

Timeline

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The Myth of Living Safely in a Toxic World

Sandra Steingraber is on the faculty of Cornell University. Her book, Living Downstream, was published in 1997 after four years of research. It explored the relationship between human cancer and environmental contamination, and it shocked an ill-informed public. During an eighteen-month book tour, she was impressed by how deeply disturbed audiences were about human health and its connection with the health of the planet. Yet few seemed to believe that it was possible to bring about an end to the production and use of toxic chemicals. A cancer survivor herself, Steingraber lives in

Ithaca, New York, with her husband and their breast-feeding two-year-old daughter, Faith. This article is adapted from her new book, Having Faith: An Ecologist's Journey to Motherhood, to be published in October 2001.

Environmental education in this country tends to focus on individual actions. From Earth Day pamphlets to college environmental science text-books, we are exhorted to recycle, compost our food scraps, turn off the tap while brushing our teeth, and insulate our attics. If we are interested in protecting our own health against a toxic onslaught, we might be advised, say, to air out our freshly dry-cleaned suits before hanging them in the closet, or give up dry-cleaning altogether. We are not told how we might collectively persuade the dry-cleaning industry to switch over to nontoxic, wet-cleaning technology. (The dry-cleaning solvent perchloro-ethylene is a suspected carcinogen and a common contaminant of drinking water. In Ithaca, New York, where I live, the headlines this morning announce a final plan for remediating the contaminated soil and groundwater at one local dry-cleaning shop: the problem was first discovered ten years earlier. Such stories are replicated across the United States.)

Or consider the widespread contamination of ocean fish with mercury. The official response of our state and federal governments has been to warn the most vulnerable among us—pregnant and nursing mothers—to restrict their consumption of fish.

This relentless attention to individual sacrifices seems almost unique to environmental issues. Other human troubles—shootings in schools, intoxicated drivers on the highway, cigarette addiction among teenagers—are widely understood as political problems requiring political solutions. Thus, a million moms march on Washington to demand changes in handgun regulations, Mothers Against Drunk Drivers pushes for lower limits on blood alcohol levels, and tobacco advertising is restricted. We somehow understand that inviting individual citizens to just say no to firearms, liquor, and cigarettes isn't the total solution.

In contrast, we pretend that we can all live safely in a toxic world if we as individuals just give up enough stuff: stop eating meat, stop eating fish, stop drinking tap water, stop swimming in chlorinated pools, stop microwaving in plastic, swear off dairy products, remove shoes at the door so as not to track lawn chemicals into the living room, handwash silk blouses rather than drop them off at the dry-cleaners. Or worse yet, we pretend we can shop our way out of the environmental crisis: buy air filters, buy water filters, buy bottled water, buy pesticide-removing soaps for our vegetables, buy vitamin pills loaded with antioxidants to undo whatever damage we can't avoid. It's as though we all aspire to become the ecological equivalent of the boy in the bubble. No wonder people feel depressed.

Fortunately—I do think it is fortunate—few of these lifestyle sacrifices actually offer much real protection for public health. The reason I think this is good news is that the sooner we quit trying to turn our bodies and homes into fortresses against toxic invasions,

the sooner we'll realize that we have no choice but to rise up and demand an end to the invasion. The hard fact is that we cannot opt out of the water cycle or the food chain.

Consider drinking water. You might think you can save yourself from exposures to carcinogens in tap water by purchasing bottled water. But the sense of safety offered by bottled water is a mirage. Because the industry is unregulated, there is no telling what's actually in the bottle. It frequently contains trace contaminants. In some cases, it even *is* tap water. Moreover, it turns out that breathing, not drinking, constitutes our main route of exposure to volatile pollutants in tap water. This is because most of them—pesticides, solvents, byproducts of water chlorination—easily evaporate. As soon as the toilet is flushed or the faucet turned on, these contaminants leave the water and enter the air. A recent study shows that the most efficient way of exposing yourself to chemical contaminants in tap water is to turn on a dishwasher. In short, we're all obligated to protect public drinking water, with which we enjoy the most intimate of relationships, whether we want to or not.

Well then, I'll just filter all the tap water coming into my house, you might be thinking here. Think again. Even if these gadgets worked perfectly—and they don't—you are faced with changing them every three to six months. You're left with a spent water filter laden with all the chemical toxins you're determined to keep out of your own body. Now what are you going to do? Throw it in the trash so it can end up leaching into the land-fill and contaminate someone else's well? Or become a source of dioxin when it's shoveled into an incinerator and lit on fire? Filters for tap water are nothing more than a way of playing an elaborate shell game with harmful chemicals.

Or consider breast milk, that most perfect form of infant nutrition, with its unsurpassed powers to boost IQ, fend off infectious diseases, encourage the development of the immune system, and prevent diabetes, allergies, and obesity. Because it exists at the top of the human food chain, mothers' milk has become the most chemically contaminated of all human foods. It carries concentrations of organochlorine pollutants that are ten to twenty times higher than cows' milk. Indeed, prevailing levels of chemical contaminants in human milk often exceed legally allowable limits in commercial foodstuffs. Thus, on average, in industrialized countries, breast-fed infants ingest each day 50 times more PCBs per pound of body weight than do their parents. The same is true for dioxins.

We cannot ask newborns to become vegetarians. (Soy-based formula is far inferior to human milk. Even as chemically compromised as human breast milk is, breast-fed babies still end up smarter, healthier, less prone to leukemia and exhibiting superior motor skills when compared to their formula-fed counterparts.) We could encourage their mothers to make such changes in their diet, but it turns out that the lifestyle approach to cleaning up breast milk is not very effective. Unless they are strict vegans, vegetarians have just as much dioxin in their fat tissues—from which breast milk is manufactured—as meat-eaters. And even among those who forswear all animal products, veganism must be longstanding—commencing a decade or more before a woman becomes pregnant—to result in meaningful declines in breast milk contamination. A Dutch study has compared

macrobiotic mothers, whose protein sources come primarily from grains and legumes, with omnivorous mothers. The milk of macrobiotic mothers contained less PCBs but their DDT levels were no different. Moreover, the nursing infants of macrobiotic mothers were still ingesting levels of contaminants that were two to eight times higher than the “allowable” daily intake.

