To Diane
There also seems to be one commonality that transcends differences in how these leaders go about their work and their development. This is the principle of creative tension. Despite all their many differences, truly effective leaders seem to come to a shared appreciation of the power of holding a vision and concurrently looking deeply and honestly at current reality. I have never seen an effective leader who did not recognize this principle, whether he or she had thought about it consciously or not.

We did not invent the principle of creative tension through the organizational learning work; indeed, many others have described it in the past. Imprisoned in the Birmingham, Alabama, jail after a historic ant segregated protest march, Martin Luther King Jr. wrote, “Just as Socrates felt that it was necessary to create a tension in the mind, so that individuals could rise from the bondage of myths and half truths . . . so must we . . . create the kind of tension in society that will help men rise from the dark depths of prejudice and racism.” While Dr. King is famous for his “dream” of equality, his leadership, like Gandhi’s before him, was grounded in helping people see current reality, “to dramatize the present situation,” as he put it. He knew that the juxtaposition of the two, the dream and the present reality, was the real force for change.

I’ve been surprised to discover that the term “leader” is generally an assessment made by others. People who are truly leading seem rarely to think of themselves in that way. Their focus is invariably on what needs to be done, the larger system in which they are operating, and the people with whom they are creating—not on themselves as “leaders.” Indeed, if it is otherwise, there is probably a problem. For there is always the danger, especially for those in leadership positions, of becoming “heroes in their own minds,” as longtime colleague and co-author Bryan Smith puts it.

A Hewlett-Packard employee studying the company’s history once asked co-founder David Packard about his theory of leadership. She reported that after a long pause, he said simply, “I don’t know about theories of leadership. Bill [Hewlett, the co-founder] and I were just doing what we loved and were so delighted that people wanted to join us.”

In the fall of 2002, Mieko Nishimizu of the World Bank was asked to deliver a keynote address in her home country, as part of a celebration of the fifty-year anniversary of Japan entering the “Bretton Woods Accord,” the post-World War II international monetary regime. In the speech, Nishimizu shared her personal story of coming to terms with the reality of poverty and her perspective on our global situation. Near the end, she eloquently summarized the poignancy of the historic times in which we live.

The future appears alien to us. It differs from the past most notably in that the earth itself is the relevant unit with which to frame and measure that future. Discriminating issues that shape the future are all fundamentally global. We belong to one inescapable network of mutuality: mutuality of ecosystems; mutuality of freer movement of information, ideas, people, capital, goods and services; and mutuality of peace and security. We are tied, indeed, in a single fabric of destiny on Planet Earth.
The impetus for building organizational learning capabilities has traditionally come from people who want to find more effective approaches to organizational change; who want to build more adaptive enterprises; and who believe in growing human and social capital in order to grow financial capital. But today, a new set of external motivations are starting to form, as we wake up to our "single fabric of destiny" and realize that we face profound societal and organizational learning challenges. Today I believe that the real possibilities for creating learning organizations may arise from the intertwining of these two forces for change.

All organizations sit within larger systems—industries, communities, and larger living systems. In one sense, it is illogical to think that the well-being of a company can be advanced independent of the well-being of its industry, its society, and the natural systems upon which it depends. For a long time, businesses have taken these larger systems mostly for granted, but it is now increasingly evident that businesses, individually and collectively, influence these systems and that the consequences of that relationship are becoming significant. Some of these influences are clear, such as when a manufacturing facility relocates, leaving half of a town unemployed, or when a power plant discharges nitrous and sulfuric oxides into the air. But many of the influences arise through larger systemic connections that remain invisible to most.

As I am writing this, yet another devastating hurricane has just hit the Gulf Coast in the southeastern United States. Like many other people, I am concerned for the safety and well-being of those affected—but I am also worried that we will not focus on solving the bigger issues. Once the immediate crisis has passed, the deeper systemic issues will remain. The pictures of entrenched poverty that the hurricanes have revealed have shocked many. But in fact, many people in the United States live in Third World conditions. The states hardest hit by the hurricane—Arkansas, Mississippi, and Louisiana—have, respectively, the first-, third-, and fifth-highest percentages of residents living below the poverty line in the United States.1 And the increased frequency and strength of the hurricanes in the last seasons is not just bad luck. Climate experts have been warning for years that as the oceans heat up, weather instability will grow; in particular, they have warned us that tropical storms moving over these warm waters have more energy to draw into them, leading to more and more severe hurricanes.

I believe climate change and entrenched poverty coexisting with economic prosperity are as much the icons of our age as are the Internet and global markets. As individuals and as businesses, we have never had to be concerned about how day-to-day decisions like the products we buy and the energy we use affect people who live thousands of miles away, or on the other side of the planet. This is the human side of globalization, and it is, indeed, an alien place for all of us. We've never been here before—and the future is watching.

SEEING SYSTEMS

Systems citizenship starts with seeing the systems that we have shaped and which in turn shape us. As the players in the beer game learned, being stuck in a system that is not working invariably leads to feeling frustrated and trapped—until we see the larger patterns and our own part in creating these patterns. Once we do, new alternatives become evident.

There are two fundamental aspects to seeing systems: seeing patterns of interdependency and seeing into the future. The ability to see interdependencies can be aided by tools like systems diagrams, but can also arise from stories, pictures, and songs. Seeing into the future starts with knowing how to interpret signs that are present today but go unrecognized by those without a systems perspective.

