

A decorative border of green leaves, possibly ivy, frames the entire cover. The leaves are small and pointed, arranged in a dense, overlapping pattern along the edges.

Deep Design

*Pathways to a
Livable Future*

David Wann

Foreword by Paul Hawken

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Livable Future*

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*with the
Center for Resource Management*

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Island Press is the only nonprofit organization in the United States whose principal purpose is the publication of books on environmental issues and natural resource management. We provide solutions-oriented information to professionals, public officials, business and community leaders, and concerned citizens who are shaping responses to environmental problems.

In 1994, Island Press celebrated its tenth anniversary as the leading provider of timely and practical books that take a multidisciplinary approach to critical environmental concerns. Our growing list of titles reflects our commitment to bringing the best of an expanding body of literature to the environmental community throughout North America and the world.

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About the Center for Resource Management

The Center for Resource Management (CRM) is a nonprofit organization with a history of addressing complex natural resource issues. CRM's activities fall into three major categories: public policy and consensus building, demonstration projects, and environmental assessment and decision-making. The hallmark of CRM's work is the formation of unusual coalitions and alliances between different sectors and interests. These coalitions focus on resolving conflicts, creating policy, and demonstrating new ideas or approaches to environmental problem-solving.

CRM works on a broad range of issues and projects, including global climate change, integrated solid waste management, clean air, Native Americans and the environment, alternative fuels, zero emissions vehicles, renewable energy, sustainable forestry in the Russian Far East, and oil and gas development. Project partners include such organizations as the United Nations Environment Programme, the World Bank, the Native American Right Fund, Wal-Mart, S.C. Johnson & Son, Inc., Ben & Jerry's, Procter & Gamble, GNB Technologies, the Pebble Beach Resort Company, and Weyerhaeuser. CRM has offices in Salt Lake City and Denver.

Deep Design

Foreword

David Wann and the Center for Resource Management are leading the way out of what is perceived as an intractable dilemma: how to improve environmental standards and resources without punishing commerce. There are those who say that commerce should rightfully bear the burden of past excesses, and indeed that has been, and will continue to be, a pattern with respect to mitigation and cleanups. But even then, the consumer is going to pay in the end, and more important, all the cleanups in the world will fail us if we don't eliminate the cause of degradation, waste, and pollution. This is where design comes in—a lightly regarded word with artistic overtones that has emerged as the leading integrating concept for preventing environmental damage.

Design is the only term we have to indicate that our plans, purposes, and projects must now take into account several disciplines, rather than one or two. We now know that if we are to solve ecological problems, we cannot practice architecture without knowledge of forestry and energy issues, that chemical engineering without epidemiology and biology is inexact and lacking, that transportation systems that do not take into account community,

family, and climate are not systems at all. This is both the challenge and the gift of the future, the bankruptcy of traditional linear thinking coupled to its attendant professions, and the emergence of cyclical-systems thinking using integrative design approaches.

It can be said that good design never emerged from license or excess. Breakthroughs in design thinking come from limitations, problems, definitive criteria, and strictures that must be addressed by a product, a building, a process. The good news, ironically, is that we have those strictures and limitations in abundance. We have always had them, but we chose to ignore carrying capacity and the principles of this nonlinear, self-organizing system we lovingly call earth. As environmentalists, biologists, and other scientists have raised a hue and cry over climate change, forest health, species loss, and the myriad of other feedbacks caused by our industrial civilization, they are easily typecast as Cassandras, gainsayers, and worse, their concerns are perceived as annoying obstacles to growth.

Today, we know those limitations are real. Despite all the arguments, there is no denying one important fact: that all living systems on earth are in decline and the rate of decline is increasing. It doesn't matter if we have sufficient supplies of oil, coal, zinc, or molybdenum if we lack airsheds, clean water, healthy soil, productive fisheries, and biological resources. Since it is the goal of *homo sapiens* to remain as one of approximately ten million species cohabiting the planet, we need go no further in our environmental assessment to understand that fundamental change is necessary. The concept of deep design provides us with a sense that these limitations are a pathway to elegant, innovative systems changes that will change life on earth for the better; that early limits are not mere prescriptions but markers that can guide us to new techniques, products, and enterprise that not only will dramatically reduce our dependence on natural resources but expand the meaning of work and what it means to be a human being here, on earth, in the last part of the twentieth century.