On the other hand, political action *can* work to purify breast milk. I am pleased to report that average concentrations of certain key breast milk contaminants—DDT, PCBs, and dioxins—have declined dramatically since the ‘70s. This improvement is a direct consequence of bans, tighter regulations, incinerator closings, emission reductions, permit denials, right-to-know laws, and tougher environmental enforcement. We nursing mothers owe a great debt to thousands of anonymous citizens from all around the world who worked to stop toxic pollution at its source.

The way we repay this debt—and continue the process of detoxification—is to stop distracting ourselves with individual sacrifices and get involved with the political struggle. Start by finding out what toxic chemicals are being released into your home community by visiting www.scorecard.org and entering your zip code in the empty box. Then take a look at some of the 35,000 pages of internal chemical industry documents that formed the basis of Bill Moyer’s exposé, *Trade Secrets*, which was recently broadcast on PBS. These are available in the Chemical Industry Archives at www.ewg.org.

Sit for awhile with the knowledge you gain from these two web sites and notice what emotions and ideas come to you. Ask yourself if we have a human rights problem here. Ask yourself how other human rights activists you admire once prevailed against formidable opponents—how women won the right to vote, how abolitionists succeeded in divorcing our economy from slave labor, how workers won the right to a weekend. I think you will find depression and cynicism yielding to inspiration and courage.

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Living Downstream by Sandra Steingraber. Vintage Books, New York, 1998. \$14.00

Cultural Creatives

By Judy Kramer

THE BEDSIDE CLOCK SAID 2 AM. At midnight I had settled under the covers after a long day. Rather than my usual fast-paced mystery, I had picked up a different book, *The Cultural Creatives: How 50 Million People are Changing the World*, thinking, “This will probably be slow going and put me to sleep.” Whoops, wrong assumption. Here it was, two hours later, and I was thoroughly stimulated.

What could be so fascinating about a sociological treatise that a tired person couldn't put it down? Why do I want everyone I know to read this book?

First, the book describes a profound shift in values and worldview among a growing number of Americans. This shift, mostly unrecorded until now, is so significant that those of us interested in the future should know about it, whether our arena is business, public policy, the media, education, community services, or societal values.

The Cultural Creatives is written by a married couple, sociologist and researcher Paul Ray and psychologist and author Sherry Anderson. Thus it brings together both the macrocosm of collective change and the microcosm of individual change.

The first third of the book is devoted to describing the results of Ray's sociological research, based on extensive surveys and focus groups. According to Ray, for several centuries, two worldviews and sets of values have competed for dominance in the U.S.—what he calls Modernist and Traditionalist.

The Modernists are economically oriented, focusing on material success and what can be seen or touched. While they may belong to mainstream religious institutions, their practical values are more secular. The Traditionalists, in reaction to Modernism, look back to what they call “small town values” and a social order of religious conservatism, male leadership, and traditional relationships.

Then in the last 40 years, a third group holding a new set of values has surfaced, whom Ray has dubbed the Cultural Creatives. Their outlook is global, and their concerns include suppression of women's voices, the destruction of the environment, violence, materialism, and corporate power. Relationships, self-actualization, authenticity, and spiritual development are important; and in politics, they seek a third way beyond “left” or “right.”

Perhaps the most amazing assertion in this section is that while 50 percent of the current U.S. population is Modernist and 25 percent is Traditionalist, the remaining one-quarter of the population is Cultural Creative. Let me repeat that: Twenty-five percent of the U.S. population, or 50 million Americans, hold neither Modern nor Traditional worldviews but are part of a sea change in values.

Another interesting assertion is that 60 percent of Cultural Creatives are women. Having joined 25,000 other women in China for the 1995 UN Fourth World Conference on Women, I was not surprised by this statistic. In my experience, women tend to have less invested in the status quo, and we have a long history of working for social change.

The second third of the book gives an historical perspective on the rise of the Cultural Creatives, from when they were too few to count in the early 1960s to now. Ray and Anderson describe some of the movements that affected the last decades of the twentieth century— for gay and lesbian rights, alternative health care, spirituality, human potential,

and world peace. Then they focus on three basic movements that had a profound impact on American values and policy—the ecology movement sparked by Rachel Carson and *The Silent Spring*; the civil rights movement led by Martin Luther King, Jr.; and the women’s movement, catalyzed by Betty Friedan and *The Feminine Mystique*. The authors tell, in condensed form, the stories of these movements.

Individuals have stories, too. After all, if most people were Modernist or Traditionalist in 1960, where did the current Cultural Creatives come from? The lives of many ordinary “extraordinary” individuals are profiled in these middle chapters, with their “aha” experiences, new perspectives, and subsequent initiatives. Incidentally, this use of stories, both individual and collective, expresses two values of Cultural Creatives—relationship, built through telling stories; and authenticity, how people “walk their talk.”

Ray and Anderson describe three characteristics of the great movements of the last 40 years. In the first place, Cultural Creatives have made up the activist core of each movement, and from them waves of change have reached every part of American life.

Second, these movements are now converging. One need only look to the activism around the World Trade Organization meeting in Seattle in 1999 to see new alliances being formed. Cultural Creatives, and those in the making, are seeing that their various causes—such as the environment, women’s empowerment, the global economy, or human potential—are interrelated.

