Leadership and the New Science: Rediscovering Order in a Chaotic World

By Margaret J. Wheatley

Prologue:
Maps to the Real World

But now my voice of invitation needs to be prefaced by a clear, more insistent voice. Now I am the town crier sounding the alarm. The world has changed. The worldview of the sciences described here is no longer hidden in books. It blares news reports and blazes across our screens in the terrifying images of these times -- wars, terrorism, migrations of displaced people, hurricanes, earthquakes, tsunamis. Chaos and global interconnectedness are part of our daily lives. We try hard to respond to these challenges and threats through our governments, organizations and as individuals, but our actions fail us. No matter what we do, stability and lasting solutions elude us. It's time to realize that we will never cope with this new world using our old maps. It is our fundamental way of interpreting the world -- our worldview -- that must change. Only such a shift can give us the capacity to understand what's going on, and to respond wisely.

We cannot hope to make sense using our old maps. It won't help to dust them off or reprint them in bold colors. The more we rely on them, the more disoriented we become. They cause us to focus on the wrong things and blind us to what's significant. Using them, we will journey only to greater chaos.

When our worldview doesn't work any longer and we feel ourselves sinking into confusion, of course we feel frightened. Suddenly there is no ground to stand on. Solutions that worked no longer do. The world appears incomprehensible, chaotic, lacking rationality. We respond to this incoherence by applying old solutions more frantically. We become more rigid about our beliefs. We rely on habit rather than creating new responses. We end up feeling frustrated, exhausted and powerless in the face of so much failure. These frustrations and fears create more aggression. We try to make things work by using brute force rather than intelligence and collaboration.

These chapters introduce new ways of understanding disequilibrium and change, and the role disorder plays in creating new possibilities for growth. Information, in our self-organizing universe, is the primary resource necessary to bring things into form. New interpretations are required for there to be new forms or new life. Self-organizing systems demonstrate the ability of all life to organize into systems of relationships that increase capacity. These living systems also demonstrate a different relationship between autonomy and control, showing how a large system maintains itself and grows stronger only as it encourages great amounts of individual freedom.

Chaos is a necessary process for the creation of new order.

Introduction: Searching for a Simpler Way to Lead Organizations

The layers of complexity, the sense of things being beyond our control and out of control, are but signals of our failure to understand a deeper reality of organizational life, and of life in general.

The story speaks with a chilling familiarity. Each of us recognizes the feelings this tale describes, of being mired in the habit of solutions that once worked yet that are now totally inappropriate, of having rug after rug pulled from beneath us, whether by a corporate merger, reorganization, downsizing, or personal disorientation. But the story also gives great hope as a parable teaching us to embrace our despair as a step on the road to wisdom, encouraging us to sit in the unfamiliar seat of not knowing and open ourselves to radically new ideas. If we beat the confusion, then one day, the story promises, we will begin to see a whole new land, one of bright illumination that will dispel the oppressive shadows of our current ignorance. I still tell Heisenberg's story. It never fails to speak to me from this deepl place of reassurance.

But my focus on science is more than a personal interest. Each of us lives and works in organizations designed from Newtonian images of the universe. We manage by separating things into parts, we believe that influence occurs as a direct result of force exerted from one person to another, we engage in complex planning for a world that we keep expecting to be predictable, and we search continually for better methods of objectively measuring and perceiving the world. These assumptions, as I explain in Chapter Two, come to us from seventeenth-century physics, from Newtonian mechanics They are the basis from which we design and manage organizations, and from which we do research in all of the social sciences. Intentionally or not, we work from a world view that is strongly anchored in the natural sciences. But the science has changed. If we are to continue to draw from science to create and manage organizations, to design research, and to formulate ideas about organizational design, planning,

economics, human motivation, and change processes (the list can be much longer), then we need to at least ground our work in the science of our times. We need to stop seeking after the universe of the seventeenth century and begin to explore what has become known to us during the twentieth century.