Seeing interdependencies that have been invisible to us leads to a particular kind of awakening, “knowing what we knew but didn’t know that we knew.” Several years ago, two different engineering specialty groups within a large product development team created the following diagram showing how they inadvertently created problems for one another.1

When one group (the NVH [noise-vibration-harshness] engineers) had a vibration problem and a quick fix, like “adding reinforcements,” rather than working with the other group on a more integrated solution, the side effects, such as the added weight of the reinforcements, often affected the second group. The second development group (who were responsible for the total weight of the vehicle) then followed suit: eschewing a collaborative solution with the NVH engineers, they simply took out the weight elsewhere and compensated with their own quick fix, such as specifying a higher tire pressure to meet safety requirements. But the higher tire pressure had the side effect of increased harshness, which then
became a whole new problem for the NVH engineers. When both groups saw the diagram together, they recognized a pattern that had plagued them for years, a reinforcing reliance on quick fixes caused by schedule pressures and an unwillingness to take the time to work out integrative solutions—and they knew how it had arisen. As they sat there, shaking their heads, they also saw what this pattern meant for their future: escalating hostilities and inferior overall product designs. Finally, someone said, “Look what we’re doing to ourselves.”

My experience is that when people truly see a systemic pattern that they have created and comprehend the suffering it will create in the future, they invariably discover ways to change the pattern. For these engineers, changing the pattern meant simply developing trust and working more closely together to achieve their goals, and they did just that. Spurred by several other similar awakenings, the larger team eventually finished the major new model car they were developing one year in advance, and returned over $60 million in allocated but unneeded “overrun budget.”

SEEING THE GLOBAL CLIMATE CHANGE SYSTEM

Seeing global systems in ways that mobilize change may seem more difficult, but I believe the basic principles are not fundamentally different. Following is a simple systems diagram to help people see the system influencing global climate change.7 As with the beer game, our first need is to expand our personal boundaries of awareness beyond just managing our own position. In this case, the traditional focus of business and of society has been on economic activity, and its growth through reinforcing processes involving income, demand, and capital investment. What we have not seen, until very recently, is one of the physical by-products of economic growth: greenhouse gases like CO\textsubscript{2} released into the atmosphere.

These emissions flow into a stock of CO\textsubscript{2} in the atmosphere (CO\textsubscript{2} concentration), just like the orders placed in the beer game flow into the supplier’s backlog.4 (See page 49.) As the stock of CO\textsubscript{2} in the atmosphere rises, more heat is trapped in the atmosphere. The resulting temperature increases have largely unknown effects on natural systems and ultimately on economic activity. Some claim that warmer climates will be good for business and economic growth. But many question these optimistic scenarios, and the simple truth is that immense uncertainties lie ahead—including weather instability, the spread of tropical diseases, the effects of added freshwater in the oceans from melting glaciers and polar ice, and shifting ocean currents.

In recent years, people around the world have begun to see this system, but they have sharply divided views about the implications for the next few decades and consequently the urgency of curtailing CO\textsubscript{2} emissions. Enough countries eventually approved the 1994 Kyoto Protocol, designed to curtail greenhouse gas emissions, that it finally went into effect in 2003. But the two largest producers of
CO₂ emissions, the United States (approximately 25 percent of global emissions) and China (approximately 11 percent), refused to join. A small but growing number of global corporate leaders believe even more aggressive actions are needed, including BP's John Browne, who first broke ranks with other oil company CEOs in 1997, speaking out about the dangers of climate change in a historic speech at Stanford University. Still, for many citizens of the world, climate change remains a disquieting but distant concern. As an American friend said to me recently, "Well, it will probably be a problem for people in a hundred years or so."

These sharply diverging views are a tragic testimony to our inability to apply even the most rudimentary systems thinking to look at the facts we have today in ways that allow us to see their implications for the future. The following graphs show historical data from the last one hundred and fifty years that correspond to the parts of the systems diagram, CO₂ emissions and average temperature, at the periphery of our mental models. The lower curve shows a slight rise—a bit less than 1 degree—in average annual temperature, not likely to invoke great concern, especially given the many short-term fluctuations. But patterns in the top two curves are much less ambiguous: CO₂ concentration in the atmosphere has increased about 30 percent over the last one hundred and fifty years (middle graph) and CO₂ emissions from combustion of fossil fuels (top graph) has grown dramatically from virtually zero.

I first showed these graphs at a major business conference on sustainable development in Europe in 2004. The five hundred or so attendees were knowledgeable and involved in a host of sustainability initiatives, including climate change. Eager to gauge their ability to interpret these curves systemically, I asked, "How would an 8-year-old child make sense of this situation and what would they want to know?" I suggested to the group that they start by thinking of a bathtub and the water flowing into the bathtub. People quickly saw that CO₂ emissions are like the water flowing into the tub and CO₂ concentration is like the current water level. When I asked what other information the child would want to know, several realized that the future also depended on the size of the outflow, the rate at which CO₂ is coming out of the atmosphere. Having realized that this missing piece of data was important to know, I asked how many people knew what the level of this outflow, "carbon sequestration," was in relation to the level of the inflow of emissions. I was shocked to find only about ten hands raised. At that moment I understood why we were in trouble. Only a few people in a group of this caliber knew that CO₂ is coming out of the atmosphere at far less than one-half the rate at which it is going in!"
Gradually the significance of this figure dawned on the group. Even if every country in the world met the targets of the Kyoto Protocol tomorrow (stabilizing global emissions at 1990 levels), CO₂ would continue to grow forever! A 50 percent, or greater, reduction in CO₂ emissions worldwide is beyond anyone's most aggressive plans.  