The third characteristic of the great movements is that they reframed debate. For example, Martin Luther King, Jr., didn’t just say that black people deserved their piece of the pie. He said that civil rights are an underlying value for all Americans, and that all Americans will benefit from inclusiveness. The ecology movement is not just about saving a particular species or place, but rather about leaving a healthy, sustainable environment for our children and other beings in the web of life. The women’s movement is not about women replacing men in power, but rather about women, and men, reaching their full potential and contributing to the well-being of the whole.

Another reason I found the ideas in *The Cultural Creatives* so stimulating is that it offers a reframing of its own. That is to say, the book presents a structure for thinking and perceiving that might change how one understands this unusual time.

It is no small feat to make sense of the world we live in. It is the best of times—more environmental awareness, more understanding of the dynamics of domestic violence, more tolerance for interracial relationships, more women in the public arena, expanding global communication systems. It is the worst of times—systemic environmental degradation, growing religious extremism, consumerism invading every arena, a global economy with no community accountability, ever more sensationalist news. You can make your own list.

Even more, if one has a set of values that finds expression in neither our contemporary materialistic society nor a return to the “good old days,” what is one’s place? One of the findings from focus groups is that Cultural Creatives feel quite isolated. They are surprised to learn that others share their values and concerns.

Since I read the book, my own frame of reference has changed. When I peruse a mainstream newspaper or watch main-stream television news—the central, if limited, mirrors for our time—I can recognize some of the Modernist or Traditionalist threads. It makes more sense now that Cultural Creatives are generally either invisible in the mainstream media or the targets of ridicule and hostility. The mainstream media is mostly Modernist and reflects Modernist values. In fact, the paradoxical state of the world, which reflects the consequences of people acting out of Modernist, Traditional, and Cultural Creative worldviews, makes more sense to me as well.

At the same time, I can see my own place in this era of change. And I feel hope. Are there really 50 million Cultural Creatives in the U.S., with many more in Europe and other parts of the world? I don’t know from direct experience. But with the possibility planted in my mind, I see Cultural Creative initiatives everywhere.

Anderson and Ray spend the last third of their book addressing perhaps the most intriguing questions raised by their work: What is happening now and what happens next? Since the most important aspect of the future—to quote the character Doc in the *Back to the Future* movies—is that it hasn’t been written yet, the authors invite us to consider “Maps for the Journey,” the title of their last section.

We each have a contribution to make—in modeling the world we want to see, in constructing new institutions, in understanding the sometimes surprising diversity of the Cultural Creative movement, in seeking connections and new alliances with others, and especially in communicating our values and worldview.

It is through this last action that Anderson and Ray make their boldest contribution. They have dared to present their findings and their vision to the public, for our critique and our engagement. It is their expressed hope that the isolation of Cultural Creatives can be broken and the true power of the movement can be expressed. At this time, they are preparing their own next step, a book on the “culture of wisdom” they see emerging. I am sure that, like *The Cultural Creatives*, it will have ideas worth losing a few hours of sleep over.

Excerpt from *The Cultural Creatives*

In the end, there can be no step-by-step description of how to become a Cultural Creative. It is a process of culture-making with tens of millions of people doing it in their own ways. Since they are part of a subculture that cannot yet see itself, these millions of Cultural Creatives do not know what a potential they carry for our common future.

Miriam MacGillis, a Dominican sister who founded Genesis Farm in Caldwell, New Jersey, tells a story that makes clear why this matters. An old woman in the Middle East planted a date: “When you plant a date, you know you’ll never eat from the date tree,” Miriam says, “because it takes about eighty years to grow roots deep enough to go to the scarce water. The date trees get so buffeted in that time by windstorms and droughts that for the most part, the tree looks like it’s dying. If you didn’t understand its process, you could easily cut it down. But if you understand the process, you can make the commitment. You have to have an image of what will happen. Once you do, it makes all the difference.”

This is how it is for all of us now. Cultural Creatives especially need a picture of what they are doing and what it means. To bring a new kind of culture to life, they need to be able to stay the course. And they need to know where they have come from and where, as a collective body, they can go.

Perhaps it is true, as Václav Havel observes, that the modern age has already ended. But if it has, how could we tell? Will new maps be sold on every streetcorner? Hardly. As we shall see, we are in the midst of a transition. Mapmakers must be content with seeing the new territory from afar—which means their maps will have serious limits. Still, all clues are helpful when you’re scouting beyond the known boundaries.

The Cultural Creatives: How 50 Million People are Changing the World by Paul H. Ray, Ph.D., and Sherry Ruth Anderson, Ph.D. Harmony Books, Random House, Inc., New York, 2000. \$25.00.

Website: www.culturalcreatives.org

Judy Kramer, a former editor of *Timeline*, is currently the nonprofits liaison for a California state legislator.

Blips on the Timeline

The term “blip” is often used to describe a point of light on a radar screen. Gathered with the assistance of Research Director Jackie Mathes, here are some recent blips which indicate positive changes toward a global community.

Gone is the Lawn

Studies show that the average lawn uses up 10,000 gallons of water over a summer, and a city could save up to 40 percent of its water by replacing grass with other species. Dr. Gordon T. Geballe, associate dean of the School of Forestry and Environment at Yale and the author of a book on redesigning lawns, cites a new trend. Beyond a wave of individual lawn-tinkerers who are simply fed up with lawn-care, many cities and towns are encouraging people to give up grass and offering cash rebates to people who replace their lawns with rock gardens, perennial beds, cactus, or native plants. Researchers at the National Gardening Association say as much as 10 percent of all U.S. yards may now be

grass-free. In Atlanta, more than 900 people have ripped up their grass and replaced it with backyard wildlife patches certified by the Nation Wildlife Federation. The most popular offering by Seattle Tilth, an organic gardening society, is a class on how to rip up a yard. High-end magazines like *House & Garden* have been running detailed features on how to grow prairie grass or moss.

