in free speech, was established to encourage, promote, and preserve democratic traditions. In the late 1700s there were very few ways to communicate except through speech: flyers, books, pamphlets, and broadsides from every conceivable quadrant of the political spectrum. The Founding Fathers wisely understood that the suppression of these political expressions would inevitably lead to tyranny of one sort or another; they did not want any one voice to have sway or dominance over the public discourse.

There was little concern at that time that among the voices clamoring to be heard would be that of commerce. In 1792, the scale of enterprise was not far removed from the world of Francesco di Marco Datini, our Tuscan entrepreneur of the fourteenth century who required ninety-six people working six months to create five bolts of woolen cloth totaling 165 yards. Four centuries later, woolen mills weren't quite that small and slow, but the founders of the American republic still had no concept of the multinational corporation. They could not have anticipated a General Electric owning an NBC, or the one hundred largest corporations having more economic power than 80 percent of the world.

By invoking the First Amendment privilege to protect their "speech," corporations achieve precisely what the Bill of Rights was intended to prevent: domination of public thought and discourse. Although corporations profess that they are legitimately exercising their democratic rights in their attempt to influence the government, their argument presupposes that all parties from the single voter to the multinational company have an equal voice in the political debates surrounding important issues. And because we took our civics classes and are reminded by the networks every four years about the effectiveness of electoral politics, Americans are inclined to believe that there are suitable checks and balances to hubris and power, corporate or otherwise. After all, starting in the 1970s and inspired by Ralph Nader and other activists, the federal government did begin a series of legislative initiatives that regulated, controlled, and monitored toxins, pollution, car mileage, worker safety and the like.

But corporations did not idly sit back and watch this dramatic challenge to their power go unchecked. Ralph Nader changed the corporate landscape by his highly publicizable initiatives, but, without

intending to, he also taught corporate America how to fight back: with public relations and money, of which it has more than anyone, including the government. Money now creates the milieu in which debates are framed, voices heard, decisions made. Corporations have created a multi-billion-dollar industry of lobbyists, public relations firms, scholarly papers prepared by conservative think tanks, artificially generated "people's" campaigns, "expert" witnesses at public hearings who work for, or are paid by, corporate interests, and lawyers based in Washington, D.C., whose sole purpose is to influence lawmakers and regulators in their offices, in four-star restaurants, at lavish receptions, on overseas junkets. Where do the congressmen go to bone up on issues? To Palm Springs to play golf, to Bermuda to snorkel, to Sunbird to ski, to Las Vegas to gamble. During the 1989–1990 legislative session, members of the House of Representatives took 4,000 privately funded trips, almost ten per member. About three-quarters of these junkets were paid for by corporations. Dan Rostenkowski, chairman of the all-powerful House Ways and Means Committee, took forty-nine business-sponsored trips, with Maui, Palm Beach, and Dublin, Ireland, among the destinations. One-third of these junkets were paid for by real estate or financial services companies. How did the legislators justify such travel? They didn't. After voting pay increases in exchange for reducing honoraria starting in 1991, they left untouched the issue of reimbursed travel for themselves and family members.

It is in these privileged and cloistered domains, and not on the floor of the Senate and the House, that the decisions of our government are made. In the 1992 presidential election, candidates inveighed against the influence of lobbyists, many of them former employees of our own government, who are now working for foreign governments. Their criticism is well founded, but this is a modest problem compared with the influence wielded by the emissaries of the Fortune 500. When staff members working for Idaho Senator Steve Symms show up at offices of the Forest Service with representatives from timber companies to demand to know why forest supervisors will not increase allowable-sale quantities, is it business or government? When the chief counsel for Louisiana-Pacific, John Crowell, Jr., is appointed Assistant Secretary of Agriculture for the Forest Service, and his first act is to demand that timber sales increase in the national forests, and

Louisiana-Pacific is the largest purchaser of timber at that time, what shall we call it? When G. Kirk Raab, the CEO of Genentech, brags after the Earth Summit that he and a handful of other executives from the biotechnology industry convinced former President George Bush to allow the United States to be the only country in the world not to endorse the Biodiversity Treaty, despite the fact that a majority of Americans supported it, do we have a democracy?[7] What ideals were served when Perkin-Elmer, Honeywell, Hewlett Packard, and Unisys sold millions of dollars of equipment to the Iraqi Atomic Energy Commission and other military agencies, equipment that is primarily and, in some cases, solely useful for building bombs and missiles? When Senator Alfonse D'Amato receives more than $900,000 from individuals and PACs representing the financial services industry, including the proceeds from a fund-raising reception at Chasen's in Beverly Hills held by Drexel Burnham Lambert, and the senator then scuttles the 1985 legislation that would have forbidden savings and loan associations from buying junk bonds, a prelude to the S&L disaster that has cost taxpayers over $200 billion, and this is not called graft or corruption or any other kind of ethical breach, can it still be called governance? Or is it business when Neil Bush, director of Silverado Savings and Loan, waits until the day after his father is elected president before announcing the closing of that bankrupt institution with losses to the taxpayers of $1 billion?

Most insidious of all, perhaps, is the overall environment in the nation's capital, alluded to by President Clinton in his Inaugural Address, that isolates the movers and shakers of our political and corporate culture from the daily experiences of the people they supposedly represent and employ. The fact that the Washington, D.C., metropolitan area is the wealthiest in the United States, quite possibly in the world, is not coincidental. At the beginning of the Carter administration, a story made the rounds in Washington about the relocating Georgian who went to a realtor asking for a house in the $50,000 range. The realtor sniffed and replied curtly that he didn't handle rentals. That Georgian was not alone—the great majority of Americans cannot afford to live in their own capital. Adding insult to injury, the corporate activities that create this environment are deductible business expenses, while the individual taxpayer's contribution to an organization that does direct political lobbying is not tax deductible.

Washington, D.C., has become a town of appearances and images, where sleight of (political) hand has largely replaced the clumsy system of payoffs, outright bribes and backroom deals of old. Sleaze has not disappeared—over four hundred members of the Reagan administration were indicted or charged with criminal conduct, including influence peddling, conflict of interest, and perjury—but sleaze has been supplanted by a pervasive atmosphere in which, unless you have money, unless you control blocs of votes and deliver some form of power, your voice is a whisper. One percent of American society owns nearly 60 percent of corporate equities and about 40 percent of the total wealth of this nation. These are the plutocrats who wield the power and control this preeminent "company town" while trying to convince the other 99 percent of the citizenry that the system works in our best interests, too.

The Clean Air Act of 1970 charged the Environmental Protection Agency with regulating airborne toxic emissions, hundreds of which are carcinogenic, many of which are lethal. Affected companies have lobbied, delayed, and sandbagged EPA efforts ever since. Twenty years later, the agency has been able to muster regulations for exactly 7 of the 191 toxins that fell under the original legislation. Included in the original legislation were proposed increases in the fleet mileage required of the auto industry; further increases have been introduced since then, and every oil company and every auto manufacturer has opposed every one of these measures, although there is no scientific doubt that greater consumption of gasoline produces greater amounts of atmospheric pollution, and therefore increased cases of asthma and a host of other illnesses.

The Clean Air Act came up for revision in 1990. The oil companies lobbied to weaken it. Their argument was simple: Stronger provisions for environmental safeguards would cost shareholders more money. One of the oil companies, Chevron, had a few years earlier conducted an internal poll of its employees and customers and found that 85 percent leaned toward environmentalism, with 37 percent strongly pro-environment, and consequently went on record as being an "environmental company." Its Chairman, George Keller, gave a speech in 1987, in which he outlined the new Chevron: "Today, we are in a very real sense a society of environmentalists. We all want clean

water and pure air and wilderness and wildlife. I don't know anyone who's against these things. Most people in industry, like most people in general, place a high value on a wholesome environment. At Chevron, we're proud of a corporate environmental policy that says we comply fully with the letter and the spirit of all laws affecting our operations."

But complying with the spirit and the letter of the law does not prevent Keller's company from trying to enfeeble this same law. The Clean Air Act originally contained provisions that would reduce toxic emissions from refineries. Chevron and other oil companies fought for a less severe provision for their own refineries, spending millions in their effort. Another way Chevron furthered its agenda was through a $95,000 contribution to the nonprofit American Enterprise Institute (AEI), a conservative think tank that has consistently taken a critical attitude toward government regulations. Exxon, General Electric, and other large polluters also pitched in. AEI issued scholarly papers backed by economic data that showed more stringent clean air standards to be "cost-ineffective."

One of the macabre outgrowths of science is that it can now estimate with some degree of accuracy the "annual mortality" rate of a given dispersion of toxic chemicals in the atmosphere; it can also predict the likelihood of diseases of the respiratory system and other maladies specific to the toxin released. In other words, science and statistics can precatalog misery. Corporations can, in turn, calculate the cost to their bottom line of any pollution-abating measures. Corporate economists then commission a group like the AEI to compare these costs against the costs to human health and life, and argue that the higher costs to the companies have a more urgent right to alleviation. Similarly, drug companies precalculate the cost of lawsuits likely to be brought as the result of introducing new drugs and compare that figure with the upside profits that can be obtained. They may even raise the price further to compensate themselves for the additional burden of potential litigation.

For years, evidence has been mounting that "cancer clusters" are forming within communities located around industrial sites, including oil refineries. In 1990, Congressman Henry Waxman of California obtained information from the EPA showing that the emissions of 149 factories, refineries, or mills give nearby residents a greater than 1-in-10,000 risk of contracting cancer. In one-third of those sites, people

have a risk of contracting cancer greater than 1-in-1,000. Six of the plants have risks as high as 1-in-100. The infamous Port Neches, Texas refinery owned by Texaco created a 1-in-10 chance for cancer among its neighbors. In the debate over key legislation regulating these sites, who speaks for the unknown people who will die? Usually it is an underfunded public interest group facing well-paid representatives of industry. The latest Clean Air legislation does not establish a health standard, but rather a technological emissions standard: It requires companies to apply the best plumbing to the problem, and the EPA will evaluate the results in the next century to see whether the standards sufficiently protect citizens' health.

A discussion of lobbying is not complete without at least mentioning the tobacco industry. In August 1992, documents dating back to 1988 were discovered and released by an organization called Doctors Ought to Care (DOC). They showed that Philip Morris, Inc., had channeled $17 million of "charitable gifts" to the pet charities of legislators in order to gain their support in defeating anti-tobacco legislation. Memos included in the documents cited efforts to buy silence, to "give where there is political benefit, and to develop 'political clout.' " Groups targeted included black and Hispanic organizations, hospitals and cultural associations. Honoraria and educational trips were thinly disguised vacations for the legislators.

Philip Morris was a major sponsor of parties and hospitality suites at the Republican Convention in 1992, despite the anti-drug rhetoric of that gathering. George Bush's former staff member, Craig Fuller, who was chairman of the convention, is now a top executive at Philip Morris. Two former lobbyists for Philip Morris, Ron Brown and Mickey Kantor, became Secretary of Commerce and U.S. Trade Representative, respectively, in the Clinton administration.

One month after the 1992 Republican convention, Senator Tom Harkin of Iowa introduced legislation in the Senate calling for the repeal of tax-deductibility of tobacco advertising and promotion. The additional income the government would gain by ending this provision would be earmarked for promoting anti-smoking campaigns directed especially to women, children, and minorities, all of whom represent markets now being assiduously pursued by tobacco companies. Harkin called his legislation a drug-abuse amendment, and argued that as it stood, the government was essentially subsidizing the

addiction of the young. Tobacco-sponsored senators from the South, led by Jesse Helms of North Carolina, called the legislation an unfair, even unconstitutional infringement on free speech. Senator Bill Bradley from New Jersey said during the debate on the Senate floor: "This is not about freedom of speech. This is about money." Perhaps he was speaking of the five-year, $200,000 grant awarded by Philip Morris in 1991 to the Jesse Helms Citizenship Center in Monroe, North Carolina. Or perhaps he was referring to the estimated $600 million the tobacco industry spends every year in legal retainers, paying experienced litigation firms so that they are "conflicted" and cannot be employed by plaintiffs. Harkin's amendment was soundly defeated.

In June 1992, the Supreme Court unanimously upheld a decision by the lower courts authorizing local towns and cities to enact and enforce their own laws concerning pesticides. The town of Casey, Wisconsin, had passed ordinances that were stricter than federal standards and that had been immediately challenged in court by the chemical companies. When Casey finally prevailed in the Supreme Court, trade associations (including the National Pest Control Association and the Professional Lawn Care Association of America) joined to create a new organization called the Coalition for Sensible Pesticide Policy (CSPP). A trade journal, arguing passionately for this cause, listed measures for companies to take if "legislation is rearing its ugly head in your community." Industry groups have had bills sponsored in the Senate and the House that would preempt the Supreme Court ruling, disallowing local legislation of toxic pesticides. When Missoula, Montana, tried to pass a referendum calling for tighter controls on local spraying of chemicals, trade associations, along with Ciba-Geigy and DuPont, spent over $50,000 to defeat it.

These scenarios are rife in our nation's capital and in our state capitals. The result is that the "limited liability" initially granted to corporations to protect them now joins with other judicial interpretations to protect those corporations from the consequences of what they do to us. A very big difference. In the business realm, democracy as the founders envisioned it is now in abeyance. All that's left are the mechanisms, the rituals, the all-important image of democracy that is invoked by the very power brokers who would subvert it. In Washington, D.C., corporations act as they do in the marketplace: They play

to win. The problem is how they win, for their usurpation of political power destroys the democratic process. Perhaps most disturbingly, we as citizens have become inured to these incursions and accept them as part of the rough-and-tumble of politics.

The legislation to ban pesticides within city limits did not spring full-blown from the mind of a bored, do-gooder activist. It followed thousands of reports of individual citizens being sickened because they happened to be downwind when a neighbor's yard was chemically treated. People have suffered seizures, lost motor function, had their pets die, and seen their children permanently injured in front of their eyes. Yet industry, with lobbyists, lawyers, and cant, continues to state through its trade organizations that legislation controlling pesticide usage "does not appear to be based on scientific evidence, but appears to represent a 'cave-in' to public perception and fear." If we are not going to "cave-in" to what we see and feel or know, then why even have local legislation?

The implication of such remarks is that the public's fears are not legitimate fears, that the public cannot be trusted to act in its own interest. It is as if we have come full, dark circle to a time when "we the people" are being asked again to subordinate our conscience, our common sense, and our collective will to a higher authority—in this case, one that would convince us that spending hundreds of millions of dollars to place chlorinated hydrocarbons on our lawns—chemicals that are toxic, mutagenic, and carcinogenic, chemicals that seep into the water table, chemicals that have caused irreversible endocrinal damage in wildlife and humans—is good for us.

This constant and unrelenting assault on private perceptions and "fears" by the well-oiled machines of public relations inevitably leads to a dispirited and defeatist private sector. William Greider writes in *Who Will Tell the People?* that "conscientious citizens ... have been stunted by the circumstances of the modern political system. They may blast away at power with telling critiques or try obstinately to block its path. But most cannot imagine the possibility of forming a continuing relationship with power—a political system that would enable them to share in the governing processes and trust its outcomes. Even alert, active people have internalized a shriveled version of democratic possibility."

By nature, by law, and by tradition, corporations often place their interests above others, including those of the community, the state, and the environment. When the chairman of the board of Union Carbide first heard about Bhopal, he stated that he would devote his life to making right what had gone so wrong for so many victims. Within weeks he was on record with a correction, saying that he had previously "overreacted," and then sought to limit compensation to the people killed and injured. His first reaction was the human one, but his second and crucial response was corporate. The president of Union Carbide cannot publicly express grief, suffering, and compassion if it places the corporation in financial jeopardy.

Following the accident, Union Carbide proceeded to liquidate a substantial portion of its assets and give them out to shareholders in special dividends, thus reducing the corporation's potential payout to the victims. Investors who bought shares after the disaster tripled their money as billions were paid out to Wall Street speculators, institutions, and arbitrageurs. In India, years after the accident, a majority of the 200,000 victims exposed to deadly gas suffer corneal opacity or blurred vision. Others have "respiratory problems, gastrointestinal disturbances, lesions in the central nervous system, psychological trauma and behavioral disturbances," as well as high rates of long-term damage to the lung, brain, liver, and kidney. Most have still received no compensation. Union Carbide's response to Bhopal was, in the opinion of many critics, unethical and inhumane, but it was not illegal. However, data from various researchers show that two-thirds of the Fortune 500 companies *have* been involved in illegal behavior between 1975 and 1985. *U.S. News and World Report* states that 115 of the 500 were convicted of a serious crime during the 1980s.

General Electric, a household name around the world, has cheated the Army, Air Force, and Navy on defense contracts. It has been convicted for criminal activities and had its contracts suspended by the Pentagon. It has been convicted of bribery in Puerto Rico, accused of insider trading, and paid civil fines for discrimination against customers as well as employees. It has more Superfund sites for toxic pollution (forty-seven) than any other company in America. It operated the Hanford nuclear reservation in the State of Washington which has created sufficient radioactive pollution to create fifty Nagasaki-size bombs. It has also polluted Florida with nuclear waste

and the Hudson River with PCBs. Billions will be required to clean up the toxic results of its mismanagement.

The list of abuses is long indeed, yet GE claims in interviews that it was not aware of any of them. Jack Welch, General Electric's long-standing chairman, regarded as one of the toughest bosses in America, is also known for consistently raising the company's sales and profits. He has been described as ruthless in his drive for greater returns on equity. But when is efficiency truly economical, and when does it push an organization over the edge and into styles of management and patterns of action that lead to deception and harm?

Almost without exception in cases of illegal or questionable corporate activity, the trail leads back to the CEO and his responsibility for sales and profits. While growth goals are explicit in all companies, the insidious, implicit pressures placed on junior levels of the corporation are less obvious but no less powerful. We know that public officials try to maintain "deniability" when dealing with hot issues like Iran-Contra, but we are less aware that corporations allow a similar style of hands-off management that on the one hand encourages division heads and sales managers to be overly expedient or to cut corners, and on the other then allows the CEO to point the finger at individuals several rungs below on the corporate ladder whenever trouble arises. The corporate "rules" usually show that an isolated individual violated company policy and that the corporation as a whole should not be held accountable.

Before the hull of the Exxon *Valdez* burst open on Bligh Reef, Exxon Chairman Lawrence Rawl had embarked on a vigorous cost-cutting mission that had sliced deeply into employee morale and management's abilities. The company had eliminated 80,000 jobs; its supertankers lost up to one-third of their crews. While the stated objectives of this campaign were to cut bureaucracy and red tape and to improve efficiency, the cost- and job-cutting stretched employees so thinly that systems were at a breaking point. At the time of the accident, the Exxon *Valdez* had moved far out of its safe shipping lane because staying in it would have required slowing down to dodge ice floes from Columbia Glacier. Trying to save a few hours in transport time cost Exxon and Alaska dearly.

Practically everything that CEO Rawl said following the Exxon *Valdez* disaster alienated him from both his customers and the general

public. Americans could identify far more easily with the wives of fishermen weeping for the loss of livelihood and family savings than with Rawl's boast, "I am confident that Exxon's traditional financial strength will not be impaired by this major accident." As argued in preceding chapters, any cost-integration plan that will effectively restore the environment *should* impair Exxon's financial strength in the case of an environmental spill. Nothing will change—or not nearly enough—until the men and women who run our major corporations can acknowledge the insensitivity of the remark by Rawl, until the legal and economic feedback corporations receive from society becomes an imperative to change. For every right we assume, there is a corresponding responsibility, and if those responsibilities are consistently breached by corporations, then it is the public's role to impose those restraints through law.

According to Russell Mokhiber, author of *Corporate Crime and Violence,* corporations kill 28,000 people and seriously injure 130,000 every year by selling dangerous and defective products. On the job, over 100,000 employees die annually owing to workplace exposure to toxins and other hazards. It is estimated that up to one-third of all cancer deaths are caused by carcinogens encountered at places of employment. The Senate Judiciary Committee has placed the cost of faulty products and monopolistic practices at between $174 and $231 billion per year. The Ford Pinto, Bhopal, the Dalkon Shield, Exxon *Valdez,* Love Canal, et al: The list is long in which the corporate system failed and individual judgment was flawed, but these episodes are usually viewed as random events. Nevertheless, in 1989, a poll conducted by *Business Week* and Louis Harris asked 1,247 adult Americans what kind of activities they thought business would risk in order to increase their profits. Between 37 percent and 62 percent of respondents said business would do one or more of the following: harm the environment, endanger public health, sell unsafe products, knowingly sell inferior products, deliberately charge inflated prices, or put its workers' health safety at risk. Only 8 percent of the respondents thought that business would do none of the above to obtain greater profits. In other words, nine out of ten Americans believe that business will lie, deceive, harm, endanger, or cheat in order to make more money.

Still, little social stigma attaches to incidents like Bhopal; the companies involved suffer relatively little economic loss; and usually no

one is held criminally accountable for the harmful actions. The episodes are defended by their corporate perpetrators and eventually pass out of the public attention. In most cases, guilty corporations sign consent decrees, admit no guilt, and are asked to pay fines, usually quite a small percentage of their overall capitalization.

The cumulative impact of corporate crime is a deep-seated, "free-floating" cynicism and distrust regarding big business. If we are to create a commercial culture that does no harm to natural and human communities, society will have to define commercial crime more effectively, and begin to see it as something less than inevitable, and more than excusable. In law, an individual is held accountable for his actions, even if those actions are carried out in ignorance of the law. A person is liable for what he does; he is also responsible for knowing what is right and wrong. Corporate crime, on the other hand, is perceived and handled differently. It is rarely even referred to as crime. No one was held responsible for the increased incidence of cancer following Three Mile Island, even though unsafe conditions and practices were known and sanctioned by Philadelphia Electric. The American executives at Shell Oil Co. in charge of manufacturing DBCP were not liable for the 1,000 Costa Rican employees of Standard Brands who became sterile after working with this chemical, nor is Standard Brands "liable" for shipping the remaining 45,000 gallons of the DBCP inventory to Honduras after the pesticide was banned in Costa Rica. When McDonnell Douglas deceives government regulators about the safety of an aircraft and people die, what shall we call it? When Procter & Gamble dumps chemicals in a Florida waterway that kill wildlife and send poisons up the food chain to be eaten by people, how shall we name it? When Dow Corning does not inform breast implant recipients of evidence it held back for eighteen years detailing potentially damaging effects of the materials involved, has a crime been committed?

It is granted that a well-run business is one of the most efficient forms of human endeavor. But we must also acknowledge that a poorly run corporation has the power to be one of the most dangerous forms of human activity ever invented. In his book, *In the Absence of the Sacred,* author Jerry Mander makes an excellent case for classifying corporations as a form of technology. We tend instead to visualize a corporation as the group of people and place it in the same category

with churches, Boy Scout troops, the YMCA, and the Wednesday night meeting at the town hall. But these institutions are profoundly different from corporations. They can certainly act bureaucratically and foolishly, but they cannot, in general, act rapaciously. They do not have the size and the power and the funds. Their social and cultural functions are not overridden by what corporations see as their higher purpose: to make money.

A corporation is a social machine with interchangeable parts and processes that can be measured, predicted, manipulated. They can be bought and sold, broken up and reassembled. Because managers manage corporations, it is difficult to see that corporations also run themselves. They have a powerful inertia toward given goals, and if one manager cannot accomplish those goals, he or she is very likely to be replaced until one is found who can. A corporation, like other technologies—nuclear power plants, airplanes, and vacuum cleaners—has an inherent, internal logic that transcends what you and I may think it is. It has a life of its own, especially since ownership can be diffused, broken into pieces, sold and inherited, and is essentially fungible. A corporation, although created and peopled by human beings, does not depend on any of them in order to exist. Founders die, so do their families; directors and managers come and go; workers have become essentially interchangeable components, particularly where the work involves repetitive, industrial tasks.