The light may be dim, but its potency grows as the door cracks wider and wider. Here there are scientists who write about natural phenomena with a poetry and a clarity that speaks to dilemmas we find in organizations. Here there are new images and metaphors for thinking about our own organizational experiences. This is a world of wonder and not knowing, where many scientists are as awestruck by what they see as were the early explorers who marveled at new continents. In this realm, there is a new kind of freedom where it is more rewarding to explore than to reach conclusions, more satisfying to wonder than to know, and more exciting to search than to stay put. Curiosity, not certainty, becomes the saving grace.

First, I don't believe that organizations are ever changed by imposing a model developed elsewhere.

In the quantum world, *relationship* is the key determiner of everything.

In chemistry, Ilya Prigogine won the Noble Prize in 1977 for work that demonstrates how certain chemical systems reorganize themselves into greater *order* when confronted with changes in their environment.

Chaos is necessary to new creative ordering.

In many examples, scientists now describe how order and form are created not by complex controls, but by the presence of a few guiding formulas or principles repeating back on themselves through the exercise of individual freedom.

I have played with the notion that organizational vision and values act like fields, unseen but real forces that influence people's behavior. This is quite different from more traditional notions that vision is an evocative message about some desired future state delivered by a charismatic leader.

Some believe that there is a danger in playing with science and abstracting its metaphors because, after a certain amount of stretch, the metaphors lose their relationship to the tight scientific theories that gave rise to them. But others would argue that all science is metaphor, a hypothetical description of how to think of a reality we can never fully know.

Chapter 1 -
Discovering an Orderly World

Organizations lack this kind of faith, faith that they can accomplish their purposes in varied ways and that they do best when they focus on intent and vision, letting forms emerge and disappear.

Fear that is everywhere must come to us from somewhere. But where? In modern Western thought, I believe one source is our fuzzy understanding of concepts that gained strength from seventeenth-century science. Three centuries ago, when the world was imagined as an exquisite machine set in motion by God -- a closed system with a watchmaker father who then left the shop -- the concept of entropy entered our collective.

[The world / Nature] continues to create systems of great scope, capacity, and diversity. And fluctuation and change are essential to the process by which order is created.

Life is about creation. This ability of life to create itself is captured in a strange-sounding new word, *autopoiesis* (from Greek, meaning self-production or self-making). Autopoiesis is life's fundamental process for creating and renewing itself, for growth and change. A living system is a network of processes in which every process contributes to all other processes. The entire network is engaged together in producing itself (CApra 1996, 99). This process is not limited to one type of organism -- it describes life itself.

There is another important paradox in living systems: Each organism maintains a clear sense of its individual identity *within* a larger network of relationships that helps shape its identity.

While we humans observe and count separate selves, and pay a great deal of attention to the differences that seem to divide us, in fact we survive only as we learn how to participate in a web of relationships.

Prigogine coined the term "dissipative structures" for these newly discovered systems to describe their contradictory nature.

Dissipation didn't lead to the death of a system. It was part of the process by which the system let go of its present form so that it could reorganize in a form better suited to the demands of its changed environment.

In a dissipative structure, anything that disturbs the system plays a crucial role in helping it self-organize into a new form of order.

If the information becomes such a large disturbance that the system can no longer ignore it, then real change is at hand.

In this way, dissipative structures demonstrate that *disorder* can be a source of new *order*, and that growth appears from disequilibrium, not balance. The things we fear most in organizations -- disruptions, confusion, chaos -- need not be interpreted as signs that we are about to be destroyed. Instead, these conditions are necessary to awaken creativity.

There is so much order that our attempts to separate out discrete events create the appearance of disorder.

! One systems scientist said that a system is a *set of processes* that are made visible in temporary structures. These living structures are in no way similar to the solid structures we build. The structures of life are transient; they are capable of changing if needed: “Caterpillar and butterfly, for example, are two temporarily stabilized structures in the coherent evolution of one and the same system” (Jantsch, 1980, 6). The system continues to develop, to release itself from the old and find new structures if they are required.