First GE Fish Ban

In an effort to prevent genetically engineered (GE) fish from affecting native species, the Governor of Maryland, Paris Glendening, signed a bill enacting a five-year ban on the release of GE fish into any state waterway that flows into any other body of water. This is the first ban of its kind to be passed in the United States.

Capping CO₂

The Entergy Corporation, one of the largest electric power generators in the U.S., announced that it plans to cap its emissions of carbon dioxide over the next five years. The Bush administration reversed a campaign pledge to regulate the emissions of power plants, and opponents of emissions controls argue that the cost would damage the industry and hinder efforts to close the “energy gap.” But J. Wayne Leonard, Entergy’s chief executive, says, “It is incumbent on every company and individual to take voluntary initiatives to reduce the risks we face in the world today.” A spokesperson for the company said Leonard decided on the cap after listening to scientists at a conference on global warming. The company plans to work with Environmental Defense, an advocacy group based in New York, to develop its emission reduction program.

Electronics Takes It Back

Most electronic equipment contains lead and other materials that could be a serious threat to human health if incinerated or dumped in landfills. Electronics Take it Back!, a nonprofit-based campaign in Silicon Valley, is demanding that manufacturers take responsibility for the safe disposition of their products. That approach, known as “extended producer responsibility,” has already taken hold in Japan, and also in Europe, where the EU parliament has legislated the collection and recycling of such goods at manufacturer’s expense. Last fall, IBM started a program through which users can have unwanted computer gear from any vendor refurbished and donated or recycled for a flat fee of \$29.99 per box. Hewlett Packard recently announced a donation or recycling program, and HP’s Rebecca Roboy said her company hopes to attract more returns than any others because its program costs less for many items, is web-based, and includes package pick-up.

SUGGESTIONS INVITED

We are always on the lookout for interesting subjects for *Blips on the Timeline*. Readers are invited to send articles or clippings indicating positive change to Jackie Mathes at the Foundation. If we use your suggestion, we'll automatically extend your subscription for a year.

The New Military Presence in El Salvador

By Ana Vergara Lencione

As has been the standard decade after decade, today's military presence in El Salvador is conspicuous and extensive. Young soldiers tread heavily in combat boots and camouflage and make no effort to conceal their guns and rifles. But these days, red crosses frame their sleeves, and numerous give-away containers of beans and tortillas dangle alongside their rifles.

A few months ago, the earth in that smallest country in Central America shook so fiercely and for such a protracted length of time that perhaps violence was redefined in the historically war-torn region. When the *terremoto* struck on the morning of January 13, 2001, the country was still entrenched in a painfully slow struggle to recover from the demoralizing effects of the civil war of the 1980s, a war that had hardened a sadly simple historical fact: In El Salvador, there were "the people," and there was "the military."

But nowadays, the drone of military helicopters, once a dreaded sound over mountain villages, means airlifts for the sick and injured or food drops over inaccessible landslide areas. In stark departure from long-standing tradition, the country, for the first time in recent history, is making available its elite military medical resources and personnel to civilians.

Because most of the hospitals throughout the land collapsed in the earthquake, the El Salvadoran government quickly established a large "tent hospital/city" just outside San Salvador in an area called El Cafetalón. There, thousands of victims are now housed, cared for, and fed by the military. My daughter, Maureen Kaila Vergara, a former San Francisco paramedic, recently returned from an earthquake relief mission that took her to El Cafetalón for a few weeks. She experienced a clearly different El Salvador from the one I lived in and remember as a child and the combat zone we all read about during the 1980s.

Maureen worked alongside military physicians and medics who were on call 24 hours a day for an astounding eight consecutive days. At any hour of the day or night these young soldiers with the red crosses on their sleeves are available to the long lines of people that form outside the dirt-floor tents waiting for medical treatment. There is the surgical "ward" where wounds are cleaned and cared for in sometimes futile but always aggressive attempts to cure infection or interrupt gangrene. There is a psyche ward where

the emotionally traumatized are counseled and looked after. There is a tent where doctors do nothing but try to mend broken bones. There is a dental “office,” a little rudimentary school and soccer field for the children, and a large open space where people are given rice, beans, tortillas, and water at least once a day.

Throughout El Cafetalón, there is uncharacteristic sharing of knowledge among military and nonmilitary personnel, and unusual cooperation among soldiers and civilian volunteers. The government is apparently open in its operations and provides full accountability for donations arriving from different parts of the world. While government officials frankly don’t know how the massive reconstruction will be carried out or what the outcome will be for the thousands who before had little and now have nothing, nevertheless the homeless have (some) shelter. The hungry have (some) food. The children are somehow cared for.

But more significantly, there is trust and compassion among the soldiers and the thousands of people who now share common though shaky ground in El Cafetalón. In this implausible “M*A*S*H-like” setting in El Salvador, there seems to be budding a long-awaited mutual sense of respect and bonding that is not jeopardized by the one-sided presence of guns and rifles.

It wasn’t always like that. Though a life-time ago, I can remember shaking in my little-girl shoes at the menacing sound of a soldier’s boot. But these days, the children look up hopefully at the sound of the soldier’s boot—a small thing (and probably difficult to fathom) to those who have never experienced it, but an awesome and meaningful thing to those of us who have.

The writer was born in El Salvador and lives in San José, California. Her daughter, the former paramedic referenced in this article, is Maureen Kaila Vergara, the Olympic cyclist who represented El Salvador in the last two Olympic Games and who continues to work in different ways for the people of El Salvador. During the medical mission to El Salvador referenced here, Maureen took with her numerous medical supplies generously donated by the Oakland and San Francisco Fire Departments.