In short, corporations are not quasi-sacred institutions like the PTA. We should think of them as a useful technology that we can employ to accomplish productive, economic tasks, nothing more, nothing less. Business lobbies resist all attempts to bring corporations under more control of the people, under the control of law. We are cautioned by business that there are already too many laws, too many regulations, too many competitive restrictions on business. That is certainly true in terms of the sheer number of regulations, but it begs an underlying question: Which arose first, the regulations or the violation of societal standards that called them forth? It is the anti-democratic nature of business that has brought upon itself the minutiae of government regulation. It is not surprising that some of this regulation should be frustratingly intrusive or misapplied. Current legislation has created legions of lawyers, regulators, and lobbyists spending vast sums of money on laws that society cannot under-

stand, and on regulations that ambiguously invite misinterpretation and litigation. Business is correct to defend its right to act in order to produce a vigorous and engaging prosperity. But it is wrong if it forgets that this freedom can only be experienced within the discipline of social responsibility.

Author Russell Mokhiber proposes a fifty-point law-and-order program to curb corporate misdeeds. Mokhiber recommends several statutes including a federal homicide statute covering corporations, creating a centralized corporate crime data base, increasing penalties for corporate destruction of documents, prohibiting industry employees from taking regulatory jobs and vice versa, and invoking stiffer penalties for corporate executives convicted of crimes. As it stands now, in the case of any fine levied against a corporation, the cost of accompanying litigation is a tax-deductible business expense. When General Electric was fined $69 million for conspiring to falsely invoice the U.S. Government for parts not shipped or sold to Israel, you and I subsidized the $400 per hour lawyers who handled the case.

Citizens are not allowed to deduct legal expenses when accused of crimes, and certainly not when convicted. By allowing corporations to do so, our tax laws imply that such deductions fall in line with normal business practice. By removing deductibility for crimes, we are taking a small but considerable step toward effective cost-integration, by placing those costs where they belong, at the feet of the perpetrator rather than the victim.

The ultimate penalty a society can give a corporation is to demand that it cease to exist. In theory, this power still rests vestigially in the hands of the citizens according to the terms of every corporate charter. We have no problem granting ourselves, acting through government, the power to incarcerate individuals who willfully break the law and harm others. That same right must be renewed with respect to corporations. If a corporation such as Rockwell International is repeatedly convicted for violating health, environmental, and safety standards, if it shows blatant disregard for the welfare of its customers, then its employees and/or the community at large should be able to petition to close down the company, causing its assets to be sold off to other corporations, all proceeds paid to shareholders, permanently dissolving the corporation. The right to do business in the United States becomes mere license if there are not enforceable responsibili-

ties concerning the health and welfare of citizens. It is interesting to note that the death penalty for individuals is less controversial than the mere suggestion that a few corporations may have forfeited their right to exist. How many people does a company have to harm before we question if *it* ought to exist?

8

When an Ethic Is Not an Ethic

We have elevated the ideology and mores of corporate life into a belief system before which we pay homage, and we have allowed it to take over the political system. We may spend an hour in church or temple every week, but we spend forty or fifty or sixty hours at the workplace, in a job that demands and receives the greatest devotion we bestow on anyone or anything outside of (and sometimes including) our families. Work or some form of collective labor has always been a defining element of society, but never before has the output of work become the dominant organizing principle of the world's peoples.

Corporations are portrayed in the media as models of efficiency producing a stream of goods and services. But compelling evidence suggests that the behavior of many individuals in the modern corporation is remarkably similar to that of addicts. The parallels between the way addicts organize their lives and the lives business encourages suggest that there are many aspects to addiction we may not have recognized before—and many ways to define it.

At the core, an addiction is a way to keep ourselves from feeling.

Thus, anything we do that keeps us from knowing ourselves and fully experiencing the world around us can become an addiction. Work, television, food, money, sex, sports, and other activities can all be addictive when we rely on them to avoid dealing with inner problems or deeper emotions. For every addiction there is a fix, an experience that we repeat over and over again, giving us the illusion that we are alive, while in fact numbing us to the real world and our real self, until it damages or destroys us.

The extension to corporate behavior is clear. We can become addicted to the deal, the power, the action, the excitement, the conflict, the aggression, the victories, the defeats, addicted even to the chaos and the stress, addicted to the point at which we feel empowered to do anything as long as it is legal (and perhaps not even legal), oblivious to many if not all of the effects of our actions on the environment, on society, or on ourselves. But like any habit, corporate addictiveness leads to chaos. Pursuing productivity and efficiency, American corporations have found anxiety. The demand to perform has become so overwhelming that, according to a recent poll, 20 to 30 percent of middle managers in the largest corporations confess that they have written memos or progress reports to their superiors that were dishonest. According to Michael Josephson, an ethics consultant for large companies, "We are swimming in enough lies to keep the lawyers busy for the next ten years." Kirk Hanson, Professor of Business Management at Stanford, says that managers feel they must be top achievers, or risk being fired. A recent profile in a business magazine of a prototypical "successful executive" described his *modus operandi* as taking no prisoners, having the hands-on quality of Attila the Hun, and as not suffering fools gladly but shooting them on sight. That was all meant as a compliment. Jack Welch, the Chairman of General Electric, nicknamed "Neutron Jack" because of his brutal and sudden firings, has eliminated 170,000 jobs during his reign and is considered one of the most admired CEOs in America by his peers. Some top executives have been summarily sent home from GE without warning, their personal effects shipped home by UPS. It should come as no surprise that another business magazine cover story featured a discussion of a "hot new skill" in the executive ranks, the ability to manage cultural, structural, and emotional chaos.

Business is faced with seemingly irreconcilable forces that sunder

old assumptions and play havoc with employee morale. As the job base in Fortune 500 companies continues to decline (four million jobs lost in the past twelve years), as health and pension benefits are curtailed, as real wages continue to fall, and with job security becoming a nostalgic relic, workers can hardly be expected to be their most creative and productive. At the same time, decades of insulating prosperity in America have left our corporations slow in responding to global threats and competitors. Fear of the future has never been an effective human motivator, yet today the loss of jobs and benefits is never far from people's concerns, affecting their willingness to take risks, to speak up, to address critical issues of safety or long-term value.

The victims of an organized addictive system are not only those who lose their jobs, but also those who keep them. You cannot pick up a magazine that does not, at one time or another, praise, envy, or profile a woman or man who "has it all," who regularly puts in sixty-hour work weeks, sits on several boards, volunteers for charity, heads the local Chamber of Commerce, works out at the health club, sails a boat, raises three children, and may even run for public office. This "successful" person is rapidly approaching burn-out, of course—you cannot "save the world" if you're destroying yourself on the altar of workaholism, wolfing food, gulping coffee, taking "red-eye" flights in the middle of the night, trying to do the work of three people—but she or he nevertheless was consistently portrayed during the 1980s as living a dazzling life. Many of us who feel inadequate about our own lives will redouble our efforts to climb the corporate ladder through a similar life of constant activity.

A friend tells a story about his business, a regional publishing house that began to build. With the expansion came a feeling of exhilaration and excitement. "Growth was just like being at a party," he recounted. "I could hear the buzzing of the conversation, the tinkling of the champagne glasses, the electricity in the air. I was having a good time but when I looked over at the doorway, there was this goofy, awkward guy standing there, not having fun, feeling like things had passed him by. And I realized it was me. My business was growing, but a part of me had been left behind, the me that is shy, quiet, and reflective." I suspect many people who get involved with business have a modest self that resists being adrenalized and overworked by incessant growth. In most cases, we see this subdued side of ourselves

as something to overcome, a limit, a reluctant and unassuming persona that needs motivation tapes and seminars to mold it into the obsessive, success-driven, capable person the late-night cable programs assure us is hiding within.

Nothing in the modern workplace, and very little in society at large, encourages us to take our time, or be satisfied with what we have. We're being presented instead with a future where we will have to work harder, but have even less leisure time than we do today, if we are going to maintain our way of life. If that sounds like a positive feedback loop, it is. We are speeding up our lives and working harder in a futile attempt to buy the time to slow down and enjoy it.

Our economic insecurity, drifting and corrupt politics, suffocating debt, and environmental degradation cannot help but be reflected in the workplace where we spend most of our waking lives. The connections may be more obvious than we are willing to grant. For example, federal debt reduces the supply of capital for investment, and thus diminishes innovation, jobs, and productivity. High deficits were an attempt to re-create with paper the industrial growth of the past, a type of growth that depended on a unique set of circumstances in relation to the environment and resources. In fact, the 1980s could be seen as a financial end run around the simple economic truth that prosperity can only come from adding value. We have reached a point where the value we do add to our economy is now being outweighed by the value we are removing, not only from future generations in terms of diminished resources, but from ourselves in terms of unlivable cities, deadening jobs, deteriorating health, and rising crime. In biological terms, we have become a parasite and are devouring our host.

For a long time in American society, a large number of people thought they were advancing under the guidance and direction of commerce. As long as we could identify the improvements in the quality of our existence with the continuing growth and influence of big business, criticism of and dissatisfaction with the system were generally discounted or ignored. But during the past twenty years our standard of living has not increased, real wages have not risen, and, for the very first time since the Industrial Revolution, our work week is getting longer, not shorter—a literally epochal development, barely remarked upon in the press. Worldwide, workplace stress has increased

to the extent that the U.N. has issued a warning report calling it "one of the most serious health issues of the 20th century." Of the seven top-selling drugs in the United States, three are for hypertension, two are for angina and cholesterol respectively, and two treat ulcers—including Zantac, the top-selling drug in the world. It is estimated that in the United States alone stress-related diseases such as ulcers, high blood pressure and heart disease cost $200 billion a year in lost workdays, medical claims, and lost compensation.

The question arises as to how long a company can prevail if its employees, consciously or unconsciously, perceive their products, processes, or corporate goals as harmful to humankind. We must consider whether on some deep or primordial level, we sense and embody within ourselves the strains and demands we place upon the environment. What does it mean to work at a company that produces copious amounts of CO_2, thousands of tons of toxins, dangerous and controversial products? A company that has a legal staff larger than its personnel department? Where gag orders are commonplace? Where lawsuits abound? And where safety is sometimes compromised? If such a company was full of depraved people, we would easily understand our dilemma and walk. But instead, it is run and operated by decent people who are friends, neighbors, and associates, people who, like ourselves, are not the least bit interested in harming the environment. Virtually no company exists or has been created to intentionally harm society, so we can assume that destructive acts of commerce are generally well intended, or based on knowledge that was available at the time of inception. But our understanding of the environment and humankind's impact upon it has accelerated and exploded in the past decades, and with that has come a great unease.

One source of the discomfort is apparent: An economy oblivious to the environment may be equally insensitive to its workers and managers. Employees will be used in wasteful ways, leading to workplace stress, overwork, ill-health or low morale. That the American workforce lives in a persistent state of anxiety further enlarges the power and control exerted over workers' lives by management. This relationship holds true in both successful and less successful companies, and it is made more acute when rank-and-file sees that a handful of executives and managers are lavishly compensated, in some cases with no apparent correlation to the performance of the company as a whole.

In sum, many employees sense (after a decade's worth of "total quality" management, employee involvement programs, and workplace enhancement) that they are still caught in a fundamental inequality that they feel powerless to change. It should come as no surprise that every time a corporation offers a generous early-retirement program as a way to cut costs, it is usually oversubscribed.

It would be one problem—a serious one, granted—if our behavior within the corporate belief system hurt only ourselves, but the damage done is greater than that. It is axiomatic that people will do things in concert that they would not dream of doing as individuals. The actions required in warfare are the standard example, but business offers plenty of its own. The infamous Pinto gas tank was not designed to explode. Rather, an elaborate skein of rationalization, denial, and suppression of information was wrapped around the facts when the safety of the Pinto was questioned within the organization, even when the car was still in the design stage. When a disaster like this strikes and the corporate belief system finds itself at risk in the public eye, public relations is called in to deal with the crisis.

Denial will always prevent us from coming to terms with our actions as they affect the natural world but denial is an understandable reaction in the face of the great gulf between commercial reality and ecological reality. The fact is, if you work for a business—or even more so, if you own a business—it is highly inconvenient to fully acknowledge what is happening in the greater environment. That awareness runs counter to what we have been taught, and what we expect and want from our lives. America was founded on the "Go West, young man" principle of exploiting new lands and resources. Since World War II, we have expanded that principle, and now seek to grow more rapidly, drill deeper, speed up the economy, take more and do it faster. Today, we seem to be entering another phase, which is to deny the downside of present natural resource practices while pretending to be environmentally responsible. Our insatiable appetite for resources and the attendant waste caused by their consumption are being masked in meaningless eco-speak.

The message is much the same whatever the context: Don't worry about too much packaging, too much plastic, or too much waste. We are going to solve the problem with recycling and clean-up. You don't

need to change your behavior, and we certainly don't need to change ours in any fundamental way. Recognizing that the greatest threat to their reputations and long-term fiscal health rested with children, their future customers, a number of corporations have entered the classroom, providing teaching kits to schools, many of which have been impoverished by tax-cutting programs supported by business. These teaching materials are, above all, cute: *Planet Patrol* by Procter & Gamble, *The Energy Cube* by Exxon, *Recyclasaurus and Recycle* by Dow Chemicals and Plastics, *Understanding the Waste Cycle* by Browning-Ferris Industries, and *Waste: A Hidden Resource* by Keep America Beautiful, a public relations extension of the packaging industry. In the same vein, Champion International put out advertisements entitled: "Save the Wheatfields. Recycle Toast." The ad goes on to say that environmental issues are "becoming clouded by misconception and confused by a myriad of concerns ... Sure, trees are a vital natural resource, but they are a renewable resource—and one that is protected by sound forest management ... The critical issue is garbage dumps." The company would like us to believe that ancient forests are comparable to wheatfields: crops you can grow year after year.

While social issues such as homelessness and poverty are rarely touched by corporations or TV programming because they represent no opportunities to create or maintain illusion, the environment is redolent with benign, endearing imagery. Soft-focus shots of deer in virgin forests are used as totemic proof of a paper company's commitment to the future even as they continue to clear-cut and fight congressional renewal of the Endangered Species Act. Native Americans look approvingly over a littered wildflower meadow being cleaned up by children using plastic bags advertised as biodegradable which in fact are not. (Mobil Oil was sued and chastised by attorney generals in several states for this ad.) Simpson Paper introduces a line of "recycled" paper with fractional amounts of post-consumer waste under the names of Thoreau, Whitman, and Leopold. British nuclear power companies announce that nuclear energy is green energy since it does not pollute the air.

Within the forest products industry, one of the leaders in imaginative public relations is Louisiana-Pacific, whose chairman, Harry Merlo, was quoted as saying, "We need everything that's out there ... We log to infinity. Because we need it all, now!" But in a *Fortune*

magazine advertisement Merlo was wordsmithed to meet the needs of the 1990s: "Respect for the environment is nothing new to me. From the time I was a small boy in a poor family of Italian immigrants, I've understood how precious our God-given resources are, and how important it is never to waste them. The lessons I learned from my mother, Clotilde Merlo—lessons of thrift, common sense, hard work, and strength of purpose—I have not forgotten for a single day."

It was Simpson Paper Co. and Harry Merlo's Louisiana-Pacific that discharged 40 million gallons per day of toxin-containing effluents into the Pacific Ocean near Eureka, California. After documenting over 40,000 violations of the Clean Water Act, surfers who were getting skin rashes and other ailments from the ocean sued both companies and won, forcing payments of fines totaling $5.6 million. The presiding judge wrote that Louisiana-Pacific "essentially exempted themselves from all environmental protection requirements and therefore [felt] free to discharge potentially chronically toxic effluent into the waters of the Pacific Ocean with impunity. The position is disingenuous and flies in the face of the Clean Water Act."

It is easy to become cynical about corporate PR and promotion, especially in the area of ecology, but cynicism may turn us away from the deeper truth, which is that environmental ad campaigns represent the limit and extent to which corporations are presently willing to accept ecological truths. Corporations do not perceive that present methods of production will deprive future generations, that there is a difference between supporting humankind with goods and services indefinitely and providing for them by relying upon environmental degradation as a means to overcome the carrying capacity of natural systems. What corporations do believe is that genuine environmentalism poses an enormous threat to their well-being. If you define well-being as their ability to continue to grow as they have in the past, they are correct.

Before the Industrial Revolution, commerce and culture were powerfully regulated by natural energy flows—mainly, the solar energy captured by food, wood, and wind. Scholars may debate the exact inflection point at which society turned to *stored* energy and, through it, harnessed the power of steam, railroads, and machinery, but once the process of industrialization commenced, the economic life of cul-

ture shifted from working with natural forces to working to overcome them. With the wholesale extraction and exploitation of stored solar energy, human beings are no longer living in synchronization with natural cycles and have accepted, however reluctantly, industrialism's shadow—waste, degradation, and dehumanization.

We have created, in essence, an artificial life, and in so doing, have lost some part of our human nature. Corporations extract resources and manufacture them into saleable products, leaving 11.4 billion tons of hazardous waste behind every year. On one level it appears that we are the customer for these goods, but on another level it is we who are being sold, offered up, and delivered to the corporations. It is we who are being extracted, mined, impoverished, and exploited. It is we who are fungible. Common wisdom holds that ecologists worry about nature while economists are concerned about human beings. But economists are in fact taking care of economics, and human beings are abandoned to the marketplace. What is for sale in America is our welfare.

Author Joanna Macy writes of a type of despair that people feel when they experience the gulf between the grotesqueness of the world and the business-as-usual tenor surrounding it. At the level of the family, the gap between what a child feels and knows is right and reasonable, and what Mom and/or Dad *tells* the child is right, can lead to schizophrenia. A similar dysfunctionality can affect an entire society that knows the state of the world is one way, yet is told over and over again that the world is something else. That disparity finds its most powerful and pervasive form in advertisements.

By the time he or she graduates from high school, an American teenager will have seen 350,000 commercials. Children watch commercials at school thanks to Whittle Communication's Channel One, which beams two minutes of advertising for every ten minutes of video "news" piped into thousands of classrooms. The average adult sees 21,000 commercials per year. Of these, 75 percent are paid for by the 100 largest corporations in America. In fact, corporations spend more money trying to get us to buy their products than we spend on all of secondary education in this country. Besides breathing, what do you do more than 3,000 times a day? What you do—or, more specifically, what is done to you—is receive several thousand messages to buy something. Not all of these are TV hard-sells. Many are marketing

messages on T-shirts, shopping bags, license plates, or even stenciled on your oranges and lemons. The others are billboards, radio spots, signs, movies, newspaper ads, labels on the outside of clothing, or sponsorships at operas and sporting events. When you arrive home in the evening, one of the first things you do is collect the flyers, junk mail, catalogs, envelopes from non-profit groups containing "personalized" letters, and free samples of shampoo hanging on your doorknob. Then the computer-generated junk phone calls start during dinner.

Few of the 3,000 daily marketing messages you receive are by invitation. The fact that we are free to ignore any one particular ad doesn't diminish the fact that the commercial environment as a whole is coercive. We cannot ignore it for it is where we live. There is no other place. With newspaper readership trailing off, and book reading likewise, TV has become America's intellectual environment. Our minds are being addressed by addictive media serving corporate sponsors whose purpose is to rearrange "reality" so that viewers forget the world around them.

Advertising *is* needed to inform, direct, and educate, but in its present form, it is an invasive expression of commerce. Advertising creates envy and a sense of inadequacy; it is responsible for mediocre TV programming because the lower denominators of taste produce the highest ratings; it deceives young and old alike into purchases that are inappropriate, unnecessary, or wasteful, feeding the frenzy of consumption that is responsible for civilization's overshooting present carrying capacity. It is a type of "disvalue," the *removal* of value from a product by transferring the monies that should go into quality to promotion and hyperbole instead. Mass-market advertising reinforces economic centralization because of the high costs required; it is antidemocratic because it is not designed to allow dissenting voices that challenge the product's value or merits, and serves no social needs. Advertising permeates our souls, and denigrates women, the intellect, and spirituality. It has been called the "paradigmatic science" of the twentieth century.

The relentlessness of corporate promotion is matched by the passivity of consumers. Both parties are implicated, but both exonerate themselves gracelessly and easily by pointing a finger at the other. Businesses say they are responding to market forces and will change when the consumer changes. Consumers feel economically trapped by

corporations and see only the narrowest of options afforded in their daily acts; consciously or not, we feel abused, objectified, taken for granted. American consumers may continually astonish even themselves by their base behavior and wants, but they have also tried to express themselves to business in thousands of other ways, from MADD's campaign against the promotion of beer and liquor to youth and citizens' clearinghouses on toxic waste issues, to local activist groups concerning open space. People are organizing to fight what they feel are the larger forces that infect their lives and values, forces that are almost invariably rooted in economic self-interest. The giant corporations are silent, immobile, and unmoved by our stirrings and longings. When they do speak, it is almost always through the disingenuous voice of "corporate communications." Fixing, restructuring, and reorganizing the corporation to serve a restorative economy will not be a solution unless businesses level with their customers. As the therapist wisely counsels: honesty does not harm, dishonesty always does. Today's deteriorating culture, environment, and economy are the fruits of decades of corporate dishonesty, a dishonesty that we have created, sanctioned, and supported.

The potency of industrial systems is overwhelming. No culture in the world has been able to resist the allure, convenience, ease, and wonder of materialism. Industrial corporations have overturned thousands of years of beliefs and practices, sometimes overnight, replacing cultural traditions that linked human welfare to deities and great natural laws with a managerial system that showed how mankind could intervene with, overturn, and even replace natural law with engineering, mechanics, technology, and systems. The growing power of corporations has not been accompanied by any comprehensive philosophy, any ethical construct, other than the accumulation of wealth as an end in itself. Very few principles guide the commercial conduct of corporations other than those randomly adduced or self-proclaimed. Everyone—managers, employees, customers—is left in limbo.

The writer Jeremy Rifkin points out how closely our industrialized concept of time is reflected in our social and environmental attitudes. When time becomes commoditized and scarce, and is constantly being accelerated, there follows an underlying separation of humankind from nature, a *weltanschauung* that says humankind can create its own world apart from the rhythms and pulses of nature. We live in a runaway

commercial culture in which humans dominate and control natural processes to ill-conceived ends, where Faustian problems caused by technology and industry are solved by new technology and industry, where, supposedly, growth is limited only by our imaginations. Those who would carry us to a new world of computerization, robotics, bio-engineering, and nano-technology see their role as architects of a future that is controllable, and thereby made secure against the random and seemingly unpredictable patterns of nature. They would create molecular machines that would eat pollution and produce ozone. They would fertilize the oceans with iron dust to reduce global warming. They would engineer our animals and plants and tailor them to human requirements: bacon with less cholesterol, tomatoes that have no genes telling them to decay, chickens without feathers or legs.

Business as practiced today is the opposite of the careful footsteps demanded by the placement of the stones in a Japanese garden, stones that make us conscious of each moment on the path, an arrangement that allows us to stop and consider the environment around us rather than merely walking or rushing through. A careful, attentive path corresponds to an ecological sense of time, honoring all biological connections.

Whenever those moments arise in life when we become aware, fully and wholly, of the transiency of our existence, we seek those tasks and roles that give our hearts, minds, and hands the potential to serve truly another human being. While paying off mortgages and raising the kids can often provide all the "meaning" people can handle in their middle years, people are searching for higher values, both in what they do, as expressed in their work, and in how they interact with the world. As the end of the millennium draws near, what this world desperately needs is to have more value added to it. Too much has been taken away and destroyed. Businesses have this opportunity and challenge to create meaningful work for those who cannot find it in what they are presently doing.

When Pacific Gas & Electric, a utility in northern California, announced a new division called the Energy Efficiency Department, they expected only a trickle of internal applicants. The new division had an agenda that was the opposite of the company's as a whole: It was to institute measures that would create energy out of conservation, and to initiate programs, rebates, and incentives to generate

"negawatts"—energy created through efficiency rather than new power plants. PG&E was overwhelmed with applications. People are hungry for ways in which they can integrate their need to be employed and support their families with work that improves the world in which they live. That department now has 300 employees.