Paul Hawken

Preface

We sometimes think of progress in a strictly technical sense—new medicines, new appliances, and faster airplanes. But these products are only a reflection of an underlying, more significant progress in human understanding. In this century, we've developed a deeper knowledge of subatomic reality, molecular biology, biochemistry, human psychology, and the complex patterns of ecology. We can now begin to incorporate the latest knowledge in our innovations, to make them not only "smarter" but wiser, that is, more responsive to environmental as well as social needs.

The industrial revolution was characterized by mechanical designs that didn't accommodate biology and human psychology; the post-industrial revolution is characterized by designs that are programmed to be nature compatible and, like nature, flexible enough to adapt to changing conditions. The best nature-compatible new designs—whether products, buildings, technologies, or communities—are sensitive to living systems with which they come into contact, accomplishing their missions without

undesirable side effects such as pollution, erosion, congestion, and stress. These “deep” designs increase options, flexibility, cultural equity, and individual power. They are easy to understand and implement. They don’t require “pampering,” sky-high insurance rates, or protective equipment. Rather than being above nature, deep designs are aligned with nature—water, the sun, our genetic heritage. Their strategies often incorporate living systems, such as alternative wastewater treatment in a greenhouse environment that’s designed to take advantage of lilies, snails, and fish. These living machines, as John Todd calls them, are self-adjusting and capable of improving their own performance. Rather than being “one-size-fits-all” systems, living machines can be customized to meet a particular need. They don’t simply minimize wastes, they optimize resource flow, performing the intended function with the least amount of energy, material, and maintenance. Living machines are not about going back to unsophisticated technology. On the contrary, their development was possible only because of new, high-tech materials that are lightweight, light-transmitting, flexible, and waterproof. Thus, they are a synthesis of nature and technology.

Deep designers are not satisfied with the comfortable status quo because they know there are flaws in our value systems—as well as in our standard procedures. When the human population was sparse and there were seemingly limitless resources, it made quantitative sense to base economies on total “throughput” of materials, energy, and activity. Now the situation is reversed, and to play by the old rules is to court catastrophe. Instead of pumping up economies with resource flows, we need to design for efficiency and the endless cycling of materials. If our needs were met more directly, perhaps we wouldn’t have to circulate so much currency in our quest for fulfillment.

Shallow designs are cruise missiles launched obliviously into the future by a culture that thrives on short-term gratification; deep designs are groves planted to benefit humankind now and in the future. While shallow designs are anonymous and generic, providing nothing but materialistic satisfaction, deep design is informed with craftsmanship and quality for lasting satisfaction. Deep design acknowledges biological and cultural wealth as well as material wealth. We can meet many basic needs with designs that consume

a minimum amount of energy and material yet are culturally informed and biologically compatible. A solar-heated house keeps occupants just as warm as the shallower oil-heated home.

This book presents many different “pathways,” or scenarios, for manufacturing, retail, community design, energy generation and use, agriculture, and other human activities. Each pathway strives to meet key criteria such as renewability, recyclability, and nontoxicity. The common theme of each pathway is the search for a more elegant approach in performing services and providing functions. As these divergent pathways reach their potential, they will converge in a sustainable, steady-state society.

One of the biggest obstacles to inspired design is that conventional Western economics is nature blind. It doesn’t perceive the inherent value of health, intact ecosystem, or sustainably operated industries. Fortunately, there are more tangible criteria on which to base design decisions than simply return on investment. Ecology, thermodynamics, sociology, and ethics form a secure, realistic foundation for a new kind of economics, one that considers the life cycle of material and energy as well as human need and capability. Deep design is an ongoing process. Once we have “tuned up” individual products—what I call Phase I—we need to integrate them into a system (Phase II) that is capable of regeneration, and aligned with nature’s momentum.

Will deep design become part of our everyday lives? If we’re smart it will. If we are each aware of what constitutes good design, we will collectively insist, for instance, that newspapers use soy-based inks, or that communities be designed to accommodate walking and bicycling. The goal of this book is to demonstrate how deep designers think, so we can begin to differentiate between designs that enhance our lives and designs that degrade them. Do we want total value in our designs, or only short-term, declining gratification? It’s up to us to choose.