William McDonough on Designing the Next Industrial Revolution

Last October, the Collective Heritage Institute held its 11th Bioneers Conference, a gathering of biological pioneers from diverse fields and cultures “who are providing pathways to a future environment of hope...an alternative scenario to the destruction depicted daily in the news... a revolution from the heart of nature.

The following address at the conference by architect William McDonough is reprinted with permission from the Bioneers. McDonough is the founding principal of William McDonough and Partners. In 1996, he received the Presidential Award for Sustainable

Development, the nation's highest environmental award, and in 1999 he was named "Designer of the Year" by Interiors magazine and one of the "Heroes for the Planet" by Time.

I'm a designer and I want to talk briefly about the concept of design itself. Design is the first signal of human intention. As we look around at the tragedies that we see in the making, we realize that we have to ask: Did we really intend for this to happen? Is this something we designed? Perhaps it's time for some new designs.

I'm going to ask you to join me as a designer. I'm going to present the problems we work with and ask you to help me solve them, so you can see what we have to deal with every day. The fundamental questions we find ourselves asking ourselves over and over again while we're designing are these: How do we love all of the children of all species for all time? When do we become native to this place? When do we all become indigenous people? Why do we leave the things we leave—plutonium, global warming, endocrine disrupters?

If we really realized that we have to love all of the children of all species for all time, why is it that in Germany today, no mother's milk would be legal to sell on a store shelf? How do you love all the children if you toxify mother's milk? You can't say it's not part of your plan that these things happened, because it's part of your *de facto* plan. It's the thing that's happening because you have no plan. And planning is most effective when it's practiced in advance. We own these tragedies. We might as well have intended for them to occur. Once you realize that our culture has adopted strategies of tragedy, perhaps it's time to have strategies of change.

First we have to start with great humility. We don't know what to do. We have indigenous traditions we can draw from, but we don't know what to do. If anybody has any problem with the concept of design humility, reflect on the fact that it took us 5,000 years to put wheels on our luggage.

So as an assignment, let's design an industrial system for world culture that treats nature as an enemy to be evaded or controlled; that measures prosperity by how much natural capital you can cut down, dig up, bury, burn, or otherwise destroy; that measures productivity by how few people are working; that measures progress by the number of smokestacks (if you're especially proud, put your names on them). It is a system that destroys biological and cultural diversity at every turn with one-size-fits-all solutions, requires thousands of complex regulations to keep us from killing each other too quickly, and while you're at it, produces a few things so highly toxic that it will require thousands of generations to maintain constant vigilance while living in terror. Can you do this for me? Welcome to the first Industrial Revolution.

It's time for a new design assignment. In 1991, I was commissioned by the city of Hannover, Germany, along with my firm and friends, to write the Hannover Principles. The same culture that created the worst of human intention in the '40s was now asking

what the best of human intention would look like. Here are some of the principles we wrote in 1991-2:

Insist on the right of humanity and nature to coexist. Recognize inter-dependence. Expand design considerations to recognize even distant effects. Respect the relationships between spirit and matter. Accept responsibility for the consequences of design. Create safe objects of long-term value. And eliminate the concept of waste, which might be the most crucial principle. Not minimizing waste—that's not real efficiency. We must eliminate the entire *concept* of waste and learn to rely on natural energy flows. Nature doesn't mortgage the past or the future. We shouldn't either.

More principles: Waste equals food. Use current solar income. Respect diversity. The big debate between commerce and environmentalists today is growth/no growth. Business says we have to have growth for the benefit of commerce. Environmentalists say growth is destroying the world. Well, isn't the real question, "What do you want to grow?" Wouldn't we rather grow prosperity, not ignorance? Wouldn't we rather grow intelligence, not stupidity? Wouldn't we rather grow health, not sickness? What do we want to grow?

The design criteria we use are different than most people's. We start with cost/performance/aesthetics, the same ones everybody uses: Can I afford it? Does it work? Do I like it? At architecture school, we obviously reverse that order. But we add: Is it ecologically intelligent? Is it fair? And is it fun?

If waste equals food, everything's a nutrient. If everything's a nutrient, it belongs in a metabolism. What are the metabolisms of the world? Well, there's life itself, which we call the biological, and there's the human-made technical metabolism. Design should fit into both these cycles. A biological product is something that you can consume. It goes back to soil.

Technical products we call products of service. You really want the service, not necessarily the ownership. If I had a TV hiding behind this podium, and I said, "I have an amazing object that provides incredible service, but before I tell you what it does, let me tell you what it is, and you tell me if you want this in your house. It has 4,360 chemicals; it's full of toxic, heavy metals; it has an explosive glass tube; and we think you ought to put it at eye-level with your children and encourage them to play with it." Do you want this in your house?

Why are we selling people hazardous waste? What you want to do is watch TV, not own hazardous material. These should be products of service. You want to design them so they go back to the same industry from whence they came. The idea of designing for durability is insane at this point. If I took my computer and said, "I've got this computer I just bought. It's going to last me for 25 years." You would say, "You are an idiot." What I

want is its service until its chips are obsolete in two years. It should be designed to go back and back and back forever instead of destroying the world.

What we're looking at is the idea of celebration of abundance instead of the bemoaning of limits. We're using too much stuff over time. We have to use less stuff over time. We're saying, let's change time to stuff, and stuff to intelligence. We'll get smarter and smarter and smarter and use less and less stuff because we'll learn to sequester materials for human use in technical and/or biological cycles, and then we can leave the rest of the world alone and still prosper.