No one knows how the global climate system will react to a continuing dramatic increase in CO₂ concentration. More importantly, no one knows what we as denizens of Earth will choose to do to reduce emissions. As the ancient Chinese adage goes, "If we keep heading as we are, we are likely to get where we are going." And we do know that the "we" will be our children and grandchildren. Despite all the uncertainties, it is safe to say that we have not yet seen the real effects of climate change, but the next generations will—unless we can learn to see the system we are creating and head in a different direction.

**LIVING AS IF WE ARE THE SYSTEM**

It is easy to get lost in thinking about global issues like climate change, to feel that there is nothing you can do, and maybe even that there is nothing anyone can do. But global systems are not just global. They are also right here.

Herein lies a secret of the systems worldview. The system is not only out there, it is in here. We are the seed carriers of the whole in the sense that we carry the mental models that pervade the larger system. We are all actors in the global energy system, the global food system, and the global industrialization process. We can either think and act in ways that reinforce the system as it currently operates, or think and act in ways that lead in different directions. Because the systems that shape our lives manifest themselves at multiple levels, we can work at multiple levels.

This does not mean that any one of us as individuals, or any one organization, can unilaterally shift these larger systems overnight. In fact, a good rule of thumb is that no one can do this unilaterally. Neither the president of the United States nor the president of China has the power to shift the world's present dependence on fossil fuels, even though their nations are the two largest users. They too are but actors in a larger system, often far more constrained than we imagine. Yet, the global energy system is enacted by humans and human institutions. It is not based on the laws of physics. Alternative systems can also be enacted.

We are all novices in understanding how systemic change can occur at the scale that matters. But the experience of many in the SoL network over the past fifteen years suggests that it can begin when enough people and institutions start to see the present system and their part in how it operates. In terms of greenhouse gases, this awareness seems to be growing among a number of leaders, especially some of the large multinational corporations and large NGOs that truly must think globally. "If I reflect on what many organizations have been going through," says Andre van Heemstra of Unilever, "the awareness of sustainability has been growing because systems thinking, in different forms, is enabling us to see more interdependencies than we have seen in the past. It is those interdependencies which make you conclude that it is more than stupid, it is reckless to think of commercial sustainability in isolation, [without thinking of] either social or environmental sustainability."

This seeing must eventually encompass a critical mass of the players that sustain the present system—what we have come to call a "strategic microcosm." In a company, this strategic microcosm represents a meaningful cross-section of people and teams that shape the present system, as when enough managers and engineers in the product development team of the auto engineering group saw the patterns of dysfunctions they were creating that thwarted their goals. Similar strategic microcosms can enable change in industries, in complex global supply networks, and perhaps even in societies. It is here that organizations grounded in systems thinking and the related learning disciplines can make a difference, by fostering collective rethinking and innovation and serving as a convener for microcosms of larger systems.

**BUSINESS AS INCUBATOR: THE SEEDS OF A NEW ENERGY SYSTEM**

As businesses, we must be the change we want to see in the world. This will mean that most everything is up for change: our products, our process, our business models, how we manage and lead, and how we are with one another. It is not likely that we can change just bits and pieces and shift the whole.

— Roger Saillant, Plug Power
Buckminster Fuller used to be fond of saying that we must learn to operate our societies on our “energy income,” the steady energy from the sun, not our “energy capital,” deposits in the earth’s crust formed from life the sun’s light nurtured millions of years ago. Creating such an energy system that can meet the needs of modern society will require many new technologies, one of which will probably be a new generation of fuel cells. By using hydrogen and oxygen as inputs, fuel cells generate electricity through an electrochemical reaction, with heat and water as the only by-products. For years, fuel cells have been hailed as a key element for an environmentally sound energy system, but they have never reached competitive price and reliability levels for most commercial applications. Roger Saillant understood this very well when, after 30 years in the auto industry, he left Visteon, a Ford Motor Company spinoff, to become CEO of a small fuel cell manufacturer of about five hundred employees (less than one-twentieth the number of employees he had previously been responsible for) that had never made a profit, and had seen its stock fall from $150 a share to less than $10 in the dot-com stock market crash, also wiping out much of the personal wealth of many employees. But, as a Ph.D. who had done four years of post-doctoral work in chemistry, Saillant had been thinking about the transition to a hydrogen economy for many years, and knew how important it could be for the state of the world. He also knew he was bringing his experience in organizational learning and world-class manufacturing operations to an industry that had often suffered from a surplus of hype and a deficit of management skill.

At Plug Power, Saillant not only found a demoralized work force but one that lacked a larger picture for why their work might matter. They were a technology company, and people were focused on the technical problems of designing and building workable fuel cells. But they had never thought much about the larger problems of sustainability, nor about creating a learning-oriented work culture. “It had never occurred to people to try and match our technical innovations with innovations in how we treated one another and [innovations] related to our larger world,” says one engineer. Soon, however, a leadership group formed, including not only senior managers but engineers and local managers, that set out to build one of the best operated fuel cell businesses in the world, and to do this “though implementing learning organization principles with sustainability principles as the basis for our organization.”

Today, Plug Power has a “Who We Are” statement developed by all its employees. It begins: “Plug Power is a tightly knit community passionately driven by the common goal of achieving the triple bottom line: People, Planet and Profit. Our success is based on the balance of our drive to transform the energy industry, our involvement in the community and the love of our families. We lead by example and engage our work with a singular determination and an unstoppable resolve.”