People are either in denial or anxious that the disparity between what we experience in our own country and how most of the world lives is widening. Our prosperity in the North often results in the victimization of cultures and women and children in southern nations. People should be concerned about the difference between a population in the North that eats high on the food chain, and the 1.1 billion people worldwide, especially children, who are malnourished or hungry. It is tragic that America's largest export after food is weaponry, often sent to governments with repressive domestic policies, governments whose military superiority is frequently used to wrest resources away from indigenous cultures to pay the debts incurred in the first place by weapons purchases. And slowly but powerfully, people are becoming concerned with the plight of women in all parts of the world, with the structural imposition of their second-class status with respect to families, education, government, business, and public policy.

Literally thousands of native cultures around the world have been destroyed by economic development. Lost with those cultures have been languages, art and crafts, family structures, land claims, traditional methods of healing and nourishment, rites and oral histories. Despite all the economic growth in the Third World between 1960 and 1980, the gap in real income between the rich and poor nations increased from a factor of 20 to a factor of 46, and that gap continues to increase. Rather than uplifting the less developed nations, industrial economies have caused increased polarization of rich and poor, unleashed ethnic conflict, destroyed lands, urbanized the poor to marginalized conditions, and made the developed nations richer in the process. According to former World Bank President Robert McNamara, "Even if the growth rate of the poor countries doubled, only seven would close the gap with the rich nations in 100 years. Only another nine would reach our level in 1,000 years." This is, in part, the result of the richer nations expanding their carrying capacity by exploiting resources in other countries. And while the United States may be richer, it has suffered some of the same fate as its neighbors

internally: the skewing of the economic pie, a loss of traditions, the destruction of culture. The top 1 percent of the population increased its wealth 150 times faster than the bottom 99 percent during the 1980s. Within the next decade, California will lose thirty-four native American languages that have existed for over a thousand years. The people who would have spoken and taught these languages to another generation are driving Ford pick-ups, drinking Bud, or have vanished from the earth.

Business *can* provide meaning for workers and customers but not until it understands that the trust it undertakes and the growth it assumes are part of a larger covenant. As long as nature, children, women, and workers are abused by institutions espousing free-market theories, the *real* deficit will continue to grow—the difference between what business has taken and what it has returned, the difference between value added and value subtracted. For most people meaning is derived from just the opposite relationship, one in which one gives more than one takes, where one's life is intricately bound to the promotion of the common good.

If adding value is what business is, or should be, all about, then it follows that you can't contribute values unless you have them. Our personal values, which have become so distant and removed from the juggernauts of commerce, must become increasingly important and, finally, integral to the healthy functioning of our economy. Business offers us rich and important ways to improve the world. Every transaction in the scheme of things is small, incremental, seemingly inconsequential, but each moment has the potential to create real change.

When Jerry Kohlberg withdrew from the Kohlberg Kravis Roberts partnership, dismayed that KKR had changed from a friend of innovative small companies to a predator, he said that "Around us there is a breakdown of ... values in business and government ... It is not just the overweening, overpowering greed that pervades our business life. It is the fact that we are not willing to sacrifice for the ethics and values we profess. For an ethic is not an ethic, and a value not a value, without some sacrifice for it, something given up, something not taken, something not gained. We do it in exchange for a greater good, for something worth more than just money and power and position."

9

The Opportunity of Insignificance

Small business is the understory of commerce, where new ideas and diversity arise and are processed into growth. One of the purposes of the restorative economy is to ensure that innovative commercial options have a chance to survive in the monoculture of corporate capitalism. Like any new species, the new and/or small business has to find a niche, some crevice in the marketplace in which it can adapt to the dominant commercial system and then live long enough to tell the tale. This is certainly possible, as the boom in small business start-ups (and survivals) in recent decades demonstrates, but that boom is only part of the story. Even though smaller businesses have been responsible for the lion's share of new jobs in the past decade, "market share" for the Fortune 500 has continued to rise.

While small businesses perform a variety of service roles, such as financial planning, haircutting, wholesaling, retailing, plumbing, providing food, and subcontracting to larger companies, it is their underrated role as institutions at the economic and cultural margins that is actually most important. Large businesses themselves benefit from the understory, for most of the giants grow through acquisition as well as their own internal development. Ideas, licenses, new technologies, and companies themselves are constantly being passed up the economic

line, enriching large corporations as well as entrepreneurs. In addition, the hard-and-fast division between large and small companies, although measurable, tends to fade away when an enterprise is examined over time.

Small business is the arena in which pragmatists, inventors, and idealists operate, where they can act clearly, directly, and affirmatively. Since they are closer to their customers, by dint of size, they are in a better position to organize and educate those customers to perceive the difference between a product made sustainably and one that is not. This is a difficult task, because when you are trying to act responsibly with respect to the environment, you find yourself competing in price against organizations that have several advantages, including their unwillingness or inability to examine the wider implications of the production and consumption of their product, as well as their inclination to do almost anything by way of advertising to sell it. Another disadvantage is that new, entrepreneurial, restorative businesses for the most part do not benefit from any type of assistance, government or otherwise. Elaborate systems of subsidies to big business have been established over the decades, and in many cases these subsidies reinforce outmoded ways of manufacturing or distribution, making it more difficult for start-ups to compete and survive. For example, the government subsidizes farmers who grow tobacco, despite the fact that cigarettes kill more people per year than AIDS, automobile accidents, suicide, homicide, fires, heroin, alcohol, and cocaine together, but certainly no subsidy exists for a truck farmer who grows vegetables for local markets. Still, the tens of thousands of restorative businesses growing and thriving in America contradict the notion that the environment and business are at cross purposes. They are only in conflict if we continue to define and construct our political and commercial systems to favor the past. As discussed in preceding chapters, what hurts the transition to sustainable and restorative businesses more than any other single factor is artificially low prices that do not fully incorporate the true costs of a product or service, especially when those low prices are the result of cost internalization, subsidies, or tax breaks.

Although many small businesses are winnowed out in the competitive process, those who survive, strengthened by their marginalization and initial undercapitalization, often prove to be formidable competitors, including such high-profile companies as Ben & Jerry's and Tom's

of Maine. Thousands of other lesser-known concerns are also doing business in a restorative way. The magazine *In Business* estimates that 70,000 businesses in the United States have the express goal of cleaning up or improving the environment. They range from a company in Oregon called DejaShoe which makes its shoes out of recycled materials, to Appliance Recycling Centers of America, which works with utilities to improve energy standards by scrapping older, inefficient appliances, recycling the CFCs and ferrous metals, and safely disposing of the toxins. The niches available for other new businesses are innumerable.

A cardinal principle and practice of any new business should be to perform tasks and services that are sustainably produced and/or promote sustainability in society as a whole. The word "sustainability" can be defined in terms of carrying capacity of the ecosystem, and described with input-output models of energy and resource consumption. Sustainability is an economic state where the demands placed upon the environment by people and commerce can be met without reducing the capacity of the environment to provide for future generations. It can also be expressed in the simple terms of an economic golden rule for the restorative economy: Leave the world better than you found it, take no more than you need, try not to harm life or the environment, make amends if you do. Sustainability means that your service or product does not compete in the marketplace in terms of its superior image, power, speed, packaging, etc. Instead, your business must deliver clothing, objects, food, or services to the customer in a way that reduces consumption, energy use, distribution costs, economic concentration, soil erosion, atmospheric pollution, and other forms of environmental damage.

While small business does not automatically represent an advanced form of social organization (it can behave as badly as large business), its marginality does give it a better chance than the multinationals to foster products, ideas, and services that are beneficial and constructive. While large companies resist the evidence of significant environmental and social problems caused and abetted by their own products and actions, smaller companies can see those problems opportunistically as pathways to growth and success. A start-up can build these practices into its foundation or business plan, or at the very least try to avoid practices and products that are by definition destructive. Starting a

business based on these principles, although challenging, is certainly less daunting than trying to change an existing business that is entrenched and embedded in an established market and cannot transform itself overnight without risk of immediate economic losses.

The distinction between growth and development is at the heart of a restorative economics. Economist Herman Daly writes:"'To grow' means to increase in size by the accretion or assimilation of material. 'Growth' therefore means a quantitative increase in the scale of the physical dimensions of the economy. 'To develop' means to expand or realize the potentialities of; to bring gradually to a fuller, greater or better state. 'Development' therefore means the qualitative improvement in the structure, design and composition of the physical stocks of wealth that results from greater knowledge, both of technique and of purpose. A growing economy is getting bigger; a developing economy is getting better. An economy can therefore develop without growing, or grow without developing." Growing implies size for the sake of size, while the idea of development implies that the product or service supplied will actually help people use fewer resources in the long run, and at the same time will serve or improve their lives. In the restorative economy, a company is based on the idea that its products or services will improve people's lives qualitatively, not quantitatively. It should provide a product or service that helps people develop their lives, and not merely increase the amount of their possessions. The smaller the business, the easier it is to internalize this distinction.

Consider health care. Our current system of allopathic medicine is a growth industry, partly because of its overwhelming reliance on technology and pharmaceutical drugs. With six out of nine trips to the doctor concluding with a prescription for a drug, allopathic medicine makes people dependent on "consuming" chemicals to alleviate symptoms or relieve conditions. The system requires large advertising budgets in specialty magazines for prescription drugs, and on television and in other media for over-the-counter remedies. It requires conventions, hospitality suites, salesmen, and all the other apparatus of modern business. The cost of developing and testing a new drug has eliminated all but the biggest or most strongly capitalized companies from competing in this market. Development costs of $200 million for a single product are normal, necessitating high prices that lock out the people in developing countries from using the prod-

uct while it is covered by patents. Proprietary formulations give companies near-monopolistic control over a product for many years, allowing predatory pricing, increasing health costs for everyone. These drugs are "economical" because as the overall cost of health services skyrockets, a single drug that can forestall or prevent hospital care will "save" its consumers tens of million of dollars per year. It is no surprise, therefore, that the allopathic system is highly profitable for the companies that control it. As I write, attempts are being made to rein in their power, but the fundamental problem is not the rapacity of the pharmaceutical and medical industry, but the allopathic system itself, which requires you to get sick in order to get well.

Preventive medicine, the alternative, is a developmental business. It, too, is founded on scientific research, but it is dedicated to preventing illness, drug dependence, and hospital care whenever possible. It is a people-to-people business, hands-on, gregarious, empowering, and educational. It informs and instructs. It is rooted in small businesses, as contrasted to promotion, propaganda, and junket holidays for physicians paid for by drug corporations. Preventive medicine gives people greater control over their lives, an understanding of the root causes of illness, and a means to reduce their dependence on drugs and hospitals. Preventive medicine is a process. It is essentially decentralized, and it can be accomplished by a barefoot doctor in Chiapas, Mexico, or by a nurse-midwife in the Bronx.

The same distinction between growth and development can be drawn in the areas of energy production and energy conservation. Energy dependence in the United States has reached alarming levels, as attested by the Gulf War, in which more than 100,000 Iraqi regular troops were killed with bulldozers and carpet bombs to liberate the oil-rich plutocracy of Kuwait. Propaganda and wartime rhetoric aside, the war was conducted to ensure that supplies of oil from the Gulf region would not be interrupted. In business terms, this was a subsidy to oil companies paid by the U.S. taxpayer, an understandable expenditure, if it was truly needed. But in fact, if former President Reagan had not in 1984 rolled back the efficiency standards for American-produced automobiles, we would have been saving more oil than we were importing from the Gulf Region in 1991. This is not to say that U.S. and other allied troops would not have gone into the region anyway, but we can be sure that if Kuwait were poor and devoid of

resources, there would have been much less popular support for the war, probably no invasion to begin with.

Another source of energy available to us, the energy saved through conservation, is not controlled by corporations or foreign governments. We have in place in America the technological ability to reduce our overall energy consumption by nearly 80 percent. Through high-mileage cars, technical retrofitting of other modes of transportation, super-efficient heating and cooling systems, insulation, weatherstripping, and new lighting technologies, the United States can not only regain its energy independence, but can create hundreds of thousands of new jobs, far more than would be lost through reduced oil imports. What has this to do with the principle in question? Oil, nuclear, and coal are all growth industries, requiring large capital investments, not only in rigs, supertankers, machinery, and plants, but, as we have just seen, in military preparedness. Energy conservation is a developmental business. Saving four-fifths of our daily current consumption of energy through efficiency and conservation is more productive than drilling or mining for energy, and it provides energy on a renewable basis. Conservation does not run aground in Prince William Sound. On the other hand, it is labor intensive, creates jobs and wealth, and promotes real economic prosperity while lowering our overall impact upon the environment. Our air gets cleaner, global warming is tempered, acid rain is reduced, and pollution dramatically decreases.

How is this relevant to small businesses? Conservation is a hands-on, community-based, house-by-house undertaking. Most energy conservation services are handled by small, locally owned concerns. Of course, this is the problem: the political clout of the energy corporations skews our national policy in their favor, promoting their own agenda, while inhibiting serious efforts at conservation.

An example of a business dedicated to development, not growth, is the timber operation run by the Menominee Indians, mentioned earlier. For the past 135 years, the Menominee have practiced a deliberate, sustained-yield practice on their 234,000 acres of forested tracts in northeastern Wisconsin. In that period, they have produced 2 billion board-feet of sawn timber while preserving the forest stock. Each time the forest has been inventoried (in 1963, 1970, 1979, and 1989), its volume has increased over the previous measurement. The preser-

vation of the forest has not only benefited wildlife, streams, and biodiversity, but also has provided a steady income for many of the tribe's members, allowing them to maintain their lives in the ten small towns dotting the reservation. But the Menominee say that if they could get an extra 10 percent for their sawn timber, they could refurbish their mills, improve productivity and compete more effectively. But with whom are they competing? Corporations that either received their timber in the nineteenth century, when the government gave 183 million acres to the railroads, or are now purchasing it from the Forest Service at prices far below market and replacement value. And how do these corporations perform? According to a recent study, "Aesthetically, the Menominee Forest has no equal among managed forests in the Lake States region ... the Menominee forest greatly surpasses, in terms of total productivity (measured in value of the products removed on a sustained yield basis), the adjacent Nicolet National Forest that has more than twice the acreage of commercial forest land."

Recently, the Menominees' harvesting practices were certified by Scientific Certification Systems, helping them gain wider recognition for their conservation practices. They now count as a customer the Knoll Group, a large manufacturer of office furniture. The company has indicated that it will switch entirely to sustained-yield timber in the coming decade. How did the Menominee begin such practices so long ago? As Kenneth Sloan, a forest supervisor in Wisconsin's Department of Natural Resources, explains: "The Menominees would no more separate the forest from its intrinsic ecological and societal value than we would separate one finger on our hand from another."

The following list of principles for sustainable small businesses are not intended as a form of commercial political correctness intended to straitjacket companies, but are rather general guidelines to evaluate the design, sources, impact, and purpose of a new or small enterprise. Any businessperson should create his or her own customized set of standards that will lead to constructive and restorative changes, standards that can be converted into actual day-to-day *practices.* These principles are not perfect, but they are possible, present, and operating, and thus give voice to the idea that business can reimagine the world it operates within, and prosper in the marketplace.

Sustainable businesses:

Replace nationally and internationally produced items with products created locally and regionally.

Take responsibility for the effects they have on the natural world.

Do not require exotic sources of capital in order to develop and grow.

Engage in production processes that are human, worthy, dignified, and intrinsically satisfying.

Create objects of durability and long-term utility whose ultimate use or disposition will not be harmful to future generations.

Change consumers to customers through education.

Sustainable businesses replace nationally and internationally produced items with products created locally and regionally. The high infrastructural costs inherent in highly centralized manufacturing and distribution are wasteful and unnecessary. Randy Hooper, a marketing professional from British Columbia, calculated the difference to a local community of 7,500 people between buying a nationally known, name-brand, all-purpose cleaner in a plastic bottle with trigger-spray attachment, and buying a concentrated cleaner poured into a refillable trigger-spray bottle. The numbers are a little tedious, but the final point is striking: local is economical.

Before there is a product, there are components, and they are expensive. Bottles cost 30¢, triggers 40¢, the package altogether about 93¢. The product itself costs 8¢, and the additional overhead of advertising, brokers, truckers, wholesalers, salesmen, taxes, trade shows, hospitality suites, giveaways, liability insurance, store "listing fees," research, market testing, waste, lawyers, and accountants brings the product to a landed cost of $2.23 in the store, and selling retail for $3.

Of the 77¢ the store makes, 35¢ goes to staffing, 13¢ for employment taxes, 12¢ for overhead, 2¢ goes to insurance, 3¢ to marketing, 7¢ is profit, and 5¢ is paid out as income taxes. Therefore, of the $3 paid by the customer, only 57¢ stays in the community where it is purchased. The remaining $2.43 (including sales tax) leaves town. If one year's supply of cleaner for this community is 10,000 bottles, the

total purchase price of $30,000 is allotted this way: $9,300 for packaging, $4,200 in various taxes, $6,900 for labor, $800 in actual raw material, $3,400 in overhead and marketing, and the balance of $5,400 to insurance companies, truckers, and sundry taxes. Of that, $5,700 stays in the community.

If the store were to buy a drum of concentrated cleaner of equal effectiveness, sold in bulk to be diluted at home with water, it would cost the local community $10,876 for one year's supply—a savings of $19,124. The costs would break down this way: $880 for the soap, $105 for transportation, $74 for packaging assuming people bring their own bottles back to the store, $1,390 for labor, $416 for overhead, marketing, and insurance, and $4,187 in various taxes. Besides saving energy, fuel, transportation, and the 833 cartons and 10,000 bottles that would otherwise be wasted, the community also keeps $4,651 of the selling price of $10,876 for itself. In the conventional manner of sale, $5,700 stays in the community. When sold in bulk form, the community keeps $4,651 and saves $19,124 for a combined total of $23,775.

By localizing production and distribution, communities export less capital while depleting fewer from resources. In the above example, there was no change in the level of consumption of cleaner, but fewer resources were used while real income went up significantly in the community. Small, economically depressed towns are usually large net exporters of capital. These towns have very little to sell (or by definition they wouldn't be so economically depressed), and in turn what income they do generate is sent right back out of town for "imported" energy, foods, and goods. According to the Rocky Mountain Institute, an average American town of 5,000 people spends about 20 percent of its gross income on energy in various forms—over $20 million a year. Ninety percent of that sum is capital exported out of town to other suppliers. If the town cuts its energy use by 25 percent, it accomplishes two things. First, it saves approximately $5 million a year, money that can be used for other purposes. Second, creating those savings requires an investment in energy conservation, both techniques and education. If the town spends $1 million a year locally in conservation measures, it creates jobs and retains more income to be spent in the same town; ideally some portion of it would be spent on other capital-retaining, resource-conserving businesses.

Every region faces the same challenge as a business: Money coming in must equal or exceed the money going out in order for the town to prosper. By closely reexamining the ways in which money leaves a town, businesspeople can find tremendous opportunities opened up for small, locally owned companies. This process requires thoughtful approaches, meetings, and community awareness.

The principle applies equally to goods imported from overseas. Although we hear much about the supposed benefits accruing to countries who open their borders and engage in freer trade, left out of the equation are the tremendous imbalances created in specific locales and communities. Self-reliance is not a bad word, nor is it uneconomic, as free-trade proponents would have one believe. Many parts of the United States mimic Third World countries in that we send overseas our coal, timber or cotton, and then shop at the mall for the furniture and clothing that have been imported. The greater value to be added is not in the extraction of a resource but in the transformation of a resource, and we are increasingly delegating that role to others. Over a period of time, if such imbalances persist, the community loses other critical resources: its talent and young people. Towns in decline are not attractive places in which to live, and residents with the ambition and education to work elsewhere do so, further impoverishing the community, and minimizing the prospect of local self-renewal and economic growth.

Obviously, if you live in eastern Washington or rural Pennsylvania, you are not going to try to grow coffee. Imported products are not all objectionable. It is just that we have ceased to pay attention, as in the soap or energy conservation example, to those areas of our local economies in which we *can* profitably and capably provide alternatives or substitutes. A community that can provide many of its necessities locally will be less affected by the roiling national and world economy. It can prosper in good times, but will be more resilient in bad. We wait too often for answers from Washington, D.C., as to how to reduce our housing and health costs, when the answers lie in our local region.

A restorative company "finds the shortest, simplest way between the earth, the hands and the mouth." Wendell Berry in his essay "Conservation Is Good Work," decries the elaborate market systems that have effectively alienated us from our roots while wasting our earth: "The dilemma of private economic responsibility is that we

have allowed our suppliers to enlarge our economic boundaries so far that we cannot be responsible for our effects on the world. The only remedy for this that I can see is to draw in our economic boundaries, shorten our supply lines, so as to permit us literally to know where we are economically. The closer we live to the ground that we live from, the more we know about our economic life; the more able we will be to take responsibility for it. The way to bring discipline into one's personal or household economy is limit one's economic geography."

To rebuild an economy to honor the natural communities on which the human society depends involves a patient reconstruction of the commercial ties and connections that bind and separate us. It is one thing for corporations to promote individual responsibility as a means to "save the earth," and quite another for an enterprise to conceive and design itself so that choices are enlarged. If changing from linear to cyclical processes is a key to re-creating business in an ecological manner, then an important component of that redesign will be feedback, accountability and responsibility. Local ownership, while not guaranteeing such a result, makes it much easier for producers and customers to know, understand, and respond to one another. Further, it also helps to maintain capital pools in the community of origin and strengthen local economies.

Sustainable businesses take responsibility for the effects they have on the natural world. One of the outgrowths of Earth Day was the emphasis in the media on stories about what the consumer could do to "save the earth." Books were published, lists were drawn up, children were galvanized, as if subtle or radical changes in personal consumption and recycling habits alone could prevent worldwide ecological damage. Individual activity is empowering, but it cannot of itself change the nature of social and environmental degradation. The popularity of the notion that it's within the power of citizens to save the earth is not surprising, because it is in the very nature of modern corporate capitalism, however inadvertently or purposefully, to put itself in the best light. While everything individuals do helps, these efforts are relatively insignificant when compared to the demands placed upon the environment by corporations themselves. Consider this fact: If the items used in households in America were all recycled, this would reduce our solid waste by only 1 to 2 percent.

After Earth Day 1990, businesses large and small flocked to the green movement, seeing it as a means to find a niche in an otherwise crowded market or, in the case of some companies, as a means to improve their tarnished image. Onto the market flooded earth candles, "recyclable" plastic, and millions of T-shirts with activist slogans put out by fashion companies. By shifting focus to the consumer, companies managed to shift much of the attention away from their own actions. We must learn to distinguish between what are called green businesses and what are genuinely restorative companies.

While small, incremental changes in commerce are worthy beginnings, they are no more than that. Restorative businesses must rethink entire processes, from production and materials sourcing to employment, distribution, and marketing. As author Kirkpatrick Sale writes, "Nothing less than a drastic overhaul of this civilization and an abandonment of its ingrained gods—progress, growth, exploitation, technology, materialism, humanism, and power—will do anything substantial to halt our path to environmental destruction, and it's hard to see how lifestyle solutions will have an effect on that."

And any substantial change in the ways in which we degrade our environment will have to emerge from business leadership. It is an insult to our intelligence when companies shrug at environmental problems by saying "the consumer made me do it." It is true that existing companies cannot easily or quickly change long-standing practices, especially when those practices were deemed acceptable and effective for so many years. But new companies must take into account all that we know to date about destructive commercial practices and build on that knowledge to avoid routes to commercial meaninglessness.

An example of a company redesigning its methods, processes, and product is Natural Cotton Colours, Inc. It is, in the words of its founder, "the result of a hobby gone wild." The company evolved out of a decade of cotton breeding by Sally Fox, a graduate in entomology from the University of California at Riverside. Her first job was as an independent cotton breeder. In the course of her work, she came across some brown-seed cotton that was being passed around to other breeders in the state. Most of the others put it aside, seeing no market for naturally brown cotton. As a lifelong spinner and weaver, Fox thought differently, and began the long and tedious job of crossing the

brown cotton with other varieties. (Because the brown cotton had extremely short lint, it could not be spun.)