We're designing a building for Oberlin College which will make more energy than it needs to operate. It's a building that's like a tree. It pays back its energy mortgage. This is using nature as a human tool. Our goal was to design a building that makes oxygen, sequesters carbon, fixes nitrogen, distills water, accrues solar energy as fuel, makes complex sugars and food, creates micro-climates, builds soil, changes with the seasons, and self-replicates. In the building we built, sewage is treated in a living machine, designed by John Todd, at the entrance to the auditorium.

We're applying these ideas to the carpet industry. Yesterday, one of the largest carpet companies in the country joined some other companies that have adopted our protocol. Carpets will become products of service. When you buy a carpet, what you want is acoustics, comfort, and so on, but the product should be designed to go back to the industry, not to a landfill.

We're also doing work with Nike, postulating that the future of a shoe should be that the soles would abrade, and instead of being terrifying for worms, it would be healthful, and the uppers are new polyesters that are infinitely recyclable. We're designing a shower gel that makes fish happy when it hits the water. We're looking at automobiles and studying their materials flows to understand how many materials are going through the actual recycling. We're positing that the materials in cars will become cars again forever. We're hoping to be able to issue environmental statements which track every molecule moving through a company and show how we're using the tool to create constant improvement.

For buildings, we've designed factories for Herman Miller. One won *Business Week's* Design for Business Award for the best building in America for business. That factory's performance is up 24 percent with the same number of people, and they're delivering \$30 million to the bottom line every six months. The building cost \$15 million to make. We gave everybody fresh air and daylight. They wear aloha shirts and make furniture and performance is up. Go figure.

For The Gap in San Bruno, California, we designed their corporate campus and we said, "Wouldn't it be wonderful if the roof was an ancient landscape of grasses of this area so if the birds were flying overhead, they would look down and say, 'Oh, it's our people.'" The roof undulates so that the people inside feel like they're working under a cloud all day. We use nighttime air to pre-cool the building so that everybody can use 100 percent

fresh air and daylight all day long. It just won an award from PG&E as one of the most efficient buildings in California, but we never designed it to be efficient. The building it was competing against was a building that was designed to minimize daylight and minimize fresh air. This is 100 percent daylight, 100 percent fresh air. Why are we designing buildings? For the building? Or for people?

For Nike, we've done a new corporate campus that's the largest geothermal system in Holland. It's designed for photovoltaics and grass. It recirculates its water.

Our most recent project, the Rouge plant, has been approved by the board of Ford Motor Company. It's a \$2 billion project over 20 years, the first vertically integrated industrial facility in the world. Coal and iron ore come in at one end, cars come out the other. We're redoing it based on a new vision for the chairman, Henry Ford's great grandson. The basic strategy is to go back seven generations and take a look at the site and see where we started. Take a look at it when the first Henry Ford got there and take a look at it today, and then ask ourselves what the next seven generations of this site will look like? Our goal will be for the factory itself to get integrated into the ecology of the place. The surest way to heal an ecosystem in ill health is to connect it to more of itself.

Humans as tools for nature. This idea of humans making smaller footprints is ridiculous. We need bigger footprints, but we should leave behind wetlands. We can celebrate the abundance of the natural world. We can celebrate what makes us special: our intentionality. We have creativity and we have hope. We celebrate the wonders of nature and allow our children's children's children's children's children's children's children to celebrate life and the pursuit of happiness, free from the intergenerational, remote tyranny of bad design.

The 2001 Bioneers Conference will be held October 19-21. Contact: Collective Heritage Institute toll-free at 1-877-BIONEER; website: www.bioneers.org. McDonough's website: www.mcdonough.com

THE WORLD CHANGED TODAY: Bill McDonough and the Birth of the Sustainable Economy

This is a video about the revolution Bill McDonough is leading to transform the relationship of nature and commerce, featuring McDonough's projects at Ford Motor Company, Herman Miller Furniture, Nike Corporation, DesignTex/Rohner Textil, Oberlin College, and Volvo. It can be valuable for business, schools, groups, and discussion forums.

Produced by Earthome. \$35.00, including shipping and handling. To order or for more information contact: Shelley Morhaim P.O. Box 212 Stevenson, MD 21153; (410) 419-3012; E-mail: filmwork@earthome.org

Report from the Underground

By Paul Stamets

What's the best way to clean up contaminated soil or groundwater? It may not be by digging them out and moving them to special landfills. An article in The New York Times titled "New Pollution Tool: Toxic Avengers with Leaves" tells how plants can be used to treat metal and organic contaminants, radioactive elements, and sewage.

In the article, The Times notes: "In the United States alone, the cost of decontaminating tens of thousands of toxic sites on factory grounds, farms, and military installations is expected to eventually surpass \$700 billion. The main approach so far...is costly and disruptive, often requiring fleets of trucks, forests of mechanical wells, and other equipment. After a decade of field and greenhouse tests, a variety of techniques harnessing the absorptive power of plants' roots appear poised for a much expanded role."

The concept of Bioremediation is not new. For years, "Bioneers"—biological pioneers—have been installing inexpensive low-maintenance systems in countries all over the world using microbes, flowers, snails, clams, crayfish, and fishes to gobble up all manner of waste products. These systems can produce drinkable water from sewage, treat the industrial wastes of a small city, and detoxify Superfund sites containing such nasty chemicals as 2,4-D, coal-tar derivatives, and creosote (see Timeline May/June 1995).

At last year's 11th Bioneers Conference, Paul Stamets explained how mushrooms are among nature's creations which can help clean up the messes we humans leave. Stamets, a researcher, lecturer, and author, is president of Fungi Perfecti, a mail-order business supplying cultures, equipment, and technologies to mushroom cultivators around the world. Here are excerpts from his presentation.

I call mushroom mycelia "Earth's natural internet." A mushroom mycelium can have a mile of cells in a cubic inch of topsoil. These root systems digest nutrients externally. They produce acids and enzymes to de-molecularize large organic complexes such as plant fibers and animal tissue. Throughout the world, on every landmass, there are mosaics of overlapping mycelial mats coursing underfoot.