In the five years since Saillant arrived, Plug Power has come a long way toward being a successful fuel cell business.” Equally important, the company is moving toward setting a standard for sustainable “zero-to-landfill” product design that will shape the fledgling fuel cell industry. “We believe we can demonstrate that it is technically possible and economically advantageous to design fuel cells for complete reuse,” says Senior Technology Officer John Elter. (Elter was nominated for the U.S. National Medal of Technology for his work in leading the famous “Lakes” team at Xerox that produced a revolutionary new copier platform in the late 1990s that was 94 percent re-manufacturable and 96 percent recyclable.) “In the future, customers who buy fuel cell products will expect to return them at the end of their service life, and the manufacturers will want them back because their components will be much too valuable to ever dump into a landfill.”

While many criticize U.S. wastefulness in energy, Saillant sees the country as having a significant leadership opportunity. “Americans consume 25 percent of the world’s energy and generate about the same proportion of greenhouse gases, with only 5 percent of the world’s population. How we design and produce products sets global norms, but today our manufacturing model causes us to waste nearly one million pounds of material per person per year, or more than one ton per person per day. The United States is a dominant force in the Western culture. The Western culture is dominant in the world. How we hold ourselves accountable for our use of our dominance and advantage in the world can profoundly accelerate or retard the changes we want to see.”

Lessons Saillant learned around the world shape his sense of how to change things. “Living and working in north-central Mexico, Northern Ireland, eastern Europe, and Asia, I learned a lot about being a guest. I believe we must learn to be better guests in all our relationships, in our communities, and in our planet setting. We need to grow spiritually and catch up to our technology. We have powerful minds, and we’re capable of creating visions and allowing
these visions to pull us forward. First, however, we must see ourselves as just one part of the global system and play our roles accordingly."

SoL researcher Katrin Kaeufer, who has been doing studies of many corporations moving toward more sustainable products and processes, says, “Plug is the only company we have yet studied where becoming a sustainable business and becoming a learning organization seem inseparable. When I interviewed people about the company and their work, they used ‘sustainability’ and ‘learning to become a learning organization’ almost interchangeably. People seemed to have internalized the idea that building a sustainable enterprise is not possible without creating a learning culture.”

SUPPLY NETWORKS: THE SYSTEM SEEING ITSELF

The innovations that will have the big impact will be ones that integrate complete value chains around securing long term viability for social and ecological as well as economic systems.

– Darcy Winslow, Nike

Today’s businesses sit within complex supply networks that often span the world. In recent years, leaders have focused on managing supply chains for efficiency improvements, cost reductions, and more rapid response. But these are small steps compared to the changes needed to create truly sustainable supply networks that will remain viable into the future. Creating such networks will require engaging organizations across entire supply chains in seeing the larger system that they are creating and innovating new ways of operating together.

No global supply networks affect more people than those for food. Food production and distribution is the world’s largest industry, employing over a billion people. For most of those living in wealthy northern countries, global food systems seem to be working fine. After all, a consumer in New York or Paris can buy a cantaloupe in the middle of winter for $1.50. But behind affordable prices and high availability for well-off consumers sits a system that is one of the most powerful generators of poverty, political and economic instability, and local environmental destruction in the world.

Over the last fifty years, prices of agricultural commodities like soy, maize (corn), wheat, cotton, and potatoes have fallen between 60 and 80 percent, while production for these same products has increased by factors of two to ten. Falling prices may be a boon to rich consumers, but they are a tragedy for rural families worldwide who depend on farm incomes. For example, the average selling price of coffee today equals roughly half what it costs coffee growers to produce. In effect, today’s global food system produces cheap food for the rich and expensive food for the poor, a condition that more and more global businesses are starting to see." Addressing a conference of advertising executives, the VP of marketing for Unilever Europe, Chris Pomfret, said “the security of our global food supply chains is absolutely critical to the future of our business. ‘Can sustainability sell?’ is the wrong question. The real question is: ‘Can a business like ours survive in the long term without sustainability?’"

Seeing the System Together. Still, the number of people and key institutions that truly see the global food system is far too small and far too non-integrated to make much difference. Although Unilever is one of the largest sellers of food products in the world, what it can accomplish acting alone is negligible. “Doing something about sustainable agriculture will require bringing parties together that normally do not cooperate,” says van Heemstra. For systems like global agriculture, this means that not only diverse businesses but also governmental and nongovernmental organizations must learn how to see the system together.

In 2004, Unilever and Oxfam were joined by over thirty multinational food companies, global and local NGOs, major foundations, and government representatives from the Netherlands, the European Commission, and Brazil in a novel experiment called the Sustainable Food Lab. The aim was to bring “sustainable food supply chains into the mainstream,” using a new process to foster collaborative learning across the supply chain."

As the Sustainable Food Lab project began to develop, it became clear that the participants shared many understandings of the interdependencies of the present system and a poignant image of where it is headed. In their words, they were trapped in a “race to the bottom,” going faster and faster toward where no one wanted to go. Three interacting sets of reinforcing forces are continuing to drive this race:"

1. Reinforcing growth in supply driven by rising production and rising profits, leading to capital investment and further increases in capacity (food producers)
2. Reinforcing growth in demand driven by supply increases that lower prices and raise availability, leading to further increase in supply as producers see more market opportunities (food companies, retailers, and consumers).

3. Further increases in capacity driven by falling prices, spurring investments in increased efficiency and land use in order to maintain farm incomes (local and larger food producers).