When Fox crossed her brown fiber with Acala Pima and Sea Island varieties, she not only created a long-staple cotton that was easily spun, but also discovered a treasure trove of other colors: many shades of brown, but also mint green, beige, and pale pink. These naturally colored cottons are now being bred on thousands of acres. From small breeding pots on Sally Fox's back porch a decade ago, Natural Cotton Colours now sells to Levi Strauss, Esprit, and other companies in Japan and Europe.

Architect William McDonough describes the Bedouin camel-hair tent as paradigmatic for ecological design. After a Bedouin tent becomes black from smoke, it heats up in the sun, creating a chimney effect that draws air into the tent that is then released through the loosely woven mesh at the top, cooling the occupants while letting in light. When it rains, the fibers swell up and seal the tent, keeping people dry. McDonough's point is that good design does several things at once, and Sally Fox's efforts have done exactly that. Her cottons do not have to be treated with harsh chemicals, defoliants, or bleaches. Of course they require no dyeing, a process that involves not only aniline and other toxic dye-stuffs, but also mordants, many of which use heavy metals to fix the dyes. And finally, Natural Cotton Colours grows much of their crops without chemicals, many of them organically as well. The resultant fabrics are soft, silky, and infused with rich and complex colors that cannot be created using any synthetic coloring process.

Cotton is one of the most polluting crops in the world (2 percent of the world's lands receive 26 percent of its pesticides). Sally Fox's work not only eliminates chemicals and toxins on the field, but in the mill and the factory as well. When she started her company, her cotton was considered a niche crop for natural weavers and spinners. Today, many people see it as an innovation that may change large segments of the cotton industry. If companies like Levi Strauss, Esprit, and Eco-Sport can successfully develop the market for these goods, the price of the cotton, now higher than that of chemically grown and treated cottons, will continue to drop, making naturally colored cottons as common as jeans.

Sustainable businesses do not require exotic sources of capital in order to develop and grow. It is axiomatic that businesses cannot grow without capital, yet, at the same time, infusions of capital have been the downfall of many a business. My main cautionary note here is not that business shouldn't have investors, but that the pell-mell effect of venture capital has a tendency to push fledgling companies into unsustainable rates of growth that drive founders and employees to stressful levels of activity and eventual dysfunction. Defenders of venture capital will point to their successes, but they never talk about the thousands of companies that soared to failure on the wings of immense capital infusions. Large investments of external capital, in the end, tend to take over their beneficiaries, both in real terms and in the values they represent. Venture capital will wrap itself in the "guise" of nurturance, but its vernacular term—"vulture capital"—describes well investees' experience of being preyed upon by an aggressive force. Because many of its investments fail, venture capital needs big kills, and thus it creates a positive feedback loop encouraging great gambles and failures.

The result is waste and burn-out. Companies that manage to grow with moderate amounts of outside capital, that take time to mature, that have deeper familial bonds, either with relatives or with the community, seem to have a better effect on society and employees than those that swing for the fences. There are notable exceptions, but in order to create an economic environment that has stability, the primacy of capital needs to be adjusted to the needs of workers and the community. This deeper understanding of the effects of capital flow on both businesses and community is lacking on almost all levels of commerce and government. There is no question that capital is needed in society, but the timing and movement of that capital have to be more humanely considered if we are to create healthy companies and communities.

The American myth of success suggests that the rich create capital, and are independent and self-made, while poor people, because they are weak, uneducated and dependent, do not garner capital. Society becomes stratified according to the ability to create money. This picture is so pervasive that the facts can hardly find room to protest. In reality, we have not one but two welfare systems. The first is meager, consisting of aid to the unemployed, dependent children, the poor and helpless. It is seen as charity, a hand-out, a grudging acceptance of

social responsibility, but it is almost always accompanied by judgment, admonishments of failure, and a high moral tone. The second welfare system is large, expansive, and expensive. It comes in the form of large government grants and programs for building highways, subsidies to the rich in the form of interest payment deductions on their houses, giveaways of timber and mining rights on government lands, government-financed research in universities, revolving-door policies between the defense industry and government resulting in expensive, poorly planned procurement policies, and so on.

The list of recipients of these handouts from the government is long, but they are not seen as recipients of welfare. However, the fact remains that three times as much housing subsidy goes to the top fifth of the population as to the bottom 20 percent who need it the most. After the war, as blacks migrated to inner cities and whites to the subsidized suburbs, government and private lenders began to red-line inner-city districts, essentially withdrawing capital from these areas. The neighborhoods slowly began a downward spiral into poverty and disrepair, thus confirming lenders' worst fears. When capital is withdrawn or even exported from a system or place, communities will inevitably collapse unless they can obtain capital elsewhere. As housing stocks decay, as manufacturing jobs migrate to the "desirable" suburbs, it is hardly surprising that families left behind in the cities suffer and, in many cases, do not hold up under the stress.

Meanwhile, Silicon Valley and their legion of free-market entrepreneurs would not exist in their present form were it not for extensive defense department purchases that essentially jump-started much of the micro-chip industry. The continued bail-out of the failed deposits in the savings and loan industry represents an unintentional subsidy of several hundred billion dollars to golf courses, resorts, office buildings, and expensive housing stock that was built but proved to be mostly unneeded. In short, we are constantly providing and directing monies to peoples, places, and businesses, and it is not surprising that those who get it do better than those who do not.

Among all of the banks in the United States, *one* has bucked the trend, corralled deposits, and headed right back to the inner city to finance and revitalize those communities by investing in housing, businesses, and human capital. South Shore Bank, located in the South Shore of Chicago, was founded in 1973 by foundations, churches, and

charitable groups. From its earliest days it has solicited funds for what it called Development Deposits. These deposits were guaranteed by the bank to be used in struggling neighborhoods to revitalize forgotten communities. To date, South Shore has loaned over $200 million, primarily in mortgages and construction loans, to rehabilitate thousands of rundown units into affordable housing. In almost all cases, the bank has chosen to go into areas that were red-lined and to loan to people who would not have been able to secure credit from any other agency. Like the Grameen Bank in Bangladesh, South Shore has not only proved lower-income people to be creditworthy, but has worked diligently with them in their neighborhoods to ensure business success. Its default ratio has been low to normal, its success in rejuvenating neighborhoods nearly legendary. Today, the bank has $210 million in deposits, its return on average equity averages 12 percent, and its capital-to-asset ratio is well ahead of government standards.

Ironically, when you look at the failed banks and saving institutions in the United States, you invariably find a pattern of lending and speculation that took them far from their roots, and certainly far from the ideal of a bank investing in its own community. During the 1980s, South Shore Bank was competing for deposits with these Sunbelt institutions that were offering unusually high rates of return, then turning around and buying junk bonds. Today, in order to ensure that depositors will not lose their funds, the taxpayer is buying back those junk bonds at face value, though many have sunk to worthlessness. During those same years, South Shore Bank was reducing the load on local and federal government in terms of unemployment claims, welfare, and federal housing grants.

Sustainable businesses engage in production processes and services that are human, worthy, dignified, and intrinsically satisfying. An almost taboo subject for business is death. Society sees the passing of a human being as sacred, an event far beyond the scrabbling of the everyday world of commerce. But in fact, commerce in the form of the health care industry is wholly involved with death, diagnosing terminal illnesses, treating and intervening in whatever way it can, and only at the very last moments relinquishing the patient to the forces that lead to death. Despite the fact that death is inevitable in the case of terminal diseases such as certain cancers, AIDS, Alzheimer's, and some lung diseases,

most insurance policies are written to cover only the cost of the "cure." Thus the relevant treating facility, usually a hospital, is required to treat the disease aggressively, even though a cure is a remote if not hopeless prospect. Such treatments are usually invasive, painful, disorienting, frightening, and always very expensive. Intensive care units cost between $1,000 and $5,000 a day, and that excludes the cost of surgery, drugs, and doctors' fees.

The hospital environment is not designed to ease the process of dying for it is entirely oriented to preventing death. People who are old, infirm, immobile, helpless, and in pain are left in brightly lit rooms, usually with another patient, and are treated with a scripted efficiency in an attempt to hold costs down. It is, as everyone knows who has witnessed it, an extremely unpleasant way to die. Beyond the emotional stress, families of the dying often face another shock, and that is the medical bills that pile up. It is estimated that 20 to 30 percent of the health care cost in one's lifetime will occur during the final year of life, and half of those costs in the final ninety days. In rough dollar terms, this means we spend $200 to $300 billion annually in "health" care during the final year of life, $100 to $150 billion during those last ninety days.

A company in Miami has addressed this issue by creating the country's first for-profit hospice. Vitas Healthcare Corporation, started in 1978, now treats some 2,100 patients at home, in hospice care facilities, and in cooperating hospitals. Until recently, hospice care has been a nonprofit service, dependent on volunteers, the United Way, foundation grants, and bake sales to pay its way. Under the leadership of the Rev. Hugh Westbrook, Vitas Healthcare has helped rewrite federal and state laws, allowing reimbursement for hospice care under Medicare and private health insurance. This has allowed alternate methods of patient care to be used by the families of the terminally ill. The plan is designed to care for patients who want to stay at home as long as possible, who have less than six months to live, and who would rather not have aggressive medical intervention while they pass away. Vitas is comprised of doctors, nurses, social workers, volunteers, homemakers, physical therapists, and religious workers who form a team to care for all the needs of the dying, from small errands and details to medical care and spiritual concerns. The team never varies during the time the patient is alive, so that relationships are established and maintained. If

necessary, the patient will go to the hospital, but he or she will still be administered to by the same team. But even in the hospital, the hospice ward is more relaxed, meals can be brought in, families can stay overnight, and children and pets are allowed.

In this one company, two issues are being addressed. The first is the cost of health care, which is out of control in the United States. While having low rates of life expectancy and high rates of child mortality compared to other industrial nations, the United States spends more on health care as a percentage of GNP than any other country in the world. We are not getting our money's worth. Second, Vitas is responding to the ironic fact that a dying person simply doesn't fit the world of industrialized medicine, which forgoes the simple needs of the dying, the need for care and understanding and emotional support, in the interests of surgery, medical technology, and drugs. By taking on both issues, Vitas Healthcare has created the first for-profit business to lower the cost while increasing the quality of care for the terminally ill.

Sustainable businesses create objects of durability and long-term utility whose ultimate use or disposition will not be harmful to future generations. If we forgive the unnecessary products already on the market—the over-packaged chotchkes, the gummy bears and injection-molded refrigerator magnets, the "Green Forest" ecological paper towels, the nacho-flavored, shrink-wrapped, ready-to-eat popcorn, the perfumes made of aromatic hydrocarbons refracted from Texas crude—and look ahead, it is possible for new companies to sidestep the commercial Tower of Babel that spills forth such irrelevant abundance, wastes so much, and does so little. Since it *is* a free market, nonsense will always be sold, but new enterprise has the grace and opportunity to provide items of clarity and simplicity, products that cut through the clutter of our lives and allow us to perform the daily acts of living in a more satisfying way. The cornucopian variety of goods that has exploded from the capitalist economies has been a neat trick, but it is not even remotely sustainable for the near or distant future.

All businesses like to think they are adding value, by taking raw or manufactured materials and assembling them into something more useful, or by providing knowledgeable, worthwhile service, such as health care, education, or accounting, that affects the customer posi-

tively. But in fact, all products and businesses do not add value. Many do quite the opposite, a result Ivan Illich calls *disvalue.* Selling products that are wasteful, cheap, quick to be thrown away, or of marginal utility is more common than it should be. Because industrialism has historically been fed by increasingly cheaper stocks of energy, it has been able through technology to lower the real price of goods for many decades, affording those in industrial countries broad materialistic options that few could resist. But industry has overshot its mark. Products have become increasingly shoddy and ill-formed, reflecting the needs of marketing and image-makers more than those of society and the environment.

To add value, one has at least to improve upon what is available in the existing market, not only in terms of taste, function, or service, but also in terms of the amount of embedded energy and resources one does or does not use when compared to the competition. A new business should try to envision the highly intermediated and complex routes whereby products are created, and then develop different products or processes that eliminate unnecessary resources, time, and energy.

When it comes to services, durability has an analogous meaning. Following the definition of information as the difference that makes a difference, durability may be seen as the service that makes a difference, as opposed to the service that is always repeated. Taking care of problems is good, helping people solve them is better. Emerson said that "nature suffers nothing to remain in her kingdom that cannot help itself." Durability in service informs or changes the customers in a way that frees them up from commercial dependence.

Sustainable businesses change consumers to customers through education. In some ways, looking directly to the customer may be the best way for a businessperson to envision the issues I have been discussing. What is the best way to serve my individual customer? The economics of restoration rests on the premise that people, if given honest information, not only about price, but about cost, will make intelligent and appropriate decisions that will improve both their own lives and life around them. Whoever has the most intelligent customers will flourish, and this is true for countries as well as companies.

In the movie *Awakenings,* there is a scene in which an elderly

woman sits motionless, confined to a wheelchair because of childhood encephalitis. The Oliver Sacks character in the movie, played by Robin Williams, fails to get any response from this woman through conversation or standard stimuli until he accidentally drops an object into her lap. She immediately reaches out to catch it. Sacks pauses to consider what has happened. He then steps back and tosses a tennis ball, with the same result: a precise catch by a woman who heretofore has been silent and immobile. When pressed by his supervising clinician as to how and why this woman can dexterously catch a tossed ball, Sacks replies that she has borrowed the "will" of the ball.

I have seen the movie again and it is this particular phrase that has stuck with me. We all borrow will: from our parents as we grow up, from coaches or mentors, even from stars and famous personages with whom we connect in less immediate ways. It is our will that is the substance of our life. When we lose it, we are on a path to a kind of death, since will is the soil from which hope arises.

I also think that borrowing will describes—or should describe—the relationship between the company and the customer. It is the corporation that borrows the will of the customer: the will to be warm, fed, and secure; the will to grow, develop, learn, and be approved of; the will to succeed, to lead a happy life, to be loved. Will is powerful stuff, not well understood; when a company borrows will, it is more than a loan, it is a covenant. That covenant is the heart and soul of the enterprise. And when the relationship between a company and its customers is not a covenant, when it is marked instead by indifference or greed, then the heart and soul of the company is sterile. Many businesses operating today treat customers as wallets disguised as human beings, assets that conform to demographic trends, passive consumers ready and willing to be manipulated.

In the restorative economy of the future, the fundamental principle to be honored is the covenant between company and customer. Businesses will become instruments of the customer; the consumer as the passive instrument of commerce will disappear. Businesses large and small that comprehend this distinction and make the change will have a far better chance to succeed in the decades ahead.

Peter Drucker has been saying for many decades (to little avail, it seems) that businesses are not created to make money. You invest in a business to make money, but you create a business to serve the needs

and wants of a customer. If the business creates the customer, the question is, what kind of customer do you want to create? This is particularly important with respect to the economics of restoration, because restoration cannot be carried out by corporations alone. Companies large and small must transform their customers so that the company can change. No businesses do this better than the Japanese, which compete to spoil the customer. If you buy a car in Japan, it is delivered to your door. If you want it serviced, it is picked up at your door. New cars are exhaustively detailed to a level that far surpasses American service. And not surprisingly, Japanese customers have become very demanding, if politely so, with high expectations built upon a lifetime's experience. By training their customer to have only the highest expectations, the Japanese have made their companies the most competitive in the world. Surviving in the Japanese market is very difficult. For this reason alone, Japanese companies have gained a powerful competitive edge over American corporations.

Americans and other Westerners sometimes ridicule the Japanese for their oversolicitous and ingratiating style of business. Women working in department stores in Tokyo wear white gloves and navy blue suits. They bow all day long, telling each customer how welcome he or she is. Customers leaving and entering restaurants are greeted and thanked by several people. Business negotiations are studiously polite and infused with favors, gifts, courtesies and thankfulness. In Japanese the words for thank you are *arigato gozaimasu*. But the conventional translation does not do justice to the underlying meaning embedded in the characters used to write the phrase. A literal translation would be "In this relative world of illusion and suffering, what you have done is very rare, I am before you as a humble goza mat." This sense of gratitude is deeply ingrained in the Japanese character and culture, and in turn informs the Japanese concept of service and of what a customer is. Earning and expressing this gratitude requires the Japanese to be extraordinarily attentive to their customers' needs. It is a part of the reason why the Japanese consistently create the small, technical innovations in electronics, automobiles, and other products that allow them to dominate industry after industry. They are years ahead of American companies, not because they take our ideas and exploit them, not because they are better tinkerers, but primarily because they are more customer-oriented.

If there is a covenant between businesses and the individual customers whose will they borrow, then the underlying principles guiding a business must be based on what that business senses about the customer. And it seems that the most profound, basic, and enduring quality uniting businesses and customers is gratitude. First, gratitude from the business to the customer; then, reciprocally, from the customer to the business because of the service, quality, and value received. Of course, the product or service is also a direct connection, but gratitude is the enduring quality of the relationship.

Perhaps that idea seems a bit soft for these hard-nosed times, but it has a distinct and practical benefit. The presence or absence of gratitude is a reliable measure of the health of any business relationship. All too often, as businesses succeed and grow, gratitude becomes ossified and institutionalized, if it is there at all, and the customer is isolated into a transaction, a piece of raw data, a unit, a consumer. Gratitude does not seem important any longer because, in a technical sense, it isn't. There is no such entry in the books of the accounting department. Gratitude is a part of social ecology because it is the most powerful way we feel and express our connection to others. It is not surprising that so many prayers around the world are essentially ways to give voice to thankfulness.

If you are merely selling to a consumer, there are only two possible outcomes, sale or no sale. But if you undertake a service role to a customer, your outcome will always be successful, because your role is to inform and care for the customer. Even if this means "no sale," you have performed your role and are therefore successful. The argument against such an approach is that companies cannot afford to be responsive to customers if this consistently results in no sale. I would counter that argument by saying that businesses perceived as caring for their customers will do better than those that do not, not merely because of the obvious reasons of customer loyalty and repeat sales, but because such a company is essentially evolving with their customer base, changing as they do, and modifying mutual behavior symbiotically.

What has weakened American companies more than anything else is the powerful combination of advertising campaigns and organizational cultures that do not listen or respond to the customer. The difference between the two approaches is critical if we are to move away from a predatory economy to one of restoration. Before any true

restoration can take place, the relationship between "symbiotes" has to be re-established and restored. Then, and only then, can a company act in the interest of society as a whole. The difference between the two approaches not only moves "out" from the company into the marketplace, but also "backwards" into the organization to product design, manufacturing methods, the consideration of waste. A business's relationship with its customers is, in this respect, as important as its relationship to the ecosystem. The ecosystem is vast; the problems we have created are intimidating. The individual customer is "local," right there in front of you, more easily understood.

The concept that one business succeeds because another does not is part of the same thinking that has created the dichotomy between consumer and customer. But, in fact, there is a large and overwhelming body of evidence demonstrating that competition in human culture, whether it be in business or other endeavors, does not improve the species, but is maladaptive and far from being the most intelligent cultural strategy. The country we admire, fear, and dislike the most in economic matters is Japan, a country that places an unusually high, even extraordinary emphasis on cooperation, collaboration, and harmony. That does not mean that Japanese companies do not compete, but it does mean that they do so within the larger cultural imperative of harmony. One of the reasons we in this culture compete actually has nothing to do with business, but rather is the addiction to winning, to beating an opponent. If the purpose of this competition and winning is an enlarged ego system, then it goes without saying that we will pursue it endlessly because, as all winners know, the joy is short-lived, the hunger endless. A restorative economy will have as its hallmark a business community that coevolves with the natural and human communities it serves. This necessitates a high degree of cooperation, mutual support, and collaborative problem-solving. It depends on very different skill-sets than those that are being drummed into us in sports, movies, and business schools. Competition for the consumer or between businesses is impractical, wasteful, expensive and degrading to all involved. It imitates an immature ecosystem, and in this day and age, that is retrogressive, not progressive.

10

Restoring the Guardian

During the energy crises of 1973–1974, many upper-income homeowners turned to solar heating for their swimming pools, a well-intended action, but not exactly the path to social and environmental equity. They could afford to take advantage of the investment tax credits offered by the federal and some state governments. In fact, all too often, the environmental movement has been the province of the upper-middle classes, both in concerns and in benefits, to the exclusion of lower-income and minority groups here and abroad who feel justifiably resentful that the gargantuan energy and resource appetites of the industrially privileged few should now force them to make sacrifices in their own lifestyles and chances for a more prosperous existence. The 50 million people who will be added to the U.S. population over the next forty years will have approximately the same global impact in terms of resource consumption as 2 billion people in India. If there is to be an ecologically sound society, it will have to come from the grass roots up, not from the top down. We have spent too much time and money making the world safe for upper-middle-class white men. "Environmentalism" cannot be the sole province of the "socially responsible" or the highly educated.

While the debate continues as to whether we have a human prob-

lem (people not willing to change their thinking and their lives) or a business problem (opportunistic companies willing and all too eager to benefit from expediency, greed, and shortsightedness) I suggest that we have a systemic problem that involves both people and commerce. What I propose does not attempt to "solve" either the human or the business problem because they are both part of evolving, complex, and dynamic systems for which there is no "solution," only change. Rather than worrying about how we can save the environment, we must turn to the root cause and worry about how we save business. Regardless of the heaps of abuse that have been and can be placed at the doorstep of commerce, the fact remains that enterprise's essential function cannot be undertaken or better effected by any other known human institution. In studies of complex adaptive systems at the Santa Fe Institute, it has been noted that food enterprises in the city of New York, and other cities like it, manage to keep all restaurants and stores completely supplied while not retaining more than a few days' reserves on hand. Quoting John Holland, computer scientist and fellow of the Institute, "From the point of view of physics, it is a miracle that happens without any control mechanism other than sheer capitalism." While I chastise corporations for co-opting what they view as threats to profits (such as the environmental movement) with slick public relations and advertising campaigns, I would suggest that we co-opt the threats to our well-being—the razing of the planet—by turning the undesirable traits of industry that cause such harm, all of which hinge on the profit motive, into benefits that can restore the ecosystem.

In her book *Systems of Survival,* Jane Jacobs proposes that society can be viewed as encompassing two moral syndromes, the "guardian" and the "commercial." Jacobs argues that the guardian system, or governance, arose in territorial and hunting societies, cultures that guarded their boundaries, were suspicious of outsiders, and were deeply protective of their possessions. The guardian system is conservative and hierarchical, adheres to tradition, values loyalty, and shuns trading and inventiveness. The commercial system, on the other hand, is based on trading, and functions well when it is open, trusting of outsiders, innovative, positive, and forward-thinking. It values collaboration, contracts, initiative, and optimism.

Jacobs' thesis is that, ideally, society should separate these two functions as completely as possible. Trouble ensues when the two sys-

tems become confused about their roles and take on the functions—and therefore the behavioral traits—of the other. The virtues of one system become vices when exercised by the other. When the guardian syndrome—governance—intrudes with its hierarchical, bureaucratic assumptions into the realm of commerce, it founders, because it is no match for business in quickness and creativity. The S&L fiasco in this country resulted directly from business's outwitting governance. Instead of insisting that industry create its own insurance system for depositors, government guaranteed that protection directly and thereby gave private institutions every incentive to choose the riskiest investments for depositors' money. Jacobs cites the nuclear power industry in Britain as another example of failure when governance tries its hand at commerce. When the Thatcher government tried to privatize British nuclear plants, no company would buy them. No company would accept them *free.* When the cost of decommissioning and clean-up was accounted for, they were losers, and business knew it.