The complexity of these mycelial mats is the basis of our food chain. Unless fungi recycle these nutrients, all ecological systems in the world will collapse. A mycelium moves silently but quickly, two to four inches a day. As a mycelium courses through the environment, it picks up information about what needs to be repaired, what needs to be recycled.

We have only scratched the surface of the wondrous potential uses for mushrooms. We can grow oyster mushrooms on coffee grounds, very important in Central and South America where there's a tremendous outflow of caffeine that's going into the watersheds

and destroying fisheries. We have developed mycelial mats to throw into sensitive watersheds to collect the dreaded 0157 strain of *E. coli* and destroy it. As the mushroom mycelium grows, it sends out a group of little messenger crystals that, as they encounter the *E. coli*, disintegrate, send back a chemical signature—information back to the mother mycelium—which then produces a secondary large macro-crystal that becomes like a strange attractant to the *E. coli*. The *E. coli* collect around these strange unknown crystals, are stunned, and the mycelium advances and consumes them.

Because the mushroom mycelium produces enzymes that sever hydrogen-carbon bonds, I was approached by a bioremediation company about decomposing diesel oil. The mycelium absorbs the oil and breaks down hydro-carbons, the basis of all pesticides—PCBs, PCPs, dioxins. We create the greatest debris trails of any organism on the planet and these things are running behind us trying to help, trying to repair the environment.

The Department of Ecology was fining the Department of Transportation of Washington State because of a toxic waste field. In a contest in Bellingham, Washington, we were one of six companies competing to see who could break down the diesel-contaminated soil. We mixed up the mushroom mycelium into the sixth pile of contaminated soil. One month later we went from pile to pile and the first five piles were dead, smelly, ugly, lifeless. We pulled the tarp away from the sixth pile, and there were oyster mushrooms, some up to 12 inches in diameter. But something even more remarkable occurred. After eight weeks, the mushrooms started to rot and they produced spores. The spores attracted insects. The flies laid eggs in the mushrooms; larvae were produced. Birds came in to eat the larvae. They brought in seeds which began the process of phytoremediation, i.e., plants growing.

So we think we have found a keystone mechanism—based primarily on organisms which can live on dead or decaying matter—that causes a domino effect which leads to repair of the ecosystem. I do think that we face an impending ecological collapse. Fifty percent of the mycorrhizal mushrooms in Europe have become extinct in the past 30 to 40 years. This is bad news because fungi can help repair the planet.

Reprinted with permission of the Collective Heritage Institute, organizers of the Bioneers Conference. Stamet's website: www.fungi.com

Five Strategies for Reinvention in Business

By Jacquelyn Ottman

"Strategies are on hand to drive innovation along a new model Sustainable development represents an opportunity to develop better products."

Jacquelyn Ottman is president of J. Ottman Consulting, a New York City-based consulting firm that advises companies on "eco-innovation"—how to develop and market

environmentally sustainable products. She has authored the book, Green Marketing: Opportunity for Innovation, and her firm publishes The Ottman Report on Environmental Marketing and Eco-innovation. Below is an abridgement of an article that originally appeared in O2 Magazine of Sustainable Design and came to us via the e-mail newsletter "Sustainability Review." Our readers in business may see ways they can apply Ottman's strategies. As consumers, we can all find help in this article for identifying businesses that are making efforts toward sustainable practices.

Efficiency will be critical to product development efforts in the years to come. As the world searches for ways to develop sustainably, particular opportunities will emerge in the areas of energy efficiency and renewable energy, alternative agriculture, recycling, mass transportation, and information technology. Pioneers in the development of new products and technologies are likely to be rewarded with opportunities to develop new markets, reduce costs, change the rules in their industries, and offer better products with enhanced customer satisfaction.

Efficient products are cheaper to operate. An example is computers that power down when not in use. Efficient products provide less of what customers don't want. Dell understands this; they build each computer from the ground up to the exact specifications of their customers. Efficient products are cheaper for people to dispose of. For example, they may have no unnecessary packaging, or they may be taken back by the manufacturer for recycling or reuse. Efficient products are also guilt-free. According to one survey, 82 percent of Americans agree that "most of us buy far more than we need." 58 percent agree that "it would make a big difference in helping the environment if we taught our children to be less materialistic." This indicates that guilt-free products can help to generate customer loyalty.

Marketers looking to streamline existing products and incorporate efficiency into their new product development efforts can consider the following five strategies:

1. Set Outrageous Goals

Set the kind of goals that make people drop their jaws. Aggressive goal-setting forces individuals to think out of the box for new solutions. Ask: "What would we do if we had to eliminate waste, water, energy, and other environmental impacts by 100 percent and still meet the needs of our customers?" Dupont and Xerox know the value of setting outrageous goals. Their environmental goals are "zero waste" and "waste-free products from waste-free facilities." Aggressive goals like these send a message that a company is serious in its intent.

2. Think Like a System

Look beyond your product in isolation, to the entire system in which it operates. Proctor & Gamble recently teamed up with Maytag to develop Tide HE (HE for "high efficiency") to complement Maytag's new Neptune ecologically correct washing

machine. In the Netherlands, Huib van Glabeek designed a combined toilet and washbasin unit that saves both space and water: the waste water from the basin is used to flush the toilet.

3. Dematerialize

Meet your customers' needs with as few resources as possible. This suggests possibilities for miniaturization, such as superconcentrated laundry detergents, as well as multipurpose products like solar panels built into wall siding. Another strategy is to offer "products of service." Car leasing and copier leasing are two examples. Interface, a leading manufacturer of commercial carpeting, has inaugurated an innovative "Ever-green Carpet Lease." Customers lease the carpet and accompanying maintenance services. Interface retains ownership of the carpet and takes it back after use for additional uses or recycling, thus retaining the value of the carpet as an asset and keeping the carpet out of landfills.