<u>...leadership is best thought of as a behavior, not a role.</u>

All this time, we have created trouble for ourselves in organizations by confusing control with order. This is no surprise, given that for most of its written history, leadership has been defined in terms of its control functions. Lenin spoke for many leaders when he said: “Freedom is good, but control is better.” And our quest for control has been oftentimes as destructive as was his. If people are machines, seeking to control us makes sense. But if we live with the same forces intrinsic to all other life, then seeking to impose control through rigid structures is suicide. If we believe that there is no order to human activity except that imposed by the leader, that there is no self-regulation except that dictated by policies, if we believe that responsible leaders must have their hands into everything, controlling every decision, person, and moment, then we cannot hope for anything except what we already have -- a treadmill of frantic efforts that end up destroying our individual and collective vitality.

! “In life, the issue is not control, but dynamic connectedness,” Jantsch writes (1980, 196). I want to act from that knowledge. I want to trust in this universe so much that I give up playing God. I want to stop struggling to hold things together. I want to experience such security that the concept of “allowing” -- trusting that the appropriate forms will emerge -- ceases to be scary. I want to surrender my fear of the universe and join with everyone I know in an organization that opens willingly to its environment, participating gracefully in the unfolding dance of order.

Chapter 2 -
Newtonian Organizations in a Quantum Age

I sit in a room without windows, participating in a ritual etched into twentieth-century tribal memory. I have been here thousands of times before, literally. I am in a meeting, trying to solve a problem. Using whatever analytic tool somebody has just read about or been taught at their most recent training experience, we are trying to come to grips with a difficult situation. Perhaps it is poor employee morale or productivity. Or production schedules. Or the redesign of a function. The topic doesn't matter. What matters is how familiar and terrible our process is for coming to terms with the complaint.
The room is adrift in flip-chart paper -- clouds of lists, issues, schedules, plans, accountabilities crudely taped to the wall. They crack and rustle, fall loose, and, finally, are pulled off the walls, tightly rolled, and transported to some innocent secretary, who will litter the floor around her desk and peering down from her keyboard, will transcribe them and e-mail them to us. They will appear on our desktops hours or days later, faint specters of commitments and plans, devoid of even the little energy and clarity that sent the original clouds -- poof -- up onto the wall. They will drift into our calendars and onto individual "to do" lists, lists already fogged with confusion and inertia. Whether they get done or not, they will not solve the problem.

The search for new shamans has begun in earnest. Our seventeenth-century organizations are crumbling. We have prided ourselves, in all these centuries since Newton and Descartes, on the triumphs of reason, on the absence of magic. Yet we, life the best magicians of old, have been hooked on manipulation. For three centuries, we've been planning, predicting, and analyzing the world. We've held on to an intense belief in cause and effect. We've raised planning to the highest of priestcrafts and imbued numbers with absolute power. We look to numbers to describe our economic health, our productivity, our physical well-being. We've developed graphs and charts and plans to take us into the future, revering them as ancient mariners did their chart books. Without them, we'd be lost, adrift among the dragons.

William Bygrave, a physicist turned organizational theorist, comments on how many management theorists either were engineers or admired that profession, from Chandler to Porter -- a lineage that continues to the present.

! This reduction into parts and the proliferation of separations has characterized not just organizations, but everything in the Western world during the past three hundred years.

"The whole corpus of classical physics," writes Danah Zohar in *The Quantum Self*, "and the technology that rests on it is about the separateness of things, about constituent parts and how they influence each other across their separateness."

The “thing” view of the world, therefore, has led to a belief in scientific objectivity.

...the dialogue with nature isolated humans from nature instead of bringing them closer to it… It seemed that science debased everything it touched” (1984, 6).
Loneliness pervaded not only science, btu all Western culture. In America, we raised individualism to its highest expression, each of us protecting our boundaries, asserting our rights, creating a world that, Bellah et al. writes, “leaves the individual suspended in glorious, but terrifying, isolation” (1985, 6)

In the quantum world, relationships are not just interesting; to many physicists, they are *all* there is to reality.