Of course, the opposite situation also occurs, in which business attempts to take on the role of guardianship and governance. Every time it tries to do so, we suffer. In the context of the arguments of this book, the process might be described as follows: Business assumes the role of guardianship vis-à-vis the ecosystem and fails miserably in the task; governance steps in to try to mitigate the damage; business tries to sabotage this regulatory process and nimbly sidesteps those regulations that *are* put on the books; governance ups the ante and thereby becomes a hydra-headed bureaucratic monster choking off economic development while squandering money; business decries "interference in the marketplace" and sets out to redress its grievances by further corrupting the legislative and regulatory process in an attempt to become *de facto* guardian, if not *de jure.*

In the political arena, this struggle plays out in virtually every industrialized country in the world as the classic two-party schism of liberal and conservative. When liberals are in power, they understandably propose controls and regulations on business; in the more extreme forms, liberal thought tries to unite the guardian and commercial responsibilities with the guardian role predominant, producing socialist enterprises of marginal efficiency. When conservatives are in power, they attempt to reverse the regulations and give business carte blanche,

invoking pious homilies to the free market and human enterprise, creating the future seeds of backlash, while avoiding the real issues of health and habitat. Conservatism has its own radical school of thought, wherein guardian and commercial roles are united but with commercial powers in the primary role. This experiment has not been tried in quite so thorough a fashion as the socialist ideology, but if it ever were attempted on a wide scale in the industrialized West, the fate of the ecosystem would be sealed.

Guardianship and commerce are trapped in a positive feedback loop, and neither is likely to solve the problems of ecological degradation and scarcity when reacting only to the excesses of the other. All of us suffer the consequences. When patterns of behavior in business repeat themselves again and again, as they do, and when the reaction of governance is another round of regulations, we would do well to consider whether "bottom-line" blame should be placed on "unruly" businesses or "incompetent" government, rather than on the design of the system within which they function.

In principle and generally in practice, business is rewarded for producing the best product demanded by the market for the lowest price. In classical economics, this free market is an efficient system because the producer has every incentive to be as thrifty and innovative as possible. The market sorts out winners and losers with democratic and sometimes draconian efficiency, relegating the ineffective producers to the economic margins, if not failure. This free-market industrial system took root in a world in which trade was expansive and global. Resources of unusual abundance were wrested away from indigenous cultures in the Americas, Africa and Asia, furthering the fortunes of the trading, industrial nations who took what they wanted with force and rapaciousness. It was colonialism, and it is practiced today not by adventurers, but by transnational corporations.

Business did not anticipate a time when those resources would diminish or run out. It was inconceivable that the vast plains and forests of the New World could be exhausted, or that the abundant new fuels of coal could produce enough waste to foul the air and the seas, or that the use of oil could eventually lead to global climate changes. So the system of rewarding lowest price, impelling companies to exploit the cheapest sources of labor and materials, could not anticipate a time when the lowest price would no longer actually be the

lowest price, when seeking out the cheapest means to get a product to market would end up costing society in terms of pollution, loss of habitat, degradation of biological diversity, human sickness, and cultural destruction. Although the symptoms of this dysfunction were evident at the very outset, they seemed minor when compared to the abundance of the world, or in the case of colonialism, justified by the doctrine of economic and racial supremacy. Today, each of us who works in or manages a business is essentially guided, even coerced, by these nineteenth-century models.

Today, business is being asked by environmentalists to internalize some of the costs that were formerly externalized and largely invisible, and thus is being forced to respond to conflicting signals. On the one hand, it is asked to deliver goods to the marketplace at the lowest possible price; on the other, it is asked to assume the "new" costs of environmental stewardship. If it performs the first function too well, it is held accountable and punished by government, if not by public opinion, because it cannot achieve the lowest price without some or many forms of environmental and societal compromises. If it performs the latter function well, its costs may be raised so high that it suffers in the marketplace.

This book notes many examples in which companies overstepped their limits and damaged society in their effort to be low-cost, high-margin producers. Current regulations draw a line beyond which business is not supposed to go lest it incurs fines and prosecution. But the basic system still rewards lowest prices. Although the number of regulations cascading forth from legislators is unavoidable given the rate and breadth of environmental depredation, the commercial syndrome is quicker and sharper than the guardian syndrome, so business's pushing these limits to the edge and beyond is inevitable. We should not be surprised that hardly a day passes when we don't read how one company or another has failed in its balancing act and spilled toxins, spewed emissions, or harmed workers. In nations where there is little if any regulation, business runs amok, and we end up with situations such as that in Mexico City, whose pollution problems make those of the L.A. basin look modest.

In order for business to function both effectively and ecologically, the contradictions between guardian and commercial interests must be reconciled. In order to break out of the destructive and ultimately fatal

loop in which we're trapped, we need a consensus-building, collaborative approach that both guardians and commerce can support. Business is concerned that it is being regulated into oblivion (an overblown fear, but one that underlines the dysfunctionality of the system), while governance, seeming to realize the dangers posed to the ecosystem and society, has spun out of control, trying to take care of everyone and everything with its runaway budgets and deficits. We need to redesign the system in a way that solves the malfunctions of both.

The role of government is to assume those functions that cannot or will not be undertaken by citizens or private institutions. Unfortunately, politics has come to be more a matter of partisan winning or losing, of benefiting one party without regard to the interests of others. Political analysts describe the intricate tradeoffs and struggles for power that exist in and around government. But forgotten is the true meaning and purpose of politics, to create and sustain the conditions for community life. Politics was not intended to be the province of money, but the arena wherein individuals could collectively discuss and manage those elements of life that affected the whole of their town, city, or state. In other words, politics was very much about food, water, life, and death, and thus intimately concerned with the environmental conditions that supported the community. When business introduces money into the discourse, it will by its very nature corrupt the dialogue. It is the role of government, then, as a political act, to set standards within the community. Simply stated, one of the roles of the guardian is to ensure that citizens and institutions take care of their habitat and clean up after themselves so that their actions and presence not compromise the life of the community, however large or small it may be.

In any endeavor, good design resides in two principles. First, it changes the least number of elements to achieve the greatest result. Second, it removes stress from a system rather than adding it. Bad design is pinning our hopes for environmental and cultural survival on a change in human consciousness and behavior alone, because we therefore depend on the highest number of uncontrollable elements—people—to undergo a great change. Likewise, bad design is having to institute several hundred thousand rules and restrictions under the jurisdiction of the government and expecting business to know them all, much less obey them.

Good design makes things easier and simpler. Good design seems natural, unaffected, and appeals to common sense. Good design for the commercial system accounts for and appeals to the innate behavioral modes of both governance and commerce. Let governance govern with a minimum of intrusion and with a genuinely "conservative" approach; let business be business at its best: humane and creative and efficient.

One of the ways to further this goal is to invert the old values and reverse the traditional cost-price incentives. We need a predictable and consistent market that recognizes the true, full costs of doing business and reassigns them to the marketplace, where they belong. We require a market economy that rewards the highest internalized cost, an economy in which business prospers when it is responsible both socially and ecologically. We need business to thrive by exceeding regulatory standards rather than by challenging or circumventing them. Businesses should literally compete to be *more* ecological, not only on moral or ethical grounds or because it is "the right thing to do," but because such behavior squarely aligns with their bottom line. In short, we must design a marketplace that obviates acts of environmental destruction by making them extremely expensive, and rewards restorative acts by bringing them within our means. If we do this, environmental restoration, economic prosperity, job creation, and social stability will become equivalent.

To achieve such a goal, business must do the unthinkable and step back from controlling the guardian so that the standards of a new market can truly and effectively benefit the whole of society, and not just one industry or sector. The most profound act of leadership that could be exerted by business would be to admit that its influence over and manipulation of government is misguided. While I don't expect that this acknowledgment will come from the heads of large corporations—in fact, I suspect some will find it laughable—I do think it can come from the emerging leadership of responsible companies and small businesses here and around the world, men and women who do accept their role to act as restorers of life.

One example of the power and influence of the transnational corporations occurred at the Earth Summit in Rio de Janeiro, The United Nations Conference on the Environment and Development (UNCED). Prior to the meeting, the U.N.'s Centre for Transnational

Corporations had issued a series of recommendations that would impose mandatory rules regulating the conduct of corporations overseas with respect to the environment. Many of the world's largest corporations, working behind the scenes, had the recommendations of the U.N. agency shelved during the conference, and substituted for them a voluntary code of conduct drawn up by the corporations themselves. After the Earth Summit, the U.N. Centre for Transnational Corporations was closed down altogether because of pressure from the large Western industrial nations. Besides the official delegates to the UNCED conference, some 30,000 other delegates met in Rio, representatives of indigenous cultures, academic institutions, churches and religions, environmental and women's groups, and nongovernmental organizations (NGOs) working on behalf of the environment and the disenfranchised. Virtually none of the 30,000 NGO delegates supported the proposals put forth by the Business Council on Sustainable Development. It is precisely with these stark refusals to acknowledge the democratic process that business must come to terms.

At the same time, the guardian of human and natural systems must recognize its own limitations in relation to commerce. It cannot tell companies what to make and how. It does not have the ability to allocate resources in an efficient manner. It cannot set prices. But it can and must set the conditions under which commerce operates. It must establish the standards that help guide the planning and development of business. It must be willing to accept that the most important social unit in a democracy is not the biggest—a large corporation—but the smallest: individuals, families, and communities that are constantly being affected by the decisions of business to externalize their costs onto society and the environment.

The argument returns us to the concept of Pigovian taxes, but in order to create a truly dynamic and evolving economy, green fees would have to be used as more than mere incentives and corrections to the market, certainly more than taxes or expenses. The idea of green fees or taxes is not new; an extensive and growing body of work describes how these taxes might work or have already worked. Academics, economists, utilities, and governments meet around the world to discuss how external costs of industrial production must be inte-

grated into prices if the public is to change its habits and consumption patterns. Although moderate green taxes are already in place in Europe and the United States (such as the tax in the United States placed on CFCs following the scientific confirmation of their ozone-depleting nature), they have not been embraced by a business- and special interest-dominated Congress.

Unfortunately, green fees are being proposed during a period in which most governments are running up large current account deficits. For the sake of argument, green fees should be considered apart from their potential role as deficit remedies. The U.S. deficit neither causes nor was caused by the ongoing degradation of the environment; it is the result of the breakdown of the political process. When green taxes are proposed as ways to close budget gaps and are then placed into the overall context of "more taxes," they will be justifiably unpopular among taxpayers. Anyone who argues that taxes pose no burden is either rich or doesn't pay them. And given the miserable performance in fiscal matters by Congress during the Reagan and Bush administrations, few taxpayers trust that any new fees or taxes instituted by the House and Senate will be spent wisely or accountably. These legitimate concerns obscure many of the benefits and positive attributes of green taxes.

The main function of green taxes is not to raise revenue for the government but to provide participants in the marketplace with accurate information about cost. They achieve both goals, of course, but their underlying purpose is to undo the distortions created by the relentless pursuit of lower prices, and to reveal true costs to purchasers. Green taxes would create, perhaps for the first time since the Industrial Age began, the closest thing approximating a truly free market, with many costs now externalized fully accounted for. To paraphrase G. K. Chesterton, there is nothing wrong with a free market, it is just that no one has tried it out yet. To assure that the public understands that the purpose of green taxes is not to raise revenue, green taxes must be explicitly revenue-neutral. Every incremental dollar collected from green fees should reduce income and payroll taxes equally, starting with the lowest income brackets and moving to the highest. It is critical that green taxes not place a burden on lower economic brackets or the middle class, because their purpose is not to punish but to reward.

The existing tax system places levies on incomes, profits, sales, payrolls, and savings. In doing so it discourages, or at least suppresses, the very elements we claim to value in a healthy economy: jobs, savings, new investment, and entrepreneurial activity. There are no positive incentives to be gained from taxing income or payrolls, but there are many disincentives; the main one is cheating. The present system is estimated to cost taxpayers and corporations $250 billion per year in lawyers, accountants, paperwork, administration, and waste. A recently completed study by Dr. James Payne places that figure even higher. He calculated that taxpayers or their accountants must plow through 8 billion pages of forms and instructions every year, resulting in 5.427 billion hours of tax-directed activity. The research estimates that for every dollar of tax revenue collected by the IRS, another 65 cents is spent on compliance, systems, forms, litigation, and data collection. This means that a government program that costs $10 billion actually requires $16.5 billion. Combined payroll and income taxes increase the cost of labor to business, giving companies strong incentives to move manufacturing offshore, to import from countries with lower labor costs, and to reduce the number of workers wherever possible, or to replace them with machines. At the same time, the bite into wages is so pronounced that workers often go around the tax system, work less, or not at all.

Taxing wages and payrolls costs the individual worker, and it costs the economy billions, some experts believe trillions, of dollars in lost business opportunity and income. When companies move their operations offshore, not only incomes are lost. Entire towns decay, crime increases, education suffers, the tax base erodes, and affected towns begin a chronic spiral of decline that prevents economic renewal. Furthermore, stricter U.S. environmental laws are often circumvented overseas, either directly by the company or indirectly by its subcontractors and suppliers. These costs are unaccounted for. Finally, the tax on interest from savings creates further obstacles to economic renewal, raising real interest rates by shrinking the pool of capital available for investment.

For fiscal year 1994, government expenditures are estimated to be $1.52 trillion. If we were to incrementally replace over a twenty-year period all government revenues ($1.25 trillion), including the deficit amount of the budget that is not collected ($264 billion), through the

use of fees on products and processes, we would be adding 5 percent of the total, or $76 billion a year (thereafter adjusted annually for inflation and any budget increases). The annual fees and taxes on virgin resources, emissions, fuels, products, wastes, rights, and services would equal about 1.2 percent of the Gross Domestic Product. At the same time, the same $76 billion per year, also adjusted annually for inflation, would be lopped off present income and payroll taxes, both individual and corporate. At the end of the period, most government revenues would be derived from green taxes, virtually none from income, payroll, or corporate taxes. Of course, people may still wish to levy a surcharge on high income individuals and companies. But we would nonetheless have consistently and steadily shifted the tax burden from income and entrepreneurial activity to those activities we wish to discourage, thereby transforming the economy. The resulting changes in the marketplace this would cause would be dramatic. Every purchase would become more constructive and less destructive. Equally important, the innate instinct to save money would reward both the customer and the environment.

The whole key to redesigning the economy is to shift incrementally most if not all of the taxes presently derived from "goods" to "bads," from income and payroll taxes to taxes on pollution, environmental degradation, and nonrenewable energy consumption. Because green taxes are incorporated into the price a company or customer pays for a resource, product, or service, they create powerful incentives to revise and constantly improve methods of production, distribution, and consumption, as well as a means to reconsider our wants and needs. The purpose of a green tax is to give people and companies positive incentives to avoid them.

For example, if gasoline were taxed to a greater degree than it is today, we would pay more attention to a variety of alternatives, including higher mileage cars and carpooling, to bicycling, mass transit, and tele-commuting. America uses about 110 billion gallons of gasoline per year. A 50-cent tax per gallon would raise $55 billion, $1 would raise $110 billion, and $2 would raise $220 billion, a figure that is about half of what we pay in income taxes at present. Compared to the costs borne by our competitors, even $2 per gallon would not be a severe tax. Americans pay one-eighth the taxes on gasoline that Europeans do; in Britain, France, and Germany such taxes range from

$2.21 to $2.80 per gallon. In Japan the tax runs at $1.63 per gallon. At an average of 34 cents per gallon, counting state and federal taxes, the United States has the lowest gasoline tax in the industrialized world.

Opponents of higher gasoline taxes claim that they unfairly penalize rural denizens who have to drive longer distances. Studies have shown that the incremental costs could be several hundred dollars higher for someone living far from an urbanized environment. Yet people in rural areas are conducting economic activities such as ranching, farming, or mineral exploration. The purpose of the tax is not to punish others, but to reflect true costs in products. Thus, rural producers would raise their prices in the marketplace to reflect their energy intensity, which is the purpose of a green fee. People need to fully understand what things truly cost. While it is true that taxes unevenly affect different pursuits and activities (glass companies use seven times the amount of energy as a percentage of manufacturing cost than do apparel companies, for example), their purpose is to create positive incentives to reexamine those activities in terms of accurate market information—namely that nonrenewable energy is expensive and will only become more so. Green fees give people ways to respond, change, invent, and innovate. They create adaptive behavior instead of the maladaptive behavior seen in the present tax code. In terms of business, they profoundly affect strategy and growth. By imposition of incremental and eventually large green fees, businesses are positively encouraged not merely to meet regulations, but to embrace them, to exceed them, because the better the job they do in this regard, the lower the green fees, the lower their costs. For example, if a company is paying $3 a gallon in equivalent energy prices for the fuel required to run its plant, and it can substitute with a combination of conservation, cogeneration, solar-generated hydrogen fuel, or wind- and solar-generated electricity at an aggregate cost of $2.50 per gallon, it not only avoids the green tax but gains an advantage over competitors who have not sought less expensive alternatives. If green fees are raised to a suitable level, then the less expensive alternatives with regard to any process are restorative rather than degrading. Now, too often, the opposite is true.

There are endless debates among theoreticians as to what true external costs are. Of course there will always be such debates because the exact cost of environmental degradation cannot be calculated. In a

poll taken of people who lived near the Rockies, respondents were asked to assign a price to how much they would accept for having their sky browned out by the pollution from a coal-fired power plant. Over 50 percent of the people said that no amount of money would compensate for the loss of their views and clean air. The question, of course, was foolish, but half of the people got the right answer, although it was not the one economists wanted or expected. They called the results irrational, when in fact it is the coal-fired plant that is irrational. Properly allocated, green taxes produce adaptive economic behavior, and although jobs will be lost as certain industrial and polluting activities are reduced, far more jobs will be created as new processes and technologies are applied and invented to do what technology has always tried to do: create lower costs and more efficiency. With green taxes, rather than becoming more efficient at planetary degradation, we become more efficient at planetary restoration. Rather than lowering costs by harming the environment, we will lower costs by enhancing it.

At this point most economists and policymakers envision green fees as just one more tax, albeit an interesting one with potentially positive side effects, but a tax, nevertheless, placed alongside the thousands of others assessed by government. In the OECD countries, there are already at least eighty-five levies that purport to address environmental issues. They range from charges on wastewater effluents in Germany, Holland, and France, to landing fees on aircraft that exceed certain noise levels in Switzerland, to deposits on automobiles, similar to those for soda pop bottles, that are returned when the car is scrapped, preventing indiscriminate dumping by a roadside. But in virtually all cases, the taxes are low. In Germany, the existing taxes on effluents is equal to $2 per person. Instead of reducing the amount of pollution, these taxes have become a method to finance environmental monitoring and have failed to become an alternative to regulations.

So far, significant levies on pollution and carbon have been opposed by industry because they will mean profound changes in virtually every business in the world. Substantial green fees may improve the quality of life for citizens, but they will gradually make obsolete capital investments in outdated, polluting equipment and processes. In some cases, they may completely eliminate certain businesses. Severance taxes on heavy metals would reduce the need for new mined

metals, but would create in their place companies that would recapture heavy metals from industrial wastestreams (200 tons of lead, for example, are used in hair dryers every year), just as silver is recaptured in the photoprocessing industry. As we well know, there are in the world today industrial companies that destroy habitats, peoples, and health, and any worthy approach to an ecological commerce must have as its agenda the replacement of these industries with endeavors and activities that have quite the opposite impact. A proposal for green taxes whose aim is merely to "clean up pollution" is essentially an agenda for the status quo.

And business, although welcoming change in theory, always fights it initially. The National Association of Manufacturers has stated that it will oppose all so-called eco-taxes or green fees. Weyerhauser opposes any tax on virgin, old-growth timber because it believes it is already doing enough to encourage recycling of wood fibers. Although product cycles continue to shorten and long-range planning appears increasingly luxurious, businesses, particularly large corporations, try to plan as far into the future as they reasonably can. In many cases, investments in manufacturing plants don't make sense unless they have twenty-year lives, at the very least. And the fact remains that business will not be affected by green fees evenly, or in all cases positively. Nevertheless, I believe they represent a change that can reinvigorate commercial enterprise for the good of all. The purpose of having a twenty-year phase-in is to allow equal opportunity for all companies to plan, adapt, and change.

It is time that we stop pretending that industries which degrade and poison are economic or useful. The present vision that informs "economic" activity is so grossly misinformed and out of touch with ecological reality that Lawrence Summers, the chief economist of the World Bank, can issue a now widely publicized memo calling the low pollution in African countries uneconomic: "Underpopulated countries in Africa are vastly underpolluted, their air quality is probably vastly inefficiently low [in pollutants] compared to Los Angeles or Mexico City."

The vision that informs green taxes is dramatically different. It assumes that human beings are enormously adaptive and creative, and that there is great untapped potential and goodwill that is repressed and inactive in our current economic culture. All too often, we have

seen taxes destroy or distort; it is difficult to imagine a tax that actually improves our lives. The tax system has been such a blunt instrument of power that its subtleties and potentially constructive attributes are largely unexplored. It was Will Rogers who pointed out that the income tax has made more liars of Americans than fishing. While we have come to accept that taxes are what we pay for a civilized society, our unexamined and Byzantine tax code may have turned that saying on its head so that today, civility is the price we pay for a taxed society. It is no longer sufficient to call upon our social conscience to justify the present system. The tax system, like all institutions in society, must have a vision and purpose integral to its implementation and collection. Although the imposition of green taxes must come from the people through their government, their overriding purpose is to restore economic scale and decision-making to local and regional levels where it belongs. As the highly centralizing and dominating effects of cheap energy and subsidized resources are eliminated, the competitive advantage of many corporations would be eliminated or reduced. Who needs a nationally advertised beer if the local beer is cheaper, tastes better, reuses its glass bottles, and employs locals? Or who needs imported pink, hard, pesticide-laced tomatoes if the local, hothouse tomatoes are red, ripe, and less expensive? We have to imagine green fees as a way to rearrange the economic game, a way that produces a better result for all. We are so battered by the insults of the existing system that we fail to see how creative are the alternatives.

11

Pink Salmon and Green Fees

Economists measure efficiency in monetary terms and produce extraordinary conclusions, such as the Lawrence Summers memo from the World Bank cited in the previous chapter. Ecologists measure efficiency in terms of thermodynamics and conservation of resources and also reach extraordinary conclusions, ones that conflict greatly with those of economists. Since it is economists, though, who are defining the terms of the argument, it is useful to confront their objections on their terms.

Given the time-honored definition of economy as the careful management of the wealth and resources of a community, we can find many areas of potential agreement between economists and ecologists. First, any time there is inefficiency in the form of pollution or waste, it is uneconomic and therefore more costly. Second, increases in efficiency not only will reduce global warming gases such as CO_2, but also will save money and improve the economy. If our economy was as energy efficient as that of Sweden or Japan, we would have been spending $200 billion a year *less* in energy during the past decade, an amount equal to the average annual budget deficit incurred by the federal government. In other words, putting aside speculation as to

when and how much the environment will be harmed by CO_2, we can proceed with what physicist Amory Lovins dubs a "no-regrets" policy, a program of increasing efficiency and energy frugality that will benefit the economy even if scientific predictions concerning global warming are incorrect.

Such a plan would offer positive economic benefits to those who create greater energy productivity. Today, throughout the United States and the richer industrial nations, the search for productivity and higher profits is leading to massive restructuring and layoffs of workers. Unemployment is becoming chronically embedded at a time when we need to deploy our full talents and intelligence to solving global environmental problems. If sufficient incentives were in place, we might instead be focusing on quadrupling energy efficiency, realizing four times as much work from every kilowatt and calorie, or conversely, deriving the same work using one quarter of the energy. This would not only solve our CO_2 problem, but would also call for a massive increase in research, development, capital formation, jobs, and economic growth. It would benefit northern and southern nations alike, greatly reducing the monies spent in poorer countries on energy, and freeing them to be devoted to critical issues like food, water, health, and infrastructure.