I researched and wrote this book under the auspices of the U.S. Environmental Protection Agency while on detail at the Center for Resource Management in Denver, Colorado. However, the views and policies in this book do not necessarily reflect policies of the EPA. Special thanks to Jack McGraw, John Cross, Linda Fisher, Harry Freeman, Don Patton, Bill Murray, Rebecca Lopez, and Heng

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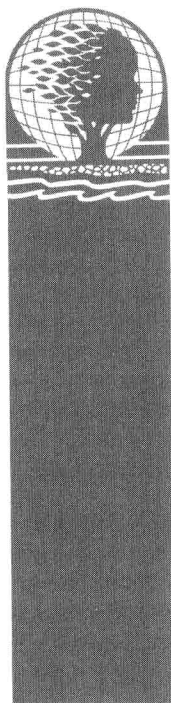
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Chapter 1

Deep Design

From the Visionary to the Pragmatic

Imagine you're stranded in a vast desert, becoming more dehydrated and disoriented with each second that passes. An hour ago you drained the last drops from your water bottle, and now you can feel those drops rapidly evaporating from your forehead in the form of sweat. A genie appears! While you alert yourself to tricks the mind can play, she offers you the choice between a crisp \$100,000 bill and a carafe of water complete with clinking ice cubes and a twist of lime. Which would you choose?

The fact is, your choice would depend on how lost you thought you were. What good is a \$100,000 bill without a life to spend it in? Yet, if you somehow survived, you could buy much more than water with that kind of money. You hesitate, even as your legs begin to buckle from heat exhaustion. The genie, sensing that you may need prompting, expands the water option to include an oasis. She even throws a bedouin tent into the deal. As you crumple to the ground, you gasp, "Okay, okay, I'll take the oasis." Suddenly, you find yourself sipping ice water in a tent that's 30 degrees cooler than ambient temperatures. You're sitting on a Persian rug in the shade of a roof woven from camel hair. You study the tent's simple yet elegant design. The loosely woven fabric is dark colored, creating a "chimney effect": the fabric heats up, the hot air rises, and cooler air circulates in to take its place. When it rains, the tent's

woven strands expand to keep you dry. And when you want to move on to another oasis, you simply roll up your home and take it with you.¹

You may be wondering why anyone would begin a book with a fable about a desert ecosystem, a bedouin tent, and an imaginary small fortune. Our fable touches on three basic kinds of wealth: biological (the oasis), cultural (the tent), and material (the money). It's a useful analogy for the options open to us as a civilization. What will we choose? How lost are we? The choices we make by design rather than default can get these three variables back in balance. One thing is certain: the preoccupation of the world's developed countries with material wealth is obliterating both biological and cultural wealth. Yet it's not too late to change paths. We can still resolve to meet our needs with innovative, conservation-oriented design rather than expensive, energy-intensive design. We can still live in a world that makes sense.

The designs featured in this book acknowledge ecological as well as sociological limits, and announce the emergence of a new way of thinking. This is not a "how to do it" book but rather a "how to think it" book. The word "design" as used here has much wider implications than living-room decor or the shape of a car. Design is much more than architectural blueprints or bright-colored packaging—it involves everything from a low-water-use landscape to planned communities. Designers need to be aware of criteria that are common to all designs, whether they are manufactured products, systems of production, or recycling processes. The challenge is to integrate diverse designs into one grand design, a sustainable culture that fits nature the way a glove fits a hand.

The contexts in which designs are produced determine their shape. Consider, for example, Western capitalism, the premise of which is to convert resources into profit. This premise was born in an era when there were relatively few people and seemingly infinite resources. Now the world faces opposite circumstances—an exploding population and dwindling resources. This hard, indisputable fact will ultimately cause us to rethink the meaning of value. As currently structured, the field of economics measures material wealth but overlooks cultural and biological wealth. It does not adequately measure the value of redwood forests, well-cooked meals, a sturdy house full of memories, clean water, heirloom vegetable seeds, elephants, crickets, and cougars, or the sound and smell