The world of relationships is rich and complex. Gregory Bateson (1980) speaks of “the pattern that connects” and urges that we stop teaching facts -- the “things” of knowledge -- and focus, instead, on relationships as the basis for all definitions. With relationships, we give up predictability and open up to potentials. Several years ago, I read that elementary particles were “bundles of potentiality.”

! None of us exists independent of our relationship with others.

Each of us is a different person in different places. This doesn’t make us inauthentic; it merely makes us quantum. Not only are we fuzzy; the whole universe is.

<u>...unity expressed as diversity.</u>

Conflicts about what’s true and false would disappear in the exploration of multiple perceptions. Weick encourages us to move away from arguing about who’s right and who’s wrong, and instead to focus our concerns on issues of effectiveness, on reflective questions of what happened, and what actions might have served us better. We could stop arguing about truth and get on with figuring what works best (1979, 152, 168-69).

Many former planning advocates now speak about strategic *thinking* rather than planning. They emphasize that organizations require new skills. Instead of the ability to analyze and predict, we need to know how to stay acutely aware of what’s happening now, and we need to be better, faster learners from what just happened. Agility and intelligence are required to respond to the incessant barrage of frequent, unplanned changes. Jack Welch, legendary CEO of General Electric, says that in this modern world of constant flux, “predicting is less important than reacting” (USA Today).

If there is no objective reality out there, then the environment and our future remain uncreated until we engage with the present.

Something is out there, we believe, challenging our skills of analysis and perception. We just have to hire the right experts in order to see it clearly. But this search for discernible, objective futures has been, if we can admit it, a great cosmic joke. We thought we could nail down reality, get it in our sights, or maybe even line up our ducks, but how is that possible in this elusive world of potentials?

We need fewer descriptions of tasks and instead learn how to facilitate *process*. We need to become savvy about how to foster relationships, how to nurture growth and development.

Now I look carefully at a workplace's capacity for healthy relationships. NOt its organizational form in terms of tasks, functions, span of control, and hierarchies, but things more fundamental to strong relations.

What gives power its charge, positive or negative, is the nature of the relationship.

! We have broken the world into parts and fragments for so long now that we are ill-prepared to see that a different order is moving the whole.

I know no better theory to explain the sudden fall of the Berlin Wall, for example. Before that event, there were many small changes going on throughout East Germany, most of which were not visible to anyone beyond their immediate neighborhood. But each small act of defiance of new way of behaving occurred within a whole fabric. Each small act was connected invisibly to all others. The global impact suddenly became visible in those few days when people tore the Wall down. The fall of the Berlin Wall demonstrates the power of "think globally, act locally." It proves that local actions can have enormous influence on a monstrous system that had resisted all other political attempts to change it. Germany could not be reunified by traditional power politics, or by high-level leaders from powerful nations. It was local actions within the system, combined with many other influences globally, that coalesced into a moment of profound change.
In a web, the potential impact of local actions bears no relationship to their size. When we choose to act locally, we may be wanting to influence the entire system. But we work where we are, with the system that we know, the one we can get our arms around. From a Newtonian perspective, our efforts often seem too small, and we doubt that our actions will make a difference. Or perhaps we hope that our small efforts will contribute incrementally to large-scale change. Step by step, system by system, we aspire to develop enough mass or force to alter the larger system.
But a quantum view explains the success of small efforts quite differently.

! ...there is potential value in working anywhere in the system. We never know how our small activities will affect others throughout the invisible fabric of our connectedness.

I don't personally spend time anymore on elaborate plans or time lines. I want to use the time formerly spent on detailed planning and analysis to create the organizational conditions for

people to set a clear intent, to agree on how they are going to work together, and then practice to become better observers, learners, and colleagues as they co-create with their environment. And I have learned that great things are possible when we increase participation.

Finally, I no longer argue about what is real. We each construct reality, and when I become curious about this, I learn a great deal from other people. I expect them to see things differently from me, to surprise me.