Economists claim that money can measure efficiencies in nature, but if that were always the case, there wouldn't be hundreds of books on how business "efficiency" is harming the environment. The old joke about economists lying awake at night worrying about whether something that works in practice can be made to work in theory certainly holds true for the issue of energy, and in fact for the consumption of all resources. We all live and work in and depend on a world that economists measure by the inadequate standards of monetary efficiency, and thus we are getting strange and incomplete information from economic indicators. When Chairman Rawl of Exxon warns us that if we don't open up the last and largest wildlife refuge in the United States to oil drilling and exploration, "the entire nation will forfeit ... substantial economic benefits," we are not being schooled in classical economics, nor in neoclassical economics, but in Exxonian economics that are at the service of corporate development. The fact is that ceiling insulation and double-glazed windows can produce more oil than the Arctic National Wildlife Refuge at its most opti-

mistic projections, at about one-twentieth the cost, with four times the employment per unit of energy conserved versus the energy consumed by burning oil. When, in 1976, Amory Lovins first published his *Foreign Affairs* article entitled "Soft Energy Paths," describing how the economy could grow and use less energy at the same time, he was viciously attacked by experts, including one from Exxon. At a Senate hearing, one scientist warned that "Should this siren philosophy be heard and believed, we can perceive the onset of a New Dark Age." As it turns out, Amory *was* wrong: He underpredicted the possible energy savings, and has since topped his own best-case scenario as to the possible efficiencies that could be achieved. Yet we still find ourselves in a combative phase in which experts and industry representatives continue to warn us gravely that we must accept a compromise between saving the environment and guaranteeing our economic future.

What is good for Exxon is not necessarily good for the economy or the country, and our challenge is to restore a symmetry so that the "natural" inclinations of business institutions such as Exxon benefit everyone, from now until long into the future. It is understandable that the dichotomy exists, that there is disagreement during this chaotic transitional phase between industrial and restorative economics. But we cannot stand still or go backward. All appeals to return to business as usual, as if the only obstacles preventing prosperity and growth were environmentalists, bleeding hearts, and nasty regulations, are as short-sighted as they are ultimately self-destructive. We must reunite the concept of efficiency to include both natural and human communities, a union that is inherent in the true concept of economy, but has been set aside in its present practice. Because efficiency should be the common ground between economics and ecology, it represents the bridge to a restorative economy.

Of all the possible green fees, taxing energy would be the most fruitful and beneficial, and it would provide the greatest short- and long-term benefit. A tax on the carbon content of fuels is a green tax that raises the price of energy sources proportionate to their emission of carbon, thereby providing users of those fuels with positive incentives to switch to more efficient combustion methods and, where possible, to less polluting forms of energy. These green fees are opposed

by industries that directly distribute or depend on these fuels, but are supported by unrelated parties who see their imposition as a positive way to improve the environment and save money.

The main purpose of energy or carbon taxes cited by its proponents is to reduce CO_2 emissions and to respond to concerns about climate change and global warming. Of the nearly 22 billion tons of carbon dioxide released into the atmosphere worldwide every year, one-fourth is generated by the United States, with only 4 percent of the world population, so a change in policy in this one country, even if other nations do not go along, would have great benefit. There are many other advantages as well. A study of the economies of Japan, the U.S., the erstwhile U.S.S.R., and the E.E.C. in the period from 1976 to 1990 showed that economic performance was directly correlated with energy prices. The more costly the price of resources, as in the case of Japan, the greater the technological innovations and economic growth. On the other hand, where energy and resources were subsidized and below market value, as they were in the Soviet Union, economic growth and innovation lagged significantly behind. The U.S. outperformed the U.S.S.R., but did not best the E.E.C., which has taxed energy to significantly higher levels than the U.S. but not as high as the Japanese. This correlation should come as no surprise, since it is higher prices that goad and urge companies and individuals toward better design and more efficient technologies and systems.

While carbon taxes will initially lower CO_2 emissions by greatly increasing energy efficiency, their ultimate purpose is the replacement of carboniferous fuels with sustainable, clean-burning energy sources that do not vitiate the dynamics of our atmosphere and climate. The timing of the imposition of the tax is one of the foremost concerns about it. If the taxes on energy should go up overnight (as they did, in effect, during the oil embargo of 1973), they cause inflation, dislocation, and chaos. But if green taxes on energy are applied over a twenty-year period, producers and consumers have ample time to adapt, plan, and reinvent. Green fees on energy should gradually rise to the level where it is less expensive for individuals and industry to rely on alternatives to carbon-based fuels. Wind, water, and solar radiation provide permanent sources of energy, and they will always be available, while coal, oil, and gas are in finite supply. Fossil fuels are useful but too damaging to be squandered out of exhaust pipes and

smokestacks. Furthermore, they give us a false and deceptive view of our carrying capacity with respect to the environment. No business in the world can long survive on its capital reserves. Every businessperson understands this, yet many ignore the fact that this same principle applies equally to energy and the environment: No culture will long survive drawing down its energy capital, and so any worthwhile green tax will eventually halt the depletion of the world's resources. The task in energy, as in food, clothing, and shelter, is to create an economy that lives off of current income, not capital resources. Thus, the purpose of green taxes is to raise the economic stakes to the level where we cannot afford to live off of capital—where it simply becomes prohibitively expensive to deforest, degrade, or destroy the environment.

Although we cannot or need not capture all of the energy that arrives every day from the sun, we can harness more than enough to meet our present and foreseeable needs, as long as those needs do not continue to involve a runaway, frenetic world of cars, planes, commuting, and travel. Relying on solar energy does not eliminate all waste, but it eliminates the bulk of CO_2 buildup in the atmosphere, as well as most of the smog and air pollution. Solar energy does not pollute, does not cause asthma and emphysema in the L.A. basin, does not destroy the forests of Europe or the northeastern United States with acid rain, does not run aground and spill into the ocean, does not seep into groundwater, pollute rivers, or create Superfund sites. These and other costs are what is missing from market prices when you pump your gas, turn on your heater, even buy your food. By relying upon an economy based on cheapest and lowest price, and in effect promising that more people can have more things, we will absolutely create a world where we will have less and less, and the imbalances between rich and poor will continue to grow more pronounced and inequitable.

We must go further than merely levying a carbon tax on energy, and issue significant green taxes on hydrocarbon-based chemicals, replacing them with processes derived from organic, non-polluting, renewable resources. This measure will ultimately help to eliminate most of the toxins in our food and water and the ozone-destroying chemicals in our atmosphere. To continue to defend the hydrocarbon industry in light of all that we know about environmental degradation is tantamount to defending the typewriter industry by stalling the

introduction of computers. As it turns out, the computer industry was given its impetus by the military and defense industries. Perhaps when we recognize that the ultimate threat to human health and existence posed by our current energy policy is as great as what we faced during the Cold War, we will marshal the same intelligence, engineering, and innovativeness that was responsible for developing computer technologies to begin restoring the earth. To establish a twenty-year time frame to work toward these objectives would be the most dynamic and stimulative economic program the United States and the world could ever embark upon. Two decades allows sufficient time to amortize all present investments in oil and coal-based systems, whether they are energy-generating or product-based.

From a strategic point of view, the choice is clear. Whenever you are faced with two different paths, each with its certainties and unknowns, the cardinal rule in strategic planning is to take the path that allows you to shift to the other path should your initial decision prove wrong. As futurist Peter Schwartz advises in his book *The Art of the Long View,* choose the option that gives you the most options in the future. Even granting status-quo defenders their argument that we know too little about global warming to warrant changing from a hydrocarbon- to a solar-based economy, even granting them their dream that technology will come up with ingenious ways to solve many of the problems with the innate toxicity of hydrocarbons, maintaining the present course is a mistake.

If we continue on the same path and find out forty, fifty, or one hundred years from now that the scientific projections about global warming were correct, it may be too late to mount an effective counter-strategy. On the other hand, if we choose to make the transition to an economy that runs on perpetual solar income and we later find out the CO_2 buildup was less a problem than anticipated, we are still ahead on every count. We have eliminated hundreds of billions of tons of pollution from the air, ground, and water, and improved health worldwide. We have engendered a myriad of new, safer, and friendlier technologies to replace those deposed. We have not poisoned the planet or our bodies with the toxins produced in a hydrocarbon-based economy. We have created hundreds of thousands of new companies and many more jobs than we lost, while moving toward a world whose work and money are infused with meaning and vision, toward

a just and constructive future. Plus we will still have all of the coal and oil that we didn't burn up, extending the life of current reserves far into the future of humankind.

The conversion to solar-based energy and other energy-efficient technologies is not a pipe dream. Using existing technologies, we can reduce present electrical consumption by 75 percent in homes and industry. Cars exist today that get nearly 98 miles per gallon, and cars on the drawing board can get as high as 200 mpg. A company called Southwall makes windows that gain heat when placed on the north side of a building in a Saskatchewan winter. We can build houses that require no internal heating devices whatsoever. Already homes in Canada are being built that use one-tenth the energy of an American home. New thermoacoustic refrigeration technologies, although not fully developed, not only eliminate the need for CFCs but also reduce energy use.

The Council on Economic Priorities reported in one study that investment in energy-efficient technologies produces four times as many jobs as building new power plants. Photovoltaic and wind-based energy systems produce two to five times the number of jobs as coal-fired or nuclear power plants. Wind farms, which initially were five times as expensive as nuclear power plants in cost per kilowatt, today generate energy at prices equivalent to those of coal and nuclear plants, and by the end of the decade should be generating electricity more cheaply than any other source except for hydropower.

If we remain true to the concept that green taxes are revenue-neutral, one of their benefits is that while the prices of polluting forms of energy prices are going up, income taxes are coming down at the same rate. The estimated cost of a $100 per ton carbon tax, given existing rates and types of fuel consumption, would range from 3.7 percent for the lowest income quintile, to 3.4 percent for the middle quintile, to 2.5 percent for the top 20 percent of the population. Since a truly equitable green tax would favor the lowest income brackets, those who would be more greatly impacted by higher energy prices would not suffer any loss of real income. For example, a person earning $30,000 a year pays $5,600 in taxes and approximately $1,100 in combined energy costs, including gasoline, heating, and electricity. If energy prices doubled to $2,200 per year, income taxes would drop by the amount of that increase, $1,100. The lower income brackets would have the same

amount of income even if they consumed the same amount of energy as formerly, but they would also have positive incentives to reexamine their energy choices. In such a case, when a person begins to explore alternative means to conserve energy, he is not merely reacting to price increases but seeking ways to increase his real income. Even in today's suppressed energy market, the real return on a compact fluorescent light bulb is between 20 and 30 percent a year. With a doubling of energy prices, the return nearly doubles as well. If Joe Six-pack still wants to buy a 400-horsepower Evinrude to power his cigarette boat across the lake, he can do that, but it will be expensive.

The EPA commissioned a study to examine the effects of a $15/ton carbon tax rising 5 percent per year until the year 2010, and found that if the money were used to cut income taxes, it would reduce economic growth $870 billion during that period, whereas if the money were used for investment tax credits, it would result in additional GNP growth of $2.6 trillion. Without examining the assumptions of the study, we can assume that small moves in the direction of green taxes are half-measures that would result in few if any of the benefits possible. In a separate study, the EPA announced that carbon taxes of $100 per ton would be necessary just to stabilize existing levels of CO_2 output at 1990 levels. (The average American generates 44,000 lbs. of CO_2 per year. A $100 per ton tax would cost $2,200.) The problem with raising carbon taxes to $15 per ton and rebating them back to the consumer is that we are talking about $27.50 per month per person—what most people pay for one month of cable TV or a carton of cigarettes. Those levels of price increments are already present in the background noise of commodity fluctuations as they ripple through the economy, and with such a meager effect on their economic circumstance, people could not be expected to change their behavior or have an incentive to invest in their own energy productivity. Thus, when green taxes are held to very low levels, they cannot have a stimulative effect. Only when green fees dramatically change the cost relationship between sustainable and nonrenewable resources will they be effective.

Green taxes on energy will also mean higher prices for industrially produced food and thus will enfranchise the local and family farmer, a goal of every presidential administration since the beginning of this

country. The main advantage of agribusiness is almost always the efficiencies gained by substituting industrial practices for traditional stewardship of the land. Big business knows only how to practice farming with technological applications of intensive energy through the use of machinery, chemicals, pesticides, and automated processing. But what is best for the High-Tech Carrot Company is rarely if ever best for society, for it produces cheap carrots in every sense of the word: Cheap in taste, cheap in the way the process degrades and mines the soil, and cheap in the way it disregards the needs and rights of workers to labor in safe and wholesome environments.

What we call "efficient" in agriculture is usually a process that substitutes fossil fuel in its myriad forms for human labor, displacing workers and families while causing widespread and lasting ecological damage to soil, water, and wildlife. When I was a child, the San Joaquin Valley was a young naturalist's delight. You couldn't drive at night without your windshield becoming a bug collection. Frogs and toads were everywhere, mockingbirds cavorted raucously outside my bedroom window, and fingerlings poured into the irrigation tanks on Wednesday afternoons when we got our share of the local water. That Valley is now ghostly, devoid of much biota, replete instead with cancer clusters and toxic waste dumps of partially used containers of pesticides and chemicals. Your windshield stays too clean at night. To say that chemical farming is efficient is to ignore the topsoil turning to hardpan, the ground levels collapsing above mined-out aquifers, the white salts glistening on the surface of the land. The most truly efficient farm is the one that most effectively internalizes all of its costs. This is a farm that builds up topsoil, that uses water sparingly and thriftily, that uses pesticides rarely if at all, that understands that the secret to healthy plants is healthy soil, not deadly chemicals. Thus, not only should energy use be taxed more heavily, but so, too, should all agricultural chemicals, from artificial fertilizers to toxic pesticides.

Farms are our most direct link to life. They feed, sustain, and nurture us. When they have to charge customers "extra" in order to sustain and nurture the soil, then something is radically wrong. As it stands now, people employing sustainable methods of agriculture need to charge more in order to make a decent living, since they compete as they do against producers who are efficient in externalizing costs. Green taxes on energy and chemicals will reverse the disincentives to

use sustainable methods of agriculture, and will promote widespread use of existing benign methods to control pests and increase yields, while providing existing chemical companies with incentives to go back to the drawing board and invent farming techniques that improve yield *and* enhance life. Most of the fertilizers and pesticides employed today are used on crops produced in overabundance and thus fall under the government subsidy programs that provide price supports for their overuse. Thus our taxes are being used not for restoration, but to subsidize environmental damage. Nitrate runoffs from artificial fertilizers pose serious threats to our water supplies; they are the main cause of eutrophication in lakes and rivers. According to the Science Advisory Board to the EPA, pesticides, herbicides, and fungicides applied to our soils and foods pose the greatest environmental threat to American citizens other than the global threats such as ozone depletion, global warming, and overpopulation.

If green taxes level the playing field for farmers and provide positive incentives to break chemical addiction, then the lowest-cost foods in the marketplace will in many cases be the highest-quality foods. The marketplace will be restored to its oft-praised purpose in life, which is to sort out the winners and losers. The winner will be the farmer who best takes care of his or her soil, animals, and posterity, not corporate entities that are essentially mining and extracting fertility for short-term gains.

Returning to sustainable, traditional farming practices will be expensive and difficult for large companies that now rely on chemical, energy-intensive means of production. When making the switch, the cost savings come later, while the crop reductions come first. In the current system, food is inexpensive because the cheap prices come first, and years and decades later we pay the true costs in erosion, toxic wells, and poisoned life, including our own. In the upside-down and inverted logic of the present economic system, we cannot imagine that there is a point where something is too cheap. America is proud that its citizens pay the lowest percentage of disposable income for its groceries, but as the man at the farmer's market always tells me, you get what you pay for. Imagine, if you will, paying 20 percent more for your food than you do now. Then imagine that the 20 percent is essentially credited back through reductions in income tax. Now imagine more family farmers, healthier food with less or no toxins on

or within it, more gainful and meaningful employment in rural areas, and greater access to a wider variety of fresh foods. The revenue-neutral nature of the green taxes will assure lower-income people that they will have not less income, but better-quality food. It seems unfair if not unjust that the only people who can now afford foods grown without toxic chemicals are those high on the income chain, who derive the greatest amount of money, indirectly or directly, from the economy of degradation.

Consider another situation ripe for green taxes: road congestion. In the San Francisco Bay Area, after decades of building freeways and bridges, the average speed of travel is 15 miles per hour during rush hour. In southern California, it is considerably less. Hardly a person who sits in a traffic jam has not considered the costs involved in fuel, time, and stress. The World Resources Institute estimates that Americans pay an extra $300 billion per year in expenses directly related to our over-reliance on the automobile. One study estimates that by 2005 Americans will waste almost 7 billion hours a year sitting in stopped traffic, at a cost of over $75 billion. Add to that the extra fuel use of 7.3 billion gallons and wear and tear on autos, and another $40 billion is lost. Accidents increase in tied-up traffic, adding to the yearly bill some $275 billion in vehicular damage and medical costs. These figures do not take into account the effects of smog, acid rain, or personal stress.

Rush-hour commuters on congested highways are participating in a market system that does not fully reflect these costs. In fact, it would be hard to design a less efficient "market" than the present urban interstate system, precisely because, again, the true costs of traffic stoppages are externalized throughout society. If tolls were placed on highways to account for these costs, automobile usage would drop, traffic patterns would change, revenues would increase, and congestion would be reduced.

A variation on automotive green fees is a proposal by financial author Andrew Tobias and the National Consumer Organization for California to charge for auto insurance at the pump as a tax per gallon. The "pay at the pump" plan would charge anywhere between 30 to 50 cents additional per gallon, a fee that sounds high until you compare it to what insurance actually costs a driver in California. When the average driver divides their annual premium by the number of gal-

lons of gasoline purchased in the year, it comes out to be 85 cents per gallon. By charging a fee at the pump, the plan would cut auto insurance costs by anywhere from 30 to 40 percent. The reductions would come in three areas. First, every driver would be insured. At present, an estimated 20 percent of California drivers are uninsured, in most cases owing to the high premiums. Second, the proposal would institute a no-fault system that would eliminate expensive litigation. Third, a 20 percent savings would be gained by eliminating the need for salesmen and advertising. All policies would be pooled in 5,000 driver lots and sold to insurance companies in bulk. Because it is in effect an "energy tax" as well, it would reduce driving and promote efficiency at the same time. In 1993, in the first legislative session in which the plan was introduced, it was defeated in committee by a vote of eight to one by a group of legislators representing a variety of special interest groups, including trial lawyers and the insurance industry.

Green taxes can be applied to a wide variety of resources, products, and processes. Products that cause distinct, identifiable, and long-lasting damage should at least pay their way. These include cigarettes, guns, ammunition, and alcohol. Tobacco use alone costs society over $60 billion a year in health costs and in lost income and productivity. These are costs we are now bearing in increased medical bills, taxes, and reduced economic performance. Taxing tobacco to take on some or all of that $60 billion doesn't "cost" more, it simply shifts the costs to the marketplace, where everyone can see them, and where the person incurring the expense to society pays for his or her impact on the rest of us. When tobacco is taxed, it has second-order positive effects that are not calculated in the $60 billion costs. For example, 35 percent of all house fires are caused by cigarettes. These fires result in great losses to life and property, and they are greatly abetted by the fact that tobacco companies put chemical additives in cigarettes to prevent them from going out, making cigarettes far more dangerous than cigars or pipes.

A more rational and constructive world would use green taxes to slow if not eliminate the arms race. The world is confronted today with the irony that countries can always find money for war but peacemaking is rarely budgeted. More than half of all Third World debt is directly attributable to the purchase of weapons from the richer countries of the north. According to Jason Clay, former head of Cul-

tural Survival, global arms sales are feeding a vicious cycle of debt and exploitation. Many of the arms that are being purchased by poorer nations are used to take over and exploit the resources of indigenous cultures, such as the forests of Penan in the Malay Peninsula. Countries that import arms in order to free up resources for export and hard currency are forced by popular resistance to increase their military expenditures, resulting in higher external debts, which in turn force them to further exploit resources to increase their export sales in order to service their debt. For example, since 1955, Somalian export of livestock—sheep, goats, and cattle—has increased ten-fold. Pressure for hard currency has led to a breakdown of the traditional nomadic system of grazing, leading in turn to soil erosion, topsoil loss, food shortages and ultimately starvation. Under the auspices of the United Nations, an international tariff could be levied on weapons makers worldwide. A tax on their output of missiles, planes, tanks, and guns would provide the U.N. with its entire budget, as well as pay for all peacekeeping efforts around the world, including the resettlement of refugees and reparations to the victims of war. A high tax would not only send an economic signal to countries, but also would ideally provide strong incentives to reduce arms purchases. The world must recognize that the suffering caused by weaponry is always greater than the economic "gain" derived from its sale.

Green taxes can revolutionize an economy toward evolving natural systems of production and design. They are more complex than the "polluter pays" concept, although in many cases they will have that result. Because they would be instituted over a twenty-year period, no business or industry would be unjustly singled out or penalized. Every company affected, directly or indirectly, would have ample opportunity to reconsider and redefine its business, if necessary. It would have time to plan, to invest, to invent, and to innovate. At the same time, consumers and workers would be freed from the tyranny of inefficient markets and would begin to integrate their actions in the workplace and in the home toward positive and constructive changes in the world.

When integrating cost and price into the marketplace, we are essentially substituting positive feedback loops with negative ones. Remember that a "positive" feedback loop keeps reinforcing activity

or behavior that is not in the interest of the party acted upon. It is the systems equivalent of a vicious cycle, a series of feedbacks that keeps telling us to do the wrong thing. Negative feedback loops, which are ubiquitous and omnipresent in nature, allow an organism to continuously adapt and respond to different inputs coming from its immediate environment, whether those inputs are threats, drought, rain, heat, or a bumper crop of grass. Any ecological model of commerce must not only mimic nature in recognizing that waste equals food, running off of current solar income, and protecting diversity, but it must also have firmly and clearly in place feedback that allows it to recalibrate constantly and quickly adjust its costs, supply, and demand. Instead of following the cyclical paradigm, most of our resource businesses today are linear systems that by their nature receive and give out the "wrong" information to themselves and the greater environment.

The way to change from a linear system with respect to raw materials and resources is to use some form of public utility to regulate their supply and production. If innovatively designed and established, such utilities would be far more effective than current market mechanisms in seeing to it that supplies of resources, whether privately or governmentally owned, are harvested and extracted in ways that ensure the long-term viability of a given ecosystem, in the case of renewables, or that the most efficient alternatives are sought, in the case of nonrenewables. I believe that a community or regional utility is a feasible control mechanism to oversee any industry that takes resources from the natural world—what we often refer to as the commons.

Biologist Garret Hardin's now-famous metaphor for the deterioration or "tragedy" of the global commons begins with the notion of a pasture open to everyone in a given village. In such a situation, the herder who overgrazes the most benefits the most, and the person who grazes a herd that consumes only his "share" of the pasture's yield is effectively penalized. But eventually the entire pasture deteriorates. In this case, when overgrazing becomes the "rational" norm, you are punished for doing the right thing, rewarded for the wrong, and all suffer in the end. This outcome fulfills what philosophers going back to Aristotle have foreseen: "What is common to the greatest number has the least care bestowed upon it." Hardin's pasture, however, is not technically about a commons, but an "open access" system where

anyone is free to take as much as they want. Commons have historically been extremely well controlled and regulated by the communities to which they belonged; not until colonization and industrialization have they been widely degraded and destroyed.

Nevertheless, the solution to Hardin's dilemma of a deteriorating open access system would be a pasture utility, one that operated independently of the specific grazing and herding needs of the villagers. The utility would be managed to maximize income from grazing fees, and therefore would have no economic interest in overgrazing, since any form of degradation would reduce the value of the utility to its owners. The pasture utility would monitor usage by grazers so that income was maximized. The utility would pay careful and constant attention to yield, growth, rotation, and fencing. The commons would not deteriorate under such a guardianship, and the natural predilection to overgraze would be thwarted.

The pasture utility is a useful model for a mechanism to guard our own commons, whether local or global. Such a utility can maximize the strengths of both the private and public sectors, without succumbing to the failings of either. Utilities are hybrid enterprises because they combine two unusual features. First, they are regulated by their constituencies through public utility commissions or other forms of public sector input. In return for accepting regulation, they are given monopolies and are guaranteed a certain level of profit. In other words, by allowing some form of public control, they receive a guaranteed return on their investment, a relationship that allows them to create and execute long-term projects, and attract capital while paying low interest rates.