The first and second sets of forces drive growth in capacity, production, and demand in many industries, not just food. They grow stronger as large multinational corporations with access to financial capital and advanced technology enter and come to dominate industries. But there are at least two novel features of food production that make these basic economic forces problematic. In general, as rising production and falling prices turn products into commodities, producers search for lower-cost ways to produce, until profits are so low that there is little incentive for businesses to expand further. But the farmers and small farming companies in poorer countries who face falling prices often continue increasing production even when there is zero profit or even loss. Farmers do so because their only other option is to abandon their farms and traditional life, and pursue an even more uncertain future by migrating to cities. Instead, they attempt to maintain their incomes by boosting production through efficiency increases like use of fertilizers and pesticides, or by farming more marginal land (the third set of reinforcing forces). In short, the reality of our food systems is that production continues to rise and prices to fall even when economic conditions are adverse. Or, as the members of the Sustainable Food Lab put it, “When incomes are up, production rises, and when incomes are down, production rises.”

This leads to the second distinctive reality of food systems; production cannot be driven up indefinitely without exceeding environmentally sustainable yields. Forced into relentless increases in production, farmers find themselves in a vicious cycle of pursuing short-term production increases that reduce the longer-term fertility of their land and lead to still more desperate measures to keep up production and incomes. Worldwide trends of overproduction have resulted in the loss of more than a billion hectares (an area the size of China and India combined) of topsoil in the last fifty years.

Driving the system are different and conflicting mental models. “Global food production is a classic case of a system out of control,” says Hal Hamilton, director of the Sustainability Institute and co-director of the Sustainable Food Lab project. “No one intends their decisions to result in a system that is unsustainable. Individuals make the best decisions possible, but they are doing so in a system that is critically fragmented. Most companies think the answer is to use technology to increase productivity. On the other side of the street, many activists are dedicated to fighting big corporations [that] they see as destroying local farming communities and ecologies. Governments get caught in the middle between corporate pressures to boost production and the political instability of farmers displaced from their lands by falling prices. Rich country governments respond by spending $500 billion a year for farm subsidies, but poor governments don’t have this option. What is lacking is any way for all of these groups to think together on behalf of the long term and their common interests.”

The Sustainable Food Lab is attempting to provide the missing piece through collaborative “sensing,” “presencing,” and “realizing”—a particular way to link together the different learning disciplines for complex problems involving diverse stakeholders. (See Appendix 3.)

Collaborative sensing (“co-sensing”) requires looking outward and looking inward. For the Sustainable Food Lab team, looking outward started with systems maps and other conceptual tools, but also included “learning journeys” in rural Brazil to experience parts of the system firsthand that most had never seen. Facing the reality of a system which we have all played a part in creating can generate
powerful forces for change—if there is time to allow the meaning of this reality to penetrate our habitual ways of thinking and feeling, thus catalyzing deeper visions, individually and collectively. Between understanding the system forces conceptually and seeing the system more viscerally through the learning journeys, the Sustainable Food Lab members knew the “race to the bottom” was a tragic competition with no winners. It is so obvious that the whole agricultural system is sick,” comments one business member.

In a six-day retreat, two months after the learning journeys, each person spent two days and nights on a “solo” in a wilderness setting, one of the oldest methods of gently lifting us out of our normal mindsets and incubating new visions. Rather than forcing very different personal visions into a single shared vision, team members then formulated different “prototype” initiatives reflecting their unique perspectives and areas of influence. These ranged from focusing on specific supply chains, to researching how to communicate the realities of the whole system to consumers, to building a broad-based business coalition of food businesses that could potentially shift the rules of the game affecting all agricultural commodities.2

Building Shared Visions That Can Shift Larger Systems. Though it is too early to gauge the impact of any of these specific initiatives, I believe these efforts provide four important lessons that can be used by others attempting to see and shift larger systems.

First, because the most intractable systemic issues cross geographic and institutional boundaries, the strategic microcosms needed to address the system must likewise be a cross-sector group representing business, government, and civil society. Forming groups of people from these different worlds who are willing to work together rather than just throw bricks at one another can itself be a major task. It took more than two years to assemble the initial group for the Sustainable Food Lab, starting with the commitment of Unilever and Oxfam to work together.

Second, seeing systems collectively entails a multifaceted journey of thinking and feeling. You will know you are starting to see the system when people begin to move beyond blame to recognize that we are all part of the problem. The global food system is driven by (1) companies pursuing “business-as-usual” models with little regard for the effects on farming families, farming communities, and environmental systems; (2) farmers being unable to moderate pressures for continual production growth; and (3) all of us as consumers when we buy food at the cheapest price with little thought as to where the food comes from.

The third lesson is that the quality of collective seeing and the shared commitment that it can engender are shaped by the quality of relationships people develop. The transformation of larger systems will not arise from the transactional relationships that characterize most business, government, and NGO activities. “The relationships among leaders across normal boundaries might be the most crucial ingredient to major change,” says Hamilton. The Food Lab participants found themselves developing deep connections, trust, and respect for each other—and recognizing that their strength as a team lay as much in their differences as in their similarities.

Finally, enacting new systems is not about getting “the answer,” it is about developing networks of engaged and trusting people who are guided by a common understanding of the current system and a commitment to create new systems. “If I learned anything . . . it is the notion that we need to be working on all different parts of the system in order to successfully change the whole system,” comments one Lab team member. Echoing Les Omotani’s comment on bringing change to large school systems, another adds, “[To get started] you don’t have to have the answers for everything that needs to be done to solve the problem. In fact, if you did have all the answers, you might not have the best answer.”