Chapter 3 -
Space Is Not Empty:
Invisible Fields that Shape Behavior

Space is the basic ingredient of the universe; there is more of it than anything else. Even at the microscopic level of atoms, where we would expect things to be dense and compact, there is mostly space. Within atoms, subatomic particles are separated by vast distances, so much so that an atom is 99.99 percent empty. Everything we touch, including our bodies, is composed of these empty atoms. We are far more porous than our dense bodies indicate. In fact, we are as void, proportionately, as intergalactic space (Chopa 1989, 96).
In Newton's universe, the emptiness of space created a sense of unspeakable loneliness.

It was difficult to effect change in such a vast, lonely world. It required generating energy of sufficient strength to propel oneself through space, enduring long enough to reach another object and cause it to respond. Newton's world of cause and effect, of force acting upon force, required great expenditures of personal energy to get someone else moving, vast regions of space to traverse to get something done. Not only did it feel lonely; it was exhausting.

If we were to observe fish, unaware of the medium of water in which they swim, we would probably look for explanations of their movements in terms of one fish influencing another. If one fish swam by and we observed the second fish serving a little, we might think that the first fish was exerting a force on the second. But if we observed all the fish deflecting in a regular pattern, we might begin to suspect that some other medium was influencing their movements. We could test for this medium, even if it were still invisible to us, by creating disturbances in it and noting the reactions of the fish.

Writer Gary Zukav terms them the substance of the universe. The things we see or observe in experiments, the physical manifestations of matter as particles, are a secondary effect of fields.

“The Newtonian picture of a world populated by many, many particles, each with an independent existence, has been replaced by the field picture of a world permeated with a few active media. We live amid many interpenetrating fields -- each filling space. The laws of motion, in field language, are rules for flows in this ocean.

For several years now, leaders have been encouraged to consider the impact of non-material forces in organizations -- culture, values, vision, ethics. Each of these concepts describes a *quality* of organizational life that can be observed in behavior yet doesn’t exist anywhere independent of those behaviors.

We can never see a field, but we can easily see its influence by looking at behavior. To learn what’s in the field, look at what people are doing. They have picked up the messages, discerned what is truly valued, and then shaped their behavior accordingly. When organizational space is filled with divergent messages, when only contradictions float through the ethers, this invisible incongruity becomes visible as troubling behaviors. Because there is no agreement, there are more arguments, more competition, more power plays. People say one thing and mean another. Nobody trusts anybody. The organization changes direction frequently and can’t find its way.

...we need congruency in the air, visionary messages matched by visionary behaviors.

Let us remember that space is never empty. If it is filled with harmonious voices, a song arises that is strong and potent. If it is filled with conflict, the dissonance drives us away and we don’t want to be there. When we pretend that it doesn’t matter whether there is harmony, when we believe we don’t have to “walk our talk,” we lose far more than personal integrity. We lose the partnership of a field-rich space that can help bring order to our lives.

Chapter 4 -
The Participative Nature of the Universe

It is common to speak of self-fulfilling prophecies and the impact these have on people’s behavior. If a manager is told that a new trainee is particularly gifted, that manager will see genius emerging from the trainee’s mouth even in obscure statements. But if the manager is told that his or her new hire is a bit slow on the uptake, the manager will interpret a brilliant idea as a sure sign of sloppy thinking or obfuscation. From studies on the impact of opportunity in organizations (Kanter 1977), we know that the “anointed” in organizations, those high flyers who move quickly through the ranks, are given at least some of their wings through our desire to observe them as winners. We endow their ideas and words with more credibility. We entrust them with more resources and better assignments. We have already decided that they will succeed, so we continually observe them with the expectation that they will confirm our beliefs.

No one, not scientist nor leaders nor children, simply observes the world and takes in what it offers. We all construct the world through lenses of our own making and use these to filter and select. We each actively participate in creating our worlds. Observation, then, is a very complex and important issue.