Of course, power utilities can be poorly managed. For decades after the Second World War, many constructed nuclear power plants that had escalating and hidden costs, but they now have unique opportunities to do the right thing, and many are doing just that. Using conservation rebates, many utilities have discovered that it is far less expensive to invest in technologies that save energy for the consumer than it is to invest in new coal or nuclear-fired power plants. This realization of Amory Lovins's "negawatt" concept is possible because utilities can strike a deal with regulatory agencies, allowing them to "make money" on the energy saved, demonstrating that conservation rebates are a win-win strategy and lowering rates for the cus-

tomer while raising returns for shareholders. These utilities are probably the first corporate bodies that have invented a means to increase profitability by not growing, a paradox made possible by the fact that electricity derived from conservation costs only one-fifth to one-tenth as much as electricity that comes out of a new power plant. It is those savings that are being split between the customers of the utility and its shareholders. The utility, by granting credits, by selling energy-efficient lightbulbs at cost, or by promoting efficient electrical motors and super-glazing, is essentially selling the absence of energy—thus the term "negawatt"—turning a profit, and improving the environment all the while saving their customers money.

Many resource systems in the world are presently over-exploited and could benefit from becoming a utility that is publicly regulated, privately managed, and market-based. Consider the benefit of a salmon utility on the Pacific Coast of the United States. The decline of the salmon population in the Northwest over the last century has been largely unabated, despite the tax-supported efforts of fish and wildlife agencies on both the federal and state levels. The legendary run of one-hundred-pound king salmon on the Elhwa River of Washington is now only a memory, for the fish are extinct. Only four sockeye salmon completed the run up the Snake River in 1991. In Oregon and Washington, over 200 of the salmon runs on the Columbia River are extinct, with another 76 soon to follow. In California, Idaho, Washington, and Oregon, salmon runs on 88 rivers are now extinct. Each stream, brook, and tributary affected was the home to a unique host of wild salmon whose genetic makeup was perfectly suited and adapted to its particular habitat. Hatchery fish do not solve the problem. They are to wild salmon what domestic chickens are to snow geese—stupid, herdish, and maladapted. In some cases, the strange and erratic behavior of hatchery salmon drives away wild salmon. In the Pacific Northwest, over $1 billion has been spent on salmon recovery in the past ten years, an effort that has not stemmed the decline in overall salmon population. Biologists now conclude that this attempt at renewal has failed because it did not focus on the cause of the salmon's decline: habitat and ecosystem degradation.

Anadromous fish populations such as salmon require unsilted, pristine riparian environments in order to breed successfully. Snags from logging, shampoo in stream run-off, and all-terrain vehicles are but a

few of the products and activities that have destroyed their habitat. Dams, pumps, upslope clear-cutting, and run-offs of fertilizers, pesticides, and herbicides don't help either. Those whose livelihood depends on salmon—fishermen and dealers—have had little say in policy decisions that brought about this depredation.

A salmon utility would recognize that existing market mechanisms do not operate in the best interest of the fish, the fishermen, the consuming public, or the salmon habitat. To support the utility, there would be a fee on salmon landed on the Pacific Coast. Those revenues would go directly to a central Salmon Utility or a number of smaller regional salmon agencies, whose sole purpose would be to increase the stock of salmon. To do this, the utility would spend its funds primarily on habitat restoration, but also on education, land acquisition, if necessary to protect key habitats, and research. As a utility, it would be allowed a guaranteed profit of 10 to 12 percent depending on performance. The salmon utility would issue stock just as a power utility does, but given its guaranteed revenue flow from the salmon tax, it would also have the capacity to issue bonds at favorable interest rates, which could be used to invest in long-term restoration projects. Because the corporation would be limited in its profitability, it would have the incentive—actually the requirement—to invest 88 to 90 percent of its revenue on a yearly basis into restoration. The long-term result of such a utility would be the increase of wild salmon. This increase would in turn bring in higher revenues that would give the utility even greater capacity to carry out its agenda. Without the power of eminent domain, it would not pose a threat to any existing agency or constituency. It could enforce already existing laws, and work with forest companies, farmers, ranchers, and other interests on a collaborative and cooperative basis. The increased yield in salmon would be a boon to fisherman as well as to consumers, since it would prevent prices from rising as they do when resources dwindle.

The salmon utility could have many spin-off benefits, such as helping fishermen create a pooled pension fund for themselves that could then be invested in the stocks and bonds of such a utility. It could hire disadvantaged youth from inner cities and educate them in biology, botany, and resource management techniques. Huey Johnson, the former head of California's Department of Natural Resources, estimates that such an agency could employ as many as ten thousand

people, but this would end up costing the consumer or taxpayer nothing, because of increased supply and stable or lower prices. In fact, it would generate tax revenue for the state as well as remove people from the unemployment rolls.

Consider how an oil utility would respond to issues as diverse but connected as the Arctic National Wildlife Refuge (ANWR) and automobiles. The current investment in ANWR is expensive, requiring $40 to $60 billion for an estimated six-month supply of oil. The Interior Department estimates concerning the economic viability of the ANWR reserves are based on companies receiving $35 to $61 per barrel over the next twenty years, about twice the present market rates for oil at the outset and rising to three and four times current rates. If oil companies are successful in finding, drilling, and extracting oil in ANWR—and the odds are considerable that the amount of recoverable oil is substantially less than forecast—there is the risk of widespread ecological damage, if not disaster, as Lovins has described: "Leasing in the Arctic National Wildlife Refuge has an 81 percent chance of finding no economically recoverable oil; a 19 percent chance of finding oil averaging a six-month national supply; a 1 percent chance of a year and a half's worth; and a 100 percent chance of trashing the refuge. If odds of so little oil are 'vital to our national security,' why cut new-car standards from 27.5 to 26 miles per gallon—thus wasting more oil per year, with 100 percent certainty, than unlikely success in the Refuge yield?" In addition to the efficiency issue, predictable and familiar environmental problems can be eliminated by this approach. Over 90 percent of the storage pits at Prudhoe Bay, Alaska, violate EPA regulations for toxins, heavy metals, and carcinogenic contamination of wetlands. Twenty-three thousand oil spills have occurred there since exploration began in the tundra. The increase in caribou population cited by oil companies as proof of the benign environmental effect of Arctic drilling and exploration is due to the hundreds of miles of new roads that have given hunters ready access to the bear and wolf populations, predators of the caribou.

Given the expense and environmental dangers of ANWR, an oil utility would follow the example of power utilities and "invest" its money more wisely. It would offer conservation rebates to persons buying high-mileage cars. It would buy back gas guzzlers to get them off the road. It would encourage, not oppose, legislation mandating

higher fleet mileage for the auto industry. It would lobby for legislation (first proposed by Lovins) to give conservation "feebates" as an incentive to new car customers who purchase high-mileage cars. Under one proposal, the gas-guzzler tax would be levied on poor mileage cars and feebated back to the efficient cars. For example, if the overall fleet mileage for the auto industry is 25 mpg, cars getting 15 mpg would be taxed an extra $2,000 that would then be feebated to the buyer of a car getting 35 mpg or more. The levels at which customers would be either paying or receiving feebates would change every year as fleet mileage increased, encouraging the purchase of more economical cars, a process that would create an automatic market mechanism to improve fuel economy. Another type of feebate would provide that the greater the difference between the mileage of your old car and the new one, providing your old car is to be scrapped, the greater the rebate given.

If by these and other means an oil utility could receive a return from energy saved rather than energy produced, as electric utilities presently do, then the proposed ANWR investment, if applied to efficiency and conservation, would produce several times as much energy as is now projected, with the additional benefit that we would still have all the oil if ever needed at a later date. By Amory Lovins' calculations, the United States has two vast, as yet largely untapped, oilfields greater than any we have yet discovered. Together they can produce 5 million barrels of oil a day for the indefinite future, at a cost of about $7 per barrel. Oilfield #1 is largely based in Detroit and is created by scrapping old cars and exchanging them with high-mileage replacements. Oilfield #2 is spread around the country and consists of weatherization and insulation of attics, walls, and windows.

Green fees on oil could be rebated back to the utility based on the efficiency achieved by its investment in conservation. In other words, if the oil utility, or a consortium of oil companies conducting themselves as a utility, spent $10 billion on conservation in a given year, they would be allowed to receive the revenues from a fee or green tax that would not only repay their investment but give them a share of the profits earned from conservation by consumers and the environment, just as was the case for the electric utilities. Since they would be held "accountable" for the energy saved for the expenditure made, they would have every incentive to seek out the most effective means

to spend the money, as their return on investment would be dependent on this calculation. We might even find that well-managed companies such as Shell and ARCO would want to assist and cooperate with General Motors so that 100 mile-per-gallon cars could get on the road that much sooner.

An example of one industry "investing" in another is the case of a consortium of U.S. utilities that announced a $30 million "golden carrot" to be given to the first company that could produce and manufacture an affordable refrigerator that would require only 350 to 550 kilowatt hours of electricity per year. Most models today use about four times that amount of energy. An energy-efficient refrigerator operating over a year would save two and a half barrels of oil, or 1,200 pounds of coal, or 13,000 cubic feet of natural gas. It would also save a consumer about $100 per year, the cost of a new refrigerator every five years. The EPA estimates that with widespread use of such refrigerators, the country would save the equivalent of 10 million barrels of oil per year. With the new refrigerators, utilities would increase their profits under formulas that allow them to increase their rates for existing electricity when they decrease volume because of conservation or efficiency.

Just as Lovins invented a market for "negawatts" for electric utilities, a market for "negabarrels" is waiting to be devised. As things presently stand, some of the most powerful corporations in America predictably oppose higher mileage standards for automobiles. We not only need these corporations to cease their opposition, but we also must construct a market mechanism that gives them the incentive to enthusiastically support such measures. After all, if an oil company can continue to grow and profit through conservation while holding onto its reserves, it has the best of both worlds. If it does so through rebates, feebates, credits, and incentives, it makes them a willing collaborator in a sustainable future. For over a century, thoughtful commentators have winced at the prospect that business will do whatever it can to make money—if necessary, even skirting the borders of propriety and law. Why not have business skirt the borders of restoration, conservation, and sustainability? Same impulse, different playing field.

Each of these hypothetical utilities addresses a critical issue in our economic life. While we derive a great deal of wealth from natural resources, we have not found an effective way to reinvest in or pre-

serve that wealth. We are losing those resources, because they are either controlled by private corporations or by the state, and neither has proved successful in establishing long-term strategies for ensuring the enduring well-being of the commons. Governments the world over give resources to corporations that are not required to take care of them, and therefore do not. The reason, as discussed in the previous chapter, is the failure of the market to internalize fully all costs. If the market is rewarded for externalizing costs and extracting wealth, then individual producers can be expected to leave to the state, wherever possible, the job of restoration and clean-up. On the other hand, it is quite impossible for a state agency to maintain ecosystem health when its main function is to deal with aftermarket degradation. When you then compound the problem with revolving-door relationships between regulatory agencies and the very enterprises they are supposed to monitor, the viability of the ecosystem is hardly a primary concern.

To argue today that the free market should control the extraction and sale of natural resources ignores the state of the commons and the free market. The market works to the benefit of the whole of society when it includes *all* costs and benefits. Only when the market accurately reflects the replacement costs of a resource (a virgin forest or salmon or Arctic oil) and the social costs of its consumption (tobacco being the most obvious) will society begin to respond to the market in a rational way.

In the end, green fees and green utilities cannot function effectively if we continue to promote free-trade agreements that reward companies for externalizing their cost overseas. Business continues to push for programs and laws that maximize current means of production, continue despoliation, and expand their markets. At present, the GATT and NAFTA agreements are little more than thinly veiled blueprints for the expansion of trade by multinational corporations. They have little to do with small businesses, community concerns, or cultural diversity, and only in passing do they consider the environment. Restraints will be removed both in regulations and tariffs, giving these corporations free rein to seek production where they can get the cheapest resources and labor. The net effect is that the world becomes a large, non-union hiring hall, with poorer countries lining up for plum investments, willing to donate land, resources, environ-

mental quality, and cheap labor as their cost of achieving economic "development." The main accomplishment of both agreements is to extend to those companies that can afford to go overseas and that have markets sufficiently large to justify that expense the ability to continue to externalize costs onto human and natural communities. The biggest companies are rewarded for seeking the lowest common denominator of cost. The prospect of approval for both agreements is being paved by the promise of more jobs. But while there are certainly more jobs in America today than there were thirty or forty years ago, the fact is that chronic unemployment has increased dramatically over the past twenty-five years while world trade has essentially quadrupled.

Similarly, no program of green fees to create balances in the marketplace will be effective if companies can circumvent them by bringing in products from overseas. If corporations are sincerely committed to environmental restoration, as so many claim to be, they will reverse current regulations and propose a new tariff status called Most Sustainable Nation (MSN), replacing Most Favored Nation (MFN). This status would grant low or no tariffs to countries that practiced sustainable harvesting of resources, that did not despoil the environment, that did not allow worker exploitation, that did not have corrupt government officials selling off tribal forests to the highest corporate bidder. Such countries would be given the freest access to western markets. Nations that continue to harm peoples and ruin lands, would be penalized by significantly higher tariffs that would reinternalize those costs that they thought were being saved by taking social and economic short-cuts. Their products would become uncompetitive, and they would have little incentive to continue industrial degradation. Critics would argue that such tariffs represent unreasonable interference with the internal affairs of other nations. The counter to such criticism is the fact that environmental degradation is no longer "internal." Environmental problems, although local in origin, have become global in impact and have to be addressed on both levels.

The European, North American, and Japanese markets are the richest in the world. Nations need access to them in order to survive and grow. Under a Most Sustainable Nation tariff system, countries following environmentally and culturally sensitive practices would be the ones to prosper. Rather than imitating the colossal excesses of the

newly industrialized countries that have nearly destroyed their environments, poorer nations would have every incentive to learn from countries that are able to integrate economic growth with the mission of social responsibility and environmental sustainability. Costa Rica would be an economic model, not Taiwan.

If people effectively change their consumption habits to avoid green taxes, where does government get its money? There are two answers to that question. First, everyone hopes that government itself would find a better design, one that does not require so much money and that over the years would diminish the size of government precisely because it has done such a good job in organizing its relationship to the people it serves. Second, green fees would have to be recalibrated as time goes on, (not to reduce them, but to maintain the flow of monies into government coffers). In other words, they are the mechanical rabbit that the economy continuously chases. The fees would be constantly evolving. As we reduce pollution or resource usage in one area, thus reducing paid-in fees, we would have to institute new fees to replace them. What this means is that the economy also is continually evolving. There is no equilibrium point. Like nature, it will be dynamic and restorative.

12

The Inestimable Gift of a Future

It is difficult, if not perilous, to propose solutions to global problems. As Wendell Berry put it, "Properly speaking, global thinking is not possible." In fact, it is the arrogance of that thinking which has created many of the problems we have today. Simply stated, why should any person, group, or commercial enterprise have the right to intrude upon or interfere with the natural and orderly life of other cultures or bio-regions? This is a question the conquistadors should have asked themselves 500 years ago, but it is just as relevant today. Most global problems cannot be solved globally because they are global symptoms of local problems with roots in reductionist thinking that goes back to the scientific revolution and the beginnings of industrialism. We have operated our world for the past few centuries on the basis that we could manage it, if not dominate it, without respect to living systems. We have sacrificed the harmonious development of our own cultures for enormous short-term gains, and now we face the invoice for that kind of thinking: an ecological and social crisis whose origins lie deep within the assumptions of our commercial and economic systems. The compelling nature of this crisis, however, is its evolutionary nature. The array of choices and problems that face us do not call for a global triage, the further dislocation of cultures, or the division of nations.

They are soluble by design, and the basis of that design rests within nature.

While many of the proposed global solutions to environmental degradation arise from the same industrial paradigm that caused them—more growth, technology and money—environmental remedies that aim at strictly national issues generally arise from political pragmatism. Politically feasible solutions tend to be half-measures that bring up the rear in terms of innovation and imagination. Historically, the only kind of dramatic action we expect or accept from a national government is the waging of war, yet the ultimate threats to human welfare posed by the environment may someday equal or exceed that presented by any previous conflict. Because we perceive the environment to be only one of many "important" issues, and because there is not a shared or universal perception of peril, our government is as yet unprepared to face up to the forces of environmental degradation.

Solutions proposed in this book are both specific and broad-based. They are not offered because they can or cannot be adopted in the next session of Congress, but rather because, given our belief systems and institutions, they are an attempt to describe how we can realistically begin to reverse our downward environmental slide, questioning the notion that we can "save" the environment by recycling our Coke cans and burrito foil. It is gratifying to learn that Hollywood studios making $40-million movies about cyborgs refuse to use tropical plywood for building their sets in order to preserve the rain forest. But our work as adaptive human beings must take root on far deeper levels than collective attempts to assuage guilt. Society must recognize that ecological principles apply absolutely to human survival, and that if we are to long endure as a world culture, or as a group of local cultures, we will have to incorporate ecological thinking into every aspect of our mores, patterns of living, and most particularly, our economic institutions.

Ecological principles central to our continued existence are typically presented in the form of environmental factoids, stories that tend to be related over and again, data that can drive the listener into a sort of calloused despair if not indifference. When repeated monotonously, environmental "facts"—bearing in mind that some of the facts are just as incorrect as some of the defenses to them—take on all of the aspects of a "sky is falling" exhortation, making the recipient feel either pow-

erless or incredulous. Some environmentalists have justifiably been criticized as complainers, focusing too much on excesses and blame. Business has completed this anxious symmetry by only seeing the worst in environmentalism, and by oversimplifying issues to play to the fears of the public. Thus, a critical basis for change and consensus is to find a way to introduce and discuss ecological principles in society in a manner that draws people together, rather than repelling or deterring them. This step is crucial, because within ecological principles reside not only the problems and challenges that face us, but also the solutions that can be used to transform our economy and society. Confusion or ignorance about these principles will not provide us comfort or protection from their implications. Underlying all ecological science is the inevitable fact that, given a chance, the earth will eventually restore itself. The salient question we need to discuss in our communities and businesses is whether humankind will participate in that restoration or be condemned by our ignorance to vanish from the planet.

Without question, the most important and most often-debated principle is carrying capacity. What is the rate at which and manner in which the world can sustain the human population that exists and is growing? We don't know the answer to that question yet. We do know that species and their habitats are closely and symbiotically related, and that changes in one affect the other, making any form of environmental degradation of paramount interest and concern. In all ecosystems, the availability of food and nutrients becomes the ultimate arbiter of population size. But we are humans, not fish in a pond. Because of our diverse and intricate needs, the arbiter of the quality of our life and continued existence extends far beyond mere food and water to include changes in forest cover, cloud formation, topsoil stability, biodiversity, fuel consumption, firewood availability, genetic preservation, heavy metal contamination, and dozens of other issues. We have created a civilization of manifest complexity, and thus we must attend to the extensive requirements and demands we place upon global carrying capacity. What misleads citizens in the richer nations is that we in the industrialized North are very well provided for indeed: with some notable exceptions, we either don't see, don't experience, or choose to ignore the impact our lives have. It is difficult for us to imagine that the ecological principle of carrying capacity can signifi-

cantly affect us. Between the advertisements for Eddie Bauer, Jeeps, the suburbs, and the mall, we assume that we're not taking too much from our environment, or we would see more signs of stress and deterioration around us.

Our comfort and abundance is the foundation for the great differences we see in public debate and private discussions about the environment. From business and government, we are presented with the concerned but optimistic "so far, so good" assessment, a school of thought that biologist E. O. Wilson calls exemptionalist. This line of thinking relies on the ability of human beings to overcome ecological "laws" through invention, ingenuity, and gumption. For every problem presented by environmentalists, optimists have an answer: desalinization, fusion, deep-sea mining, space, and bio-engineering. Their conjectures are easier to swallow than the alarmist voices of environmentalists who say we are outstripping the earth's means to sustain the human species. Ever since the Reverend Thomas Malthus wrote his "Essay on Population" in 1798, there has been a dispute as to when or whether humankind would exceed the capacity of the earth to provide our daily bread. Books such as *Limits to Growth* and *The Population Bomb* have enlivened the controversy, not only because they were based on research and science, but because the arguments were made forcefully and dramatically. The concept of doomsday has always had a perverse appeal, waking us from our humdrum existence to the allure of a future harrowing drama. Yet another view held by a small group of writers and journalists (very few scientists, however) proclaims that environmentalism is a hoax, that we have been unnecessarily frightened, that environmentalism is a delusional scam from the political fringes to coerce others into a liberal agenda. A large and anxious audience is quite ready to wake one morning and find that, much like the thermonuclear cold war, our environmental bad dream is over, the opposing sides having made peace, and that we needn't worry anymore.

The view I choose is this: The underlying principles informing such cautionary predictions are largely correct, while the timing and nature of humankind's destiny with earthly limits is still unknown. This means that the optimists who say we will be taken care of in the future will be correct for the time being, until the day they are wrong, when we will all be in big trouble. The environmentalists, warning of

impending catastrophe, will usually be wrong with regard to specific predictions, but are right in principle. What does this tell us? It suggests we find a path of existence that honors both camps; that recognizes limits while using our innovative capacity to invent and reimagine our world to increase efficiency, decrease harm, improve our existence. In other words, we need to create an economy and way of relating to our material world that is not an either/or argument, but a means to create the best life for the greatest number of people precisely because we do not know the eventual outcome or impact of our current industrial practices. In other words, we need an economy based on more humility.

What ecology offers is a way to examine all present economic and resource activities from a biological rather than a monetary point of view, including the impact that our present lifestyle will have on generations henceforth. If we take that view, we see that the exemptionalists' strategy of "increasing" overall levels of production on a sustainable basis allows us to overcome and evade critical limits and present resource limitations, but only by using a number of self-deluding methods.

First, we are accelerating the rate that we draw down capacity from our environment. We do this by pumping out aquifers that can never be restored, by cutting ancient forests that cannot regenerate for hundreds or thousands of years, by destroying soil fertility (we have lost 17 percent of the arable land in the world since World War II), by burning fossil fuels (a large but ultimately limited carbon sink that may best be used for feedstock rather than fuel), and by depleting fisheries. Artificially fertilized monocultures work for many decades to increase crop yields, but they ultimately destroy the soil through salinization, destruction of humus, and over-cropping. Even as the Israelis reclaim the desert, water levels in wells that keep their agriculture alive are dropping disastrously.

We are speeding up utilization of resources through the use of fossil-fuel servants, machines and technology that allow us to get a lot more from our environment faster and more expediently than was formerly possible. This leads many to believe that technology in some form or another will provide the means to forestall or eliminate present and future threats posed by human exploitation of the environment. Proponents of this view argue that we require a

"healthy, growing" economy to pay for the changes that are required or, as they say, to "clean up the environment." In other words, the health of the environment is subordinated to the health of an economy that by its nature depends on environmental exploitation. Unfortunately, in such an economy, financial incentives support technologies that give us the ability to harvest, extract, process, or mine our resources even more expeditiously.

Second, we take from other ecosystems by the importation of products and raw materials from different parts of the world. While we have stopped many damaging practices that affect our own environment at home, we are benefiting from the continuation of those same practices carried out by American or foreign companies overseas. In short, we are either buying or degrading other people's environments and then consuming them for ourselves.

Last, we have displaced other species by taking over their habitats. It is difficult for human beings to evaluate when and where they have overstepped a boundary that exists only in perception and understanding. This boundary is the point at which our lives and needs displace other living communities to the point that they retreat or perish. In other words, we have become invaders. Our bodies and livestock now consume close to 40 percent of the net production of the land environment. As we push out other species and occupy new ecosystems, we diminish biodiversity; we not only reduce overall ecosystem capacity, but we also create further threats to our own chances of survival, since our fate is inextricably linked with the fate of other forms of life.

The problem is essentially this: We in the rich, industrial nations are under the impression that we are experiencing an ingenious outfoxing of carrying capacity. Clever, yes, but ingenious no, because our means of production do not necessarily increase the carrying capacity of the environment, they only temporarily insulate us from the results of our actions. We confuse our rate and ability to consume with the capacity of living systems to provide for those wants. Ecologist Dr. David Suzuki entitled one of his speeches, "Are Humans Smarter than Bacteria?" He was not the first to remind us of the analogy of the twenty-ninth day: When algae take over a lake they grow exponentially, doubling every twenty-four hours, until the thirtieth day, when they effectively remove all oxygen from the water, killing all other forms of life. Since the algae bloom doubles daily, on the twenty-ninth

day, it covers only half the lake, a reasonably benign condition as long as one does not take into account the nature of exponential growth.