As we develop our capacity to see large global systems, deeper patterns will become clearer. When I attended a daylong session on international manufacturing at MIT, I listened to a representative of a leading labor rights NGO talking about the problems with multinational apparel manufacturers, and heard a tale remarkably similar to that of global food production—a tale of falling prices, relentless expansion, and lower-than-living-wage conditions for workers. Then, to my amazement, not once but several times, the labor advocate talked of a “race to the bottom” in global apparel manufacturing. I left wondering whether the Sustainable Food Lab might not be just about food, but about learning how to shift the forces driving many global supply chains toward where nobody wants to go.

SOCIETY: TALKING ACROSS THE BOUNDARIES

It is time for all of us to come together and think about the future we want to create. If we do nothing, our children could be living on $2 a day.

— Salim Al-Aydh
In an increasingly interdependent world, it is ironic that many of our societies are becoming more fragmented and polarized. In one sense, this is understandable. When one is facing complex issues that engender considerable fear, there is security in being able to pull back into a particular ideology, a true answer. But one group’s ideology is rarely shared by others, and consequently walls develop between groups. After a while, ideology becomes identity, and polarization becomes self-reinforcing.

Our interconnected world confronts all societies with a mandate to revive the capacity to talk together and live together. Nowhere are the stakes higher than in the Middle East. Building on its knowledge with dialogue in general and the world café process in particular, in the fall of 2004 Saudi Aramco convened a dialogue meeting in Hawar, the first in an unusual series of gatherings. In many ways, it was the next logical step in the process that began when Aramco expanded to include key business partners in its strategic dialogues on the core problems confronting Saudi society. But this went farther in terms of the range of participants. It was convened by Gulf SoL, a SoL network that included over twenty companies from throughout the Gulf region (Kuwait, Dubai, the United Arab Emirates, and Bahrain, in addition to Saudi Arabia). The group was, on average, more senior than participants in the earlier meetings, with many heads and founders of companies, along with founders of influential NGOs and schools, and leading thinkers and academics. And it included both men and women—for many, it was the first time in their lives that they had attended such a meeting with both sexes.

As with the earlier sessions Aramco convened, this dialogue started with a presentation that surveyed the current economic condition of the Gulf region countries. Nearly all of these countries have the same core problems seen in Saudi Arabia: large and rapidly expanding numbers of unemployed young people, stagnant or falling GDP per capita, and economies overly dependent on oil. This presentation catalyzed two days of passionate conversations about the area’s traditional culture, its schools, its oil-dependent economy, and its possibilities for change.

In my experience, when people are able to engage authentically in discussions on subjects that matter deeply to them, there is almost no limit to their energy, courage, and willingness to step into foreign territory. During breaks in this gathering, traditionally dressed Arab gentlemen repeatedly came up to me in states that ranged from bewilderment to anxiety and said things like, “In all my life, I have never talked about subjects like this with a lady.” My sense was that, in some ways, the women were more ready for serious dialogue. Excluded by law from professional activities in many of the Gulf countries, they form networks to mentor and support one another. Like other excluded groups finally invited to the table, they had been waiting for this day, and they were not shy. They spoke with fire and conviction, articulate about the pressing issues facing their societies, and relentlessly positive about possibilities for change.

As I listened, I also saw the universality of the issues with which participants wrestled. Their core questions were similar to those of people everywhere: How do we preserve what we care deeply about in our traditions while allowing those traditions to evolve in harmony with today’s world? How can we be responsible to our children, to create conditions in which they can have an authentic Arab identity and yet be able to thrive in a globalizing society? What would healthy twenty-first-century Islamic Gulf societies look like?

A second gathering similar to the Hawar dialogue was held six months later, and as I write this, a third is being planned. Several initiatives have started to form—including a job training center for young Saudis to assist in the school-to-work transition, a national mentoring network connecting successful business leaders with young people, and a variety of education initiatives involving promising innovations in the traditional school system, widely recognized as an area of pivotal change. Many young leaders are joining the conversations. One participant, for example, has started a women’s college in Jeddah, which, unlike the traditional universities, works closely with Saudi businesses to ensure an education that addresses real needs for social change and innovation.

As I sat in the closing circle at the Hawar dialogue, an older mentor to many of the Saudi women, listening to one person after another share what the conversation had meant to him or her, leaned over to me and whispered, “This is historic.” I just nodded—knowing the truth of her words and knowing also that I had only the dimmest comprehension of what this really meant for her, for the other women in the circle, and for everyone else.

When she said this, two thoughts came to mind. The word “politics” comes from the Greek polis, the gathering place where citizens came to talk about the issues of the day. What I saw in Hawar, and what I see happening in projects like the Sustainable Food Lab, is a rebirth of the polis, people coming together, reaching toward one
another across their differences rather than being driven apart by those differences. It is hard for me to imagine effectively confronting the host of imbalances in our present way of living together on the planet without recovering this capacity for dialogue.

Second, I had a powerful sense of having been there before. I suddenly recalled being in South Africa, fifteen years earlier. My good friend and colleague, Adam Kahane, who has led successful civic dialogue work in South Africa, Guatemala, and elsewhere, once commented that he did not see the possibility for this happening in Israel and Palestine, because, in his view, “both sides still think they can stick to the way they have been doing things. They have not yet seen that they have no future without changing their own thinking and strategies.” By contrast, in the mid-1980s, cultural polarization started to shift in South Africa. People started to see into the future; they started to recognize the simple fact that their current path was leading in a direction that no one wanted. When this happens in a society, those who have been polarized, the excluded and the included, start to talk with one another—as citizens with a common destiny. They see their interdependency in creating a different future, and new forces for change are set free.