Let me develop a quantum interpretation as to why participation is such an effective organizational strategy. In the traditional model, we leave the interpretation of data to senior or expert people. A few people, charged with interpreting the data, observe only a very few of the potentialities contained within that data. How often do we even think about all the data that goes unnoticed because we rely on these solitary observations?
Think of organizational data for a metaphoric moment as a quantum wave function, moving through space, rich in potential interpretations. If this wave of potentials meets up with only one observer, it collapses into only one interpretation, responding to the expectations of that particular person. All other potentials disappear from view and are lost by that solo act of observation. This ione interpretation is then passed down to others in the organization. Most often the interpretation is presented as objective, which it is not, and definitive, which is impossible.
Consider how different it is, in quantum imagery, when data is recognized as a wave, rich in potential interpretations, and completely dependent on observers to evoke different meanings. If such data is free to move, it will meet up with many diverse observers. As each observer interacts with the data, he or she develops their own interpretation. We can expect these interpretations to be different, because people are. Instead of losing so many of the potentials contained in the data, multiple observers elicit multiple and varying responses, giving a genuine richness to the observations. An organization rich with many interpretations develop a wiser sense of what is going on and what needs to be done. Such organizations become more intelligent.
It would seem that the more participants we engage in this participative universe, the more we can access its potentials and the wiser we can become. We banish the ghosts of this ghostly universe by engaging in a different pattern of behavior -- one in which more and more of us are included in the process of observing what is going on, and contributing our unique interpretations to the organization.

“people support what they create.”

We know that the best way to create ownership is to have those responsible for implementation develop the plan for themselves. No one is successful if they merely present a plan in finished form to others. It doesn’t matter how brilliant or correct the plan is -- it simply doesn’t work to ask people to sign on when they haven’t been involved in the planning process.

In quantum logic, it is impossible to expect any plan or idea to be real to people if they do not have the opportunity to personally interact with it. Reality is co-created by our process of observation, from decisions we the observers make about what we choose to notice. It does not

exist independent of those activities. Therefore, we cannot *talk* people into our version of reality because truly nothing is real for them if they haven't created it. People can only experience a proposed plan by interacting with it, by evoking its possibilities through their personal processes of observation.

We live in a universe where relationships are primary… Nothing exists independent of its relationships. We are constantly creating the world -- evoking it from many potentials -- as we participate in all its many interactions.

It makes me wonder how we will design our organizations in the future. AS we struggle with the designs that will replace bureaucracy, we must invent organizations where process is allowed its varied-tempo dance, where structures come and go as they support the work that needs to get done, and where forms arise to support the necessary relationships.

Traditional organization charts are filled with lines connecting well-bounded boxes. It would be a breakthrough to think of the lines as reaction channels, places where energy meets up with other energy to create new possibilities. But S-matrices stretch my thinking even more because they demand that I stop thinking of roles or people as fixed entities. They lead me into the world of "no-things," where who you are depends on who you meet.

Chapter 5 -
Change, Stability, and Renewal:
The Paradoxes of Self-Organizing Systems

I sit now in a small playground, watching my youngest son run from one activity to another. He has climbed, swung, and jumped, whirled around on a spinning platform, and wobbled along a rolling log until, laughing, he loses his balance. Now he is perched on a teeter-totter, waiting to be bumped high in the air when his partner crashes to the ground. Everywhere I look, there are bodies in motion, energies in search of adventure.
It seems that the very experiences these children seek are ones we avoid: disequilibrium, novelty, loss of control, surprise. These make for a good playground, but for a dangerous life. We avoid these things so much that if an organization were to take the form of a teeter-totter, we'd brace it up at both ends, turning it into a stable plank. But why has equilibrium become such a prized goal in adult life? Why do we seek so earnestly after balance? Is change so fearsome that we'll do anything to avoid it?

The Second Law of Thermodynamics applies only to isolated or closed systems -- to machines, for example. The most obvious exception to this law is *life*. Everything alive is an open system

that engages with its environment and continues to grow and evolve. Yet both our science and culture have been profoundly affected by the images of degeneration contained in classical thermodynamics. When we see decay as inevitable, or society as going to ruin, or time as the road to inexorable death, we are unintentional celebrants of the Second Law. James Lovelock, biologist and author of the Gaia hypothesis, says the laws of thermodynamics "read like the notice at the gates of Dante's Hell" (1987, 123).