4. Make It Fit

Albert Einstein once said, "Make things as simple as possible and no more." Make products fit customers' needs—and no more. This strategy makes the case for appropriate technology. For example, it can be argued that combustion engine vehicles represent too much technology and resources for most of the transportation needs they fill day-to-day. Electric vehicles are far better suited for short trips and local commutes. This suggests an alternate market positioning for electric cars, which are currently positioned in the U.S. as exact substitutes for combustion engines. This strategy also has implications for localized technologies, especially for renewable energies like solar, wind, and hydro.

5. Restore

Environmental product efforts are generally initiated with a goal of minimizing environmental impact. The underlying assumption is that products use up resources and create waste. But why not develop products and marketing programs that can actually add something back to the environment or to society? Marketing programs that give back value or education on important issues can also help to offset the effects of consumption. In the U.S., Hannah Anderson, a catalog retailer of children's clothing, encourages customers to send back used clothing and offers a 20 percent discount on future orders as an incentive. The company then sends the clothing to children in need in a program they call "Hannahdowns." In the U.K., an inventor developed the BayGen radio as a vehicle for bringing information about AIDS and birth control to people in developing countries, where batteries are scarce and expensive and there are no facilities for recycling or safe disposal. His radio relies on an old-fashioned mechanism. One winds up a crank for 25 seconds and gets 25 minutes of playing time. Extending the social benefits further, the radio is made by disabled workers in South Africa.

CONCLUSION: The potential for efficient, and hence sustainable, products to enhance customer satisfaction can be viewed in several ways. Strategies are on hand to drive innovation along a new model that says products don't have to be disposed of, they can be more useful to society if they are reused or remanufactured. People's needs can be profitably met with services in place of products or an optimum combination of both. Sustainable development represents an opportunity to develop better products

Jacquelyn Ottman's website: <http://www.GreenMarketing.com>

Biotech Is Pushing the Possibilities Past the Breaking Point

By Tom Abate (San Francisco Chronicle, February 5, 2001)

Tom Abate's column "Bioscope" is a weekly staple in The San Francisco Chronicle, covering the news that streams from the biotechnology industry. Noting with due respect that he does not hesitate to call attention to the ethical issues of the industry upon which his livelihood depends, Timeline asked Abate for permission to print this excerpt from a column written in response to two items: the news of a bioengineered mouse with a human ear growing out of its back and the announcement by a physiologist at the University of Kentucky and a fertility expert in Italy that six couples had signed up for their experiment to clone human beings.

Many people are asking questions about biotechnology these days. But they generally question bits of technology. They don't look at things in a comprehensive way. Different constituencies take one aspect of the biomedical complex and ask, "Do we know what we're doing?"

The answer is no, we never have, and in any case it's not the sort of question that generally gets asked in Western civilization. Our culture is based on an implicit faith in technology— advances in technology have tended to improve life spans and prosperity. Western culture has let technology evolve at its own pace, trusting that the process would yield more blessings than drawbacks.

This is not to say that technology is or ever was entirely unfettered. In the biotech context, for instance, government agencies oversee medical and agricultural experiments by company scientists. At universities, institutional review boards peek over the shoulders of researchers, asking questions like how many animals will be consumed in an experiment and whether there is an alternative.

Yet I see two trends forcing us to question our blind faith in technology.

The first trend is public suspicion that our watchdog institutions are unable to ride herd on change. Such cynicism isn't new. But the explosion of knowledge and the accelerating pace of innovation would stress even a perfect regulatory system, and we know our system isn't perfect. Not long ago, for instance, a young man died during a gene therapy experiment because a professor with a financial stake in the outcome was a bit too aggressive in administering a potent medicine.

The second and newer trend is that technologies that seemed like science fiction a few years ago are now within the reach of small teams of experts. For instance, the February edition of *Wired* magazine carried a cover story on cloning which boasted that a good cell biologist could produce a human clone for \$50,000.

After 1997, when Dolly the sheep made headlines, California and a few other states passed laws against human cloning. The federal government has banned the use of federal funds for human cloning experiments but has placed no restrictions on what private entities can do.

Should there be a law against human cloning? I don't have a firm opinion. What I do worry about, however, is whether the law could ever keep pace with biotech, because at some point I'm certain I'll want to outlaw something.

Which brings me back to the mouse with the ear on its back, and the question, "Do we know what we're doing?" At this point, that heretical query is being spread by critics... such as biotechnology foe Jeremy Rifkin, Northern California food activists Frances Moore Lappe and Anuradha Mittal, and culture critic Jerry Mander.

But these critics are laying the groundwork for a needed culture change. We must learn to control the inexorable growth of technology. Biotechnology will be at the crux of this change, because I am sure that science will make it possible to do things with life that our moral sensibilities will not allow.

It is time for us to define civilization not by the things which our technology makes possible, but by which possibilities we chose.

If

If you have food in your refrigerator, clothes on your back, a roof overhead, and a place to sleep, you are richer than 75 percent of the people of this world.

If you woke up this morning with more health than illness, you are more blessed than the million who will not survive this week.

If you have never experienced the danger of battle, the loneliness of imprisonment, the agony of torture, or the pangs of starvation, you are ahead of 500 million people in the world.

If you can attend a church meeting without fear of harassment, arrest, torture, or death, you are more blessed than three billion people in the world.

If you have money in the bank, in your wallet, and spare change in a dish someplace, you are among the top 8 percent of the world's wealthy.

If you can read this message, you are more blessed than over two billion people in the world who cannot read at all.

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Palo Alto, California
July, 2001