Business finds itself in an awkward position of being, in a sense, the most global institution in the world today. Large multinational corporations, like BP, Unilever, and Saudi Aramco, arguably have a more comprehensive view of global economic, cultural, and environmental trends than do most national governments. Because of this, they can play a pivotal role in convening people to see larger systems that transcend national boundaries, and to confront deep issues that political partisanship may obscure. Corporations will be most effective in doing so to the degree that they advocate for the health of the whole, and use methods for collective inquiry, systems thinking, and the building of shared visions that they have tested and refined on their own problems—indeed businesses’ practical experience with such methods may be one of their greatest contributions. In political climates dominated by fragmentation, polarization, and distrust, the best leaders will be those with practical experience in the power of reflective conversation and an understanding of how transformative relationships can solve complex problems. For these reasons, in the coming years, I expect “business as usual” to change quite a bit.

The real systems citizens are mostly under the age of twenty. More and more children growing up today have a perspective and awareness of the world as a whole that did not exist in the past. More than any previous generation, they see what is happening around the world, and they naturally relate to other people and cultures differently. And they have deep concerns about their future.

Several years ago we began including children and young people in SoL dialogues, especially when we were talking about the future of education and global systemic issues. I will never forget hearing a 12-year-old girl in one of these sessions say very matter-of-factly to a forty-five-year-old executive, “We feel like you drank your juice and then you drank ours.”

Schools could play a pivotal role in transforming young people’s concerns about the future into the foundations for productive systems citizens if they could see this as their role and think of themselves as part of a global system. Former dean of the MIT Engineering School Gordon Brown, a champion of systems thinking in schools in the later years of his life, used to say, “To be a teacher is to be a prophet. We are not preparing children for the world we have lived in but for a future that we can barely imagine.” Unfortunately, around the world, schools are caught up in the pressures to preserve a traditional system that finds itself under increasing stress, unable to innovate. So while children grow up today with the instincts to be systems citizens, there is little to encourage them in this direction.

This is especially ironic given the mounting evidence that children are natural systems thinkers; if given a chance to cultivate these innate talents, they can develop sophisticated critical thinking skills much more quickly than one might expect. In schools where systems thinking is woven throughout the curriculum, and students and teachers work together as learners and mentors rather than passive listeners and all-knowing experts, these innate skills can truly flower. If we can succeed in moving toward a learner-centered, systems-based education system, I believe we will see just how readily systems citizenship develops—and how ineffective the traditional classroom, teacher-centric model of learning actually is.
I also believe one key in this shift will be accepting that innovations needed in education represent a bigger task than educators can accomplish in isolation; they will need to be co-created by a microcosm of the whole system, including business and the students themselves. Les Omotani, superintendent of Hewlett-Woodmere district in Long Island, says, “I have found that one of the most reliable ways to get people thinking freshly about becoming a genuine learning community is to elevate the student voice and the role of students in our conversations, our planning, and our decision making. Last year, for example, we ran a ‘wellness café’ with the students—a big meeting organized as a world café on the theme of wellness. Fifty students volunteered to be table hosts and facilitators, and two hundred people from the community came, including some faculty members. Kids here are hungry for this sort of more responsible and active leadership role. I also believe this could develop into a national movement. Our schools are paralyzed. Overstressed teachers and administrators try desperately to fend off pressures from dissatisfied business leaders and fearful parents. Yet we all know the education for the twenty-first century must change profoundly from education for the nineteenth and twentieth centuries. This requires space for innovation, not just pressures for performance. Young people feel this acutely. They know they need to grow up as citizens of the world. They need to understand the world’s problems and they need to know how to work productively on them. Schools that fail to address these needs will be increasingly marginalized and irrelevant for kids. And, the young people are eager to be part of this. The real question is, ‘Are we?’”

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FRONTEIRS

We stand at the frontier of the reinvention of the prevailing system of management. What has been developing for centuries cannot be reversed in a few years. Nor is there any basis for being sanguine that the new will steadily supplant the old. Deep habits of thought and action drive ways of operating that make managers feel the need to maintain control, investors demand that businesses grow at any cost, and the whole private-sector system operate in a way that often “privatizes” profits and “socializes” costs like deteriorating environmental and social capital. Nevertheless, powerful forces for change are also at play: the Internet is breaking down traditional information monopolies, increasingly networked organizations cannot be controlled from the top, and awareness of the costs of global industrial development patterns is growing.

In the preceding chapters, I have tried to share innovations emerging around the world and across diverse organizational settings. The emphasis has been on what is already occurring, including ways that the foundational elements of learning cultures are
When I was young I always wanted to be an astronaut. I even studied aeronautics and astronautics in college to prepare. But then I got hooked on "systems theory" and a new, earthbound career was born.

But I still remained deeply fascinated with the experience of being in space, a fascination that was heightened by the first Apollo pictures of the earth. So it was with great interest that I finally had an opportunity to get to know astronaut Rusty Schweickart who attended one of our leadership programs several years ago.

I learned from Rusty that many of the astronauts struggle when they return to earth, trying to put into words their feelings of what it meant to them to hover above their home planet. Rusty struggled for five years (he flew on Apollo 9, which tested the lunar module in earth orbit in March 1969) before words adequate to the task began to form.

In the summer of 1974, he had been invited to speak to a gathering on "planetary culture" at Lindisfarne, a spiritual community on Long Island. After considering and discarding many ways of sharing his experience he realized that he couldn't tell it as his story.
Because it was our story. He realized that he and the other astronauts represented an "extension of the sensory apparatus of the human species. Yes, I was looking out from my eyes and feeling with my senses but it was also our eyes and our senses. We who were the first to leave and look back at the earth were looking back for all of humankind. Though there were only a few of us, it was our responsibility to report back what we experienced." Realizing this, he decided simply to describe what it was like—as if you and I, the listeners, were there as well.