Whether they feature Lapland reindeer, algae, or bacteria, the moral of all exponential growth stories is the same: When a single species grows exponentially without regard to carrying capacity, it will suffer an ignoble fate. Although we do not know whether the rise in human population and environmental exploitation is an "S" curve that will level out to stability or a "J" curve that will climb up a nearly straight line only to crash, there is little to indicate in resource statistics or demographics that we are as yet any smarter than bacteria. Suzuki addresses the optimistic paradigm in his analogy by theoretically granting that technology may be able to increase our carrying capacity. But in that dying lake, a 100 percent increase in oxygen buys only 12 more hours of life, a 50 percent increase just 6 hours. So even if we can increase food, forest, fuel, and water production by 50 to 100 percent over the next fifty years, we have not truly solved or even changed the nature of the problem, nor have we bought much time.

The optimistic, anti-Malthusian scenario does not address the problem of exponential growth, and it certainly does not address the question of quality of life. Between Malthus' time and the beginning of the twentieth century, approximately 600 million people were added to the world population, an increase of 6 million people per year. From then until 1950, we added another 900 million people, making the annual increase 18 million per year. By 1975, population was nearly 4 billion, a jump of 1.5 billion, an annual increase of 60 million per year. At this writing, eighteen years later, that rate is nearly 100 million new births per year. This is why scientists keep harking back to bacterium and reindeer. Since there is no experiential way to grasp exponential population growth except by observing other systems, it is better to witness it in a petri dish than on a continent.

If you take a basketball and pretend it is the earth, and then paint it lightly with a spray can, the thin emulsion of pigment coating the surface is ten times thicker, relatively speaking, than the band of life that supports our existence on this planet. The definition of carrying capacity is the maximum level of a species or population that can be steadily and consistently supported by the resources on that thin coating. The key word is *consistently,* meaning decade after decade, century after century. It does not mean infinitely, but it certainly means long

into the future. And on that score, we are doing quite the opposite. When the strain placed upon an ecosystem by a population is greater than it can sustain—a situation we see in Somalia, the Sudan, and Ethiopia—carrying capacity is reduced, starvation can occur, and social unrest is inevitable. But in fact, the problem of carrying capacity lies not just with the obvious examples seen on our TV screens, but is worldwide. Those who argue that we need to grow our way out of ecological problems do not acknowledge a profound and troubling contradiction: If the population of China lived as well as the population of Japan or France or the United States, we would endure untold ecological devastation.

Even as we invoke economic pieties to justify multinational expansion and "freer" trade policies, the actual result of helping the world raise itself by its bootstraps has been the opposite: By 1990, the lowest quintile in world income had become twice as poor when compared to the top quintile than it was in 1960. The benefits of global expansion are highly concentrated in the northern countries, and in the hands of corporations and their owners. Executives of multinational corporations that openly "embrace" the environmental movement still want their perquisites, their first-class upgrades, their insulating luxury. But you cannot grow out of a problem if it is embedded in the thing that is growing, or as the Somalians say, you cannot wake up a man who is pretending to be asleep. It makes far more sense to examine the system itself, to slow down and arrest industrialism so that it is redesigned and assembled into a system whose growth enhances human existence.

We are seeing increases in population while decreasing the carrying capacity of our ecosystems—two trains speeding toward each other in the night. The tragedy is not that they will collide, but that they will pass each other at great speed, leaving a gap between what we will need and what will be available, a gap that will expand rapidly owing to the exponential nature of growth. By accepting damage to the environment in order to increase our capacity, whether it is our own skies and rivers, or the forests of the Amazon basin, we face an ultimate reckoning between these two opposing principles.

At present fertility rates of 3.3 children per family, the population of the world will be 107 billion people in the year 2100. No one accepts that figure, of course, so projections assume a rather significant

reduction of fertility rates over the coming decades, resulting in a peak population of 12 to 14 billion sometime in the latter part of the next century. In order to achieve these projections, demographers assume there will be a greater degree of prosperity worldwide, since people who feel more economically secure tend to see increased population as a threat and reduce the number of children they bear. If those economic aspirations are not realized, we may see different results. In either case, the demands upon the environment will increase dramatically.

We may have already surpassed the point at which we can sustainably support the world's population using present standards of production and consumption. That disturbing possibility should impel us to seek, as sensibly and quickly as possible, an integration of our wants and needs as expressed and served by commerce, with the capacity of the earth, water, forests, and fields to meet them.

Thus, this book proposes three approaches, all guided by the example of nature. The first is to obey the waste-equals-food principle and entirely eliminate waste from our industrial production. This not only saves resources outright, but it rearranges our relationship to resources from a linear to a cyclical one, greatly enhancing our ability to lead prosperous lives while reducing environmental degradation. Instead of organizing systems that efficiently dispose of or recycle our waste, we need to design systems of production that have little or no waste to begin with.

The second principle is to change from an economy based on carbon to one based on hydrogen and sunshine. This is primarily achieved by reversing the historical incentives surrounding the production and consumption of energy, away from the cheapest combustion toward the most enduring production. This is the "soft path" Amory Lovins described nearly twenty years ago, but the imperatives for implementation are even more compelling now because of our greater knowledge of ozone loss, global warming, and destruction of forests due to acid rain. It doesn't matter how many hundred years' of supply we have of coal and oil, because if we combust it, we will raise CO_2 levels eight to ten times higher than normal, a level that the most stalwart environmental skeptic would find alarming.

Third, we must create systems of feedback and accountability that support and strengthen restorative behavior, whether they are in

resource utilities, green fees on agricultural chemicals, or reliance on local production and distribution. Conversely, we have to look at how our present economic system consistently rewards short-term exploitation while penalizing long-term restoration, and then eliminate the ill-placed incentives that allow small sectors of the population to benefit at the expense of the whole. This should not be done through stifling restrictions, but through standards that release creativity and productivity. Ecological restoration can probably be carried out more naturally and surely by smaller enterprises than by larger, unwieldy corporations. The diversity of the small business sector of the economy must be encouraged, not by government loans, but through the revitalization and revisioning of incentives that will liberate the imagination, courage, and commitment that resides within small companies.

All three recommendations have a single purpose: to reduce substantially the impact that each of us has upon our environment. It is the nature of the human condition that people will not cut back on their possessions and wants on their own. This is particularly true since we have no economic vision of what a country or world could be like that is both reducing its impact and material possessions while actually increasing work and job security. We are all made anxious by the memories of past economic cycles, experiences that convince us that any type of voluntary reductions are a form of lunacy. But in fact, we have to find an ecological, imaginative, and participative means to lessen our impact. We have to be able to imagine a life where having less is truly more satisfying, more interesting, and of course, more secure.

A restorative economy is not going to lead to a life of dulling comfort and convenience. We have to recognize that we've reached a watershed in the economy, a point at which "growth" and profitability will be increasingly derived from the abatement of environmental degradation, the furthering of ecological restoration, and the mimicking of natural systems of production and consumption. Economist Kenneth Boulding described this economy many years ago, one in which an affluent life "will have to be combined with a curious parsimony ... far from scarcity disappearing, it will be the most dominant aspect of the society; every grain of sand will have to be treasured, and the waste and profligacy of our own day will seem too horrible that our descendants will hardly be able to bear to think about us."

I believe we are on the verge of a dramatically different economy, one that is even more complex than what has preceded it. Like the systems it will hopefully imitate, the economy will become increasingly diverse and differentiated. While certain industrial skills will become less valuable, biological knowledge and understanding will soar in demand because it will provide the means to integrate human needs with the carrying capacity of natural systems. While coal mines will be shuttered, removing the last insult from the lives of men and women who have long suffered for the Industrial Age, opportunities in solar hydrogen will expand. We will no doubt try to protect the livelihoods of coal miners, much as the Luddites were legitimately concerned about the destiny of hand loom operators, but in this and other dislocations, it is critical to have an overall vision, for ourselves, our communities, and our country. Only within the framework of a broader perspective can we address the issues of equitability and change, not by arresting the critical process of economic evolution in order to continue outmoded forms of production, but by designing ways to recycle lost livelihoods into the jobs of the future.

The changes that these proposals would bring about would be widespread, eventually enormous. But any sober look at the future, at the patterns of decay and disorder that are sweeping across the world, tells us that we can no longer simply talk about change. Just as we can trace back patterns of development and see how much of our lives have been changed by cheap and abundant energy, reversing the historic fall in energy prices would have a direct and powerful impact on our daily lives. Much of what we see and experience in modern society is a direct result of cheap cars and gasoline. Remove those two factors, and suddenly the suburbs and post–Le Corbusier downtowns are seen for the forlorn and dehumanizing forms they are. The much-vaunted global integration of the world economy depends on fossil fuel–driven transport systems composed of planes, ships, and trucks. It is not surprising that this energy-driven growth is producing cities around the world much like our own urban areas, with comparable slums, crowding, pollution, and crime. Higher energy and resource costs don't mean we have to stop trade or foreign commerce, but we should be prepared to bid farewell to energy- and resource-consumptive luxuries such as Chilean strawberries and nectarines flown in daily during New York winters.

The purpose of all these suggestions is to end industrialism as we know it. Industrialism *is* over, in fact; the question remains how we organize the economy that follows. Either it falls in on us, and crushes civilization, or we reconstruct it and unleash the imagination of a more sustainable future into our daily acts of commerce. Protecting our industries because we want to be pro-business and pro-jobs will have the same level of effectiveness as did the Soviet effort to maintain its industries in the 1970s and 1980s. You cannot protect a system that is rigid and entrenched without sacrificing the interests of the people it intends to serve. The thrust of a restorative economy will comprise two key issues. The first is to learn how much each of us can humanely take while we are on earth. The more of us, the less we can take, but on the other hand, the better we design our economy and commercial systems, the less we need. The calculus is expressed in the principle of living off of current income, solar or otherwise. Since we cannot enforce a regimen on ourselves without political repressiveness, we have to evolve into that state through innovation, design, and cooperation. The second issue is to restore and re-create some of what we have lost. The idea that we can bottom out in the next few decades and achieve sustainable development is a popular but short-sighted ideal. Bottom out, yes. At some time in the relatively near future, we will achieve a "balance" between what we are consuming and the capacity of the earth's ecosystems to provide those needs, although under existing models of production and consumption, it is likely to be far different and cause far more suffering than we are presently willing to admit. But rather than look at that balance point as a zero-sum outcome that is distantly achievable, a restorative economy means thinking big and long into the future.

It also means doing something now. It means trying things that may fail. It means shaking up City Hall. It means electing people who actually want to make things work, who can imagine a better world. It means writing to companies and telling them what you think. It means never forgetting that the cash register is the daily voting booth in democratic capitalism. We don't have to buy products that destroy or from companies that harm or are unresponsive. If we want businesses to express a full range of social and environmental values in their daily commercial activities, then we, too, will have to express a full range of values and respond to the presence or absence of princi-

ple by how we act in the marketplace. It may mean being obstreperous or conciliatory, and knowing when to be which. To go back to our nature can also mean becoming "sour, astringent, crabbed. Unfertilized, unpruned, tough, resilient, and every spring *shockingly* beautiful in bloom." It may mean a meticulous reinventorying of our lives, and our country. It will mean, in the words of Vaclav Havel, trying harder "to understand than to explain. The way forward is not in the mere construction of universal systemic solutions to be applied to reality from the outside; it is also in seeking to get to the heart of reality from the inside, through personal experience." It is time to clean out the closet, both conceptually and materially, and to reexamine our priorities and beliefs. We can't wait until the guardians wake up, but that doesn't mean we shouldn't try to wake them up. We cannot wait for business to set a new course. We have to educate our businesses and, wherever appropriate, let them educate us.

When architect Jaime Lerner was appointed mayor of Curitiba, Brazil, in 1973, it was a rapidly growing town of 500,000 with sprawling slums (*favelas*). The *favelas* had many problems, not the least of which was garbage that could not be collected because of narrow or non-existing streets. Since trucks could not get in, and because the garbage was attracting rodents and disease, Lerner had to come up with a way to get the garbage out. The solution was to pay people for their garbage by placing recycling bins around the *favelas* and giving tokens to the city's transport system for the separated and therefore recyclable trash. For organic waste, which was taken by farmers and made into fertilizer for their fields, he gave chits that could be exchanged for food. It has worked spectacularly. Kids scour the *favelas* for trash, and can spot the difference between polyethylene terephthalate and high-density polyethylene bottles. The tokens give the poorer citizens the means to get out of the *favelas* to where the jobs are, while promoting cleanliness, frugality, and the reclaiming and recycling of waste.

In the end, it was a simple plan. The money gained from recycling combined with the money saved by not having to take trucks into the narrow streets pays for the tokens. It is a cyclical, waste-equals-food system implemented at the grass roots. Because of this and dozens of other similar innovations, Curitiba is considered a landmark in urban development and thoughtful planning. But it happened, according to

Lerner, because he and others were not afraid to try new things. Not everything worked, but so much did that it has bred an innovative atmosphere throughout the city, now nearly three times its 1973 size. Curitiba is entirely self-sufficient (it decided to no longer accept money from the state, because of the red tape involved), it is booming, prosperous, and clean.

Living in a civilization that is profoundly and violently at odds with the natural world will not end overnight. But if there is to be an economy of meaning and purpose, it must have two agendas. It must serve and nurture the aspirations of the poor and uneducated, and it must also, as its underlying goal, seek to reconstruct, know, or revive genotypes, species, ecosystems, forests, vernal pools, allelomorphs, subspecies, grasslands, seral stages, reserves, natives, gradients, corridors, and habitat blocks. If that language is unfamiliar, it is because most Americans are more often taught to identify types of cars than types of birds; we can identify one thousand corporate logos but less than ten native plants. We are starkly unfamiliar with the vocabulary of conservation biology or the science of restoration, both of which hold the key to our future on earth. It is not merely a question of stopping the cutting in the remaining ancient forests, it is literally the task of re-creating the ancient forests of the future. "Going forward" will someday mean replacing what has been lost, as well as returning what should not have been taken, not only in our forests and grasslands, but in our inner cities and rural backwaters as well.

Industry and mainstream economists argue that we don't know enough about the potential dangers ahead to warrant wholesale changes to our economic system. Best leave things as they are until we do more research is the generic reply from the executive suite. It is a fair argument, whose logic is impeccable. But as is true of the economy, the values that inform it are inverted. What is best to leave alone is the wholesale assault on nature and living systems. More research is definitely needed, more study on how industries and corporations can conduct themselves so that they do not harm and can reconstruct what has been lost. When visitors gasp at the beauty of their cut stones, Italian quarry workers are known to say: "God never had a bad day." It is not nature that is the experiment, it is our economic system. Restoration is the conservative, ethical, and economic ethic; laissez-faire capitalism is what is out of control, and it is having a lot of bad days.

We have a thousand years of work ahead of us—brilliant, sustaining, innovative work, a profound act of citizenship and participation that harmonizes the relationship between commerce and nature. "The world that environs us, that is around us, is also within us," writes poet and farmer Wendell Berry. "We are made of it; we eat, drink, and breathe it; it is bone of our bone and flesh of our flesh. It is also a Creation, a holy mystery, made for and to some extent by creatures, some but by no means all of whom are humans. This world, this Creation, belongs in a limited sense to us, for we may rightfully require certain things of it—the things necessary to keep us fully alive as the kind of creature we are; but we also belong to it, and it makes certain rightful claims upon us: that we leave it undiminished, not just to our children, but to all the creatures who will live in it after us." To do this, we must take back our country watershed by watershed, its seas and plains, our valleys, wetlands, and coasts, to reclaim the places that give form to our culture, that give life to our families.

Eliot Coleman, a skilled truck farmer who coaxes luscious red tomatoes out of the rocky soil of Maine in June, once said that the problem with America is that it usually hits exactly what it is aiming at. And in the 1980s and for decades before, we aimed for money. We got it. It was not evenly distributed. It is now highly concentrated, posing as great a threat to democracy as any foreign power ever did, but that is what this country made—money. In the process we completely forgot that success and failure, when measured by currency alone, are impostors, and that our lives, whose transience often becomes evident all too late, can have little meaning unless we feel in our passing that we were able to serve the nature and humanity that gave us our breath and soul. W .S. Merwin, the poet and naturalist, cites Robert Graves when he reminds us that we have one story, and one story only, to tell in our life, and that "When there is no story / that will be our story / When there is no forest / that will be our forest." We are made to believe over and over again by our parents and businesses, by our culture and televisions, by politicians and movie stars, that it is the story of money, of finance, of wealth, of the stock portfolio we will leave the children, the partnership at the law firm, the jewel of the house in the suburbs with its pool and radar dish. These are impoverished, small tales and whispers that have made us restless and craven, not stories at all. As author and garlic grower Stan-

ley Crawford writes: "The financial statement must finally give way to the narrative, with all its exceptions, special cases, imponderables. It must finally give way to the story, which is perhaps the way we arm ourselves against the next and always unpredictable turn of the cycle in the quixotic dare that is life; across the rock and cold of lifelessness, it is our seed, our clove, our filament cast toward the future." It is deeper than anything commercial culture can plumb. And it is there waiting. As writer Pam Houston put it, "[It] is a difficult story to tell because what's right ... is only as wide as a tightrope, and what's wrong ... yawns wide, beckoning on either side."

If hope is to pass the sobriety test, then it has to walk a pretty straight line to reality. Nothing written, suggested, or proposed is possible unless business is willing to embrace the world we live within and lead the way. As long as business sees the environment as a rearguard action, it will constantly be in a reactive mode, fighting off social concerns as if they were uninvited bill-collectors. It is time for business to leap-frog the debate and take the initiative, not in self-serving and gratuitous pronouncements and awards, but in a genuinely open process of dialogue, collaboration, reflection, and redesign. By being dominant, business is bringing woe and tribulation upon itself and society. It must submit, not to any one demand, but to a process that is mediative, healing, and imaginative. There are literally thousands of ideas and means to improve and change how we do things. They await a receptive ear, an open heart on the part of commerce.

I imagine, perhaps fancifully, a kind of environmental assembly or congress throughout this and other countries, one that would be representative and consensually based, one that would draw together people from all walks of life, all disciplines, all industries, all aspects of our communities. The official Earth Summit in Rio was less than a complete success. As the editors of *The Ecologist* put it so well, "Unwilling to question the desirability of economic growth, the market economy, or the development process itself, UNCED never had a chance of addressing the real problems of 'environment and development.' Its secretariat provided delegates with materials for a convention on biodiversity, but not on free trade; on forests but not on logging; on climate but not on automobiles. Agenda 21—the Summit's 'action plan'—featured clauses on 'enabling the poor to achieve sustainable livelihoods' but none on enabling the rich to do so; a section on women but none on

men ... The best that could be said for the Earth Summit is that it made visible the vested interests standing in the way of the moral economies that local people, who daily face the consequences of environmental degradation, are seeking to reestablish."

An environmental congress should not be a forum where people preset the agenda, control the debate, marshal the participants, and then stake out their territory on issues that concern them. Rather, it should be a place where we can create a deliberative process that brings to the fore the concerns, observations, fears, and doubts that we all share. On all sides of the issue, from displaced and unemployed auto workers to the poor who are downwind from toxic waste incinerators, from the middle classes to the deeper fears of our children, we are not hearing what people are saying. The noise of those in power is drowning out the plaints of those who are not. While some people fret for the loss of ancient forests, logging families fear for their livelihood. There is a mutuality and causality to those anxieties, as there is to all of our fears and doubts; they are not necessarily as opposed to each other as special interest groups would have us believe.

Writing in 1982 about the "fate of the earth," which was then perceived as the danger of nuclear holocaust, Jonathan Schell concluded with this description of our numbed lack of participation:

At present, most of us do nothing. We look away. We remain calm. We are silent. We take refuge in the hope that the holocaust won't happen, and turn back to our individual concerns. We deny the truth that is all around us. Indifferent to the future of our kind, we grow indifferent to one another. We drift apart. We grow cold. We drowse our way toward the end of the world. But if once we shook off our lethargy and fatigue and began to act, the climate would change. Just as inertia produces despair—a despair often so deep that it does not even know itself as despair—arousal and action would give us access to hope, and life would start to mend: not just life in its entirety but daily life, every individual life. At that point, we would begin to withdraw from our role as both the victims and the perpetrators ... We would no longer be the destroyers of mankind but, rather, the gateway through which the future generations would enter the world. Then the passion and will that we need to save ourselves would flood into our lives. The walls of indifference, inertia, and coldness that now isolate each of us from others, and all of us from the past and future generations, would melt, like snow in spring ... By restoring severed links with life, we will restore our own lives. Instead of

stopping the course of time and cutting off the human future, we would make it possible for the future generations to be born. Their inestimable gift to us, passed back from the future into the present, would be the wholeness and meaning of life."

We have become convinced by the trappings and arcana of government proceedings that we are unequipped as citizens to participate in or mold the debate over critical issues. If people form ad-hoc groups to question or challenge existing or proposed government policy, they are referred to as "loose-knit," or "sprawling," or "kitchen table," as if we should be ashamed that the original democratic process that takes place on a grassroots level is not well-coiffed and shod. Linguist Noam Chomsky has commented on the disparity between the high level of knowledge on sports talk shows and the superficiality of the contribution people make when addressing national or international issues, as if we have already decided that we cannot know enough to make a worthy response to these issues. Chomsky disagrees: "It seems to me that the same intellectual skill and capacity for understanding and for accumulating evidence and gaining information and thinking through problems could conceivably be used under a different system of governance, one that included popular participation in important decision-making areas, in areas that really matter to human life. It does not require extraordinary skills or understanding to take apart the illusions and deception that prevent understanding of contemporary reality. It requires the kind of normal skepticism and willingness to apply one's analytic skills that almost all people have."

If our programs to "save the environment" are hatched up by experts, attested to in hearings on Capitol Hill, and voted on by a Congress that has received $1 billion in PAC monies, no matter how clever or ingenious their solutions they will create divisiveness and dislocation. The patterns of healing and design must arise from all levels of society, not merely the top. The logging situation in the northwest of America, although it involves public lands, must ultimately be solved by individuals, companies, and communities in that part of the United States. While it is true that certain issues with respect to the environment must be imposed nationally or internationally—green taxes, certainly, lest they fail by the backdoor—their origins must reside deep in the longings of peoples to lead fruitful lives.

William McDonough, the architect and designer, echoed Henry Wallace, when, in the rotunda of the Jefferson Memorial in 1991, he called for a new declaration, not of independence, but of interdependence. A "Declaration of Interdependence" can guide and teach us, just as did the first Declaration, how to change our systems and practices so that we become an improved and better nation. Our environmental assemblies should result in such a declaration, and should arise from the people, as did the first. There are new truths that we hold self-evident, and they must be heard and spoken. Such forums should feel fair; they should honor differences and not feel partisan; they should proceed in a manner that embodies the qualities we want to see in our government and in our companies; they should not be about power, but about aspiration and need and knowledge; and they should establish broad bases of agreement. These gatherings should include all people, from our children to our elders. They should enliven and give hope; they should be recognized by politics but not politicized; they should be councils that build consensus, recognize diversity, and encourage constructive change. Such a congress would be tantamount to creating a natural constitution, with attendant rights and responsibilities made clear to all. The creation of a new story for Americas, a recovery of the commons, would ensure that once again life is celebrated on earth. Such conventions are ultimately an endless discussion by people on how to say grace, knowing that we *do* take and harm as we live; that life is always a moral question that lies before us sweetly, dependent on our gratitude and constant struggle to cause as little suffering as possible to all and everything around us.

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Chapter 12

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Index

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PAUL HAWKEN is the author of *The Next Economy* and *Growing a Business* and coauthor of *Seven Tomorrows: Toward a Voluntary History*. He is the cofounder of several businesses, and lives in Sausalito, California.

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