Up there you go around every hour and a half, time after time after time. You wake up usually in the mornings. And just the way that the track of your orbits go, you wake up over the Mideast, over North Africa. As you eat breakfast you look out the window as you're going past and there's the Mediterranean area, and Greece, and Rome, and North Africa, and the Sinai, the whole area. And you realize in one glance that what you're seeing is what was the whole history of man for years—the cradle of civilization. And you think of all the history you can imagine looking at that scene.

And you go around down across North Africa and out over the Indian Ocean, and look up at that great sub-continent of India pointed down toward you as you go past it. And Ceylon off to the side, Burma, Southeast Asia, out over the Philippines, and up across that monstrous Pacific Ocean, vast body of water—you've never realized how big that is before. And you finally come up across the coast of California and look for those friendly things: Los Angeles, and Phoenix, and on across El Paso and there's Houston, there's home, and you look and sure enough there's the Astrodome. And you identify with that, you know—it's an attachment.

And down across New Orleans and then looking down to the south and there's the whole peninsula of Florida laid out. And all the hundreds of hours you spent flying across that route, down in the atmosphere, all that is friendly again. And you go out across the Atlantic Ocean and back across Africa.

And that identity—that you identify with Houston, and then you identify with Los Angeles and Phoenix and New Orleans and everything. And the next thing you recognize in yourself, is you're identifying with North Africa. You look forward to that, you anticipate it. And there it is. That whole process begins to shift what it is you identify with. When you go around it in an hour and a half you begin to recognize that your identity is with the whole thing. And that makes a change.

You look down there and you can't imagine how many borders and boundaries you crossed again and again and again. And you don't even see 'em. At that wake-up scene—the Mideast—you know there are hundreds of people killing each other over some imaginary line that you can't see. From where you see it, the thing is a whole, and it's so beautiful. And you wish you could take one from each side in hand and say, "Look at it from this perspective. Look at that. What's important?"

And so a little later on, your friend, again those same neighbors, the person next to you goes to the moon. And now he looks back and sees the Earth not as something big where he can see the beautiful details, but he sees the Earth as a small thing out there. And now that contrast between the bright blue and white Christmas tree ornament and that black sky, that infinite universe, really comes through.

The size of it, the significance of it—it becomes both things, it becomes so small and so fragile, and such a precious little spot in the universe, that you can block it out with your thumb, and you realize that on that small spot, that little blue and white thing is everything that means anything to you. All of history and music, and poetry and art and war and death and birth and love, tears, joy, games, all of it is on that little spot out there that you can cover with your thumb.

And you realize that that perspective . . . that you've changed, that there's something new there. That relationship is no longer what it was. And then you look back on the time when you were outside on the EVA [extravehicular activity] and those few moments that you had the time because the camera malfunctioned, that you had the time to think about what was happening. And you recall staring out there at the spectacle that went before your eyes. Because now you're no longer inside something with a window looking out at the picture, but now you're out there and what you've got around your head is a goldfish bowl and there are no boundaries. There are no frames, there are no boundaries.
Floating in space, Rusty discovered the first principles of systems thinking. But he discovered them in a way that few of us ever do—not at a rational or intellectual level but at a level of direct experience. The earth is an indivisible whole, just as each of us is an indivisible whole. Nature (and that includes us) is not made up of parts within wholes. It is made up of wholes within wholes. All boundaries, national boundaries included, are fundamentally arbitrary. We invent them and then, ironically, we find ourselves trapped within them.

But there was something more. In the years following that first talk at Lindisfarne, Rusty found himself drawn into a whole new series of insights and personal changes. He found himself drawn into new work, leaving his post as commissioner of the California Energy Commission and becoming more active in joint projects involving U.S. astronauts and Soviet cosmonauts. He listened and learned about others’ experience. He began to involve himself in activities that seemed congruent with his new understandings.

One that had a special impact was learning about the “Gaia” hypothesis—the theory that the biosphere, all life on earth, is itself a living organism. This idea, which has deep roots in many preindustrial cultures, such as American Indian cultures, “struck a deep chord in me,” says Rusty. “For the first time it gave the scientist in me a way to talk about aspects of my experience in space that I couldn’t even articulate to myself. I had experienced the earth in a way that I had no way to describe. I had experienced the aliveness of it—of it all.”

At the conclusion of the leadership workshop, someone asked spontaneously, “Rusty, tell us what it was like up there?” He paused for a long time. When he finally spoke, he said only one thing. “It was like seeing a baby about to be born.”

Something new is happening. And it has to do with it all—the whole.

Each of the five learning disciplines can be thought of on three distinct levels:

- practices: what you do
- principles: guiding ideas and insights
- essences: the state of being of those with high levels of mastery in the discipline

The practices are activities upon which practitioners of the discipline focus their time and energy. For example, systems thinking entails using the “systems archetypes” in order to perceive underlying structures in complex situations. Personal mastery entails “clarifying personal vision,” and “holding creative tension,” simultaneously focusing on the vision and current reality and allowing the tension between the two to generate energy toward achieving the vision. Working with mental models involves distinguishing the direct “data” of experience from the generalizations or abstractions that we form based on the data.

The practices are the most evident aspect of any discipline. They are also the primary focus of individuals or groups when they begin to follow a discipline. For the beginner, they require “discipline” in the sense of conscious and consistent effort because following the practices is not yet second nature. In a