Equilibrium is neither the goal nor the fate of living systems, simply because as open systems they partner with their environment. These systems are called "open" because they have the ability to continuously import energy from the environment and to export entropy. They don't sit quietly by as their energy dissipates. They don't seek equilibrium. Quite the opposite. To stay viable, open systems maintain a state of non-equilibrium, keeping themselves *off balance* so that the system can change and grow. They participate in an open exchange with their world, using what is there for their own growth. Every organism in nature, including us, behaves in this way.
In the past, system analysts and scientists studied open systems primarily by focusing on the *structure* of the system (see Capra 1996, Part Two). This route led them away from observing or understanding the processes of change and growth that keep a system viable over time. Instead, analysts were interested in those influences that would support stability, which is the desired trait of machines.

Prigogine's work demonstrated that disequilibrium is the necessary condition for a system's growth.

All life takes form as dissipative structures.

Some scientists have wondered if spiral forms in art describe an archetypal experience of change, creation followed by dissipation and then new order. We see such spiral patterns in satellite photos of hurricanes. We live in a spiral-shaped galaxy; in fact, astronomers have concluded that the same iterative model used in the Belousov-Zhabotinsky chemical reaction applies to the scroll formation of star clusters.

We experience an inherent tension between stability and openness, a constant tug-of-war. But as I read about self-organizing systems, these dualities aren't present. Here are systems that stay strong by staying open. How do they do it?

(1) The viability and resiliency of a self-organizing system comes from its great capacity to adapt as needed, to create structures that fit the moment. Neither form nor function alone dictates how the system is organized. Instead, they are ***process structures***, reorganizing into different forms in order to maintain their identity.

Information must actively be sought from everywhere, from places and sources people never thought to look before. And then it must circulate freely so that many people can interpret it. The intent of this new information is to keep the system off-balance, alert to how it might need to

change. An open organization doesn't look for information that makes it feel good, that verifies its past and validates its present. It is deliberately looking for information that might threaten its stability, knock it off balance, and open it to growth. This is so different from the way information is handled in well-defended organizations. In these, only information that confirms existing plans or leadership is let in. Closed off from disturbances, kept at equilibrium, such organizations run down, atrophy, and die (see also Chapter Six).
While a self-organizing system's openness to disequilibrium might seem to make it too unpredictable, even temperamental, this is not the case. Its stability comes from a deepening center, a clarity about who it is, what it needs, what is required to survive in its environment. Self-organizing systems are never passive, hapless victims, forced to react to their environments. AS the system matures and develops self-knowledge, it becomes more adept at working with its environment. It uses available resources more effectively, sustaining and strengthening itself. It gradually develops a stability that then helps shelter it from many of the demands from the environment. This stability enables it to continue to develop in ways of its own choosing, not as a fearful reactant.

What comes to dominate over time is not outside influences, but the self-organizing dynamics of the system itself. Because it partners *with* its environment, the system develops increasing autonomy *from* the environment and also develops new capacities that make it incredibly resourceful.

But this self-organizing world teaches that boundaries not only create distinctions; they are also places for communication and exchange (see Margulis and Sagan 1986).

As plant manager Richard Knowles described this, "I no longer know where the plant ends, and I've learned it's not important to know that." As relationships developed far beyond the plant, it created conditions *within* the plant for levels of autonomy and experimentation that resulted in extraordinary new levels of safety and productivity.

(2) A second process fundamental to all self-organizing systems is that of *self-reference.* When the environment shifts and the system notices that it needs to change, it always changes in such a way that it remains consistent with itself. This is autopoiesis in action, a system focused on maintaining itself, producing itself. It will choose a path into the future that it believes is congruent with who it has been. Change is never random; the system will not take off in bizarre new directions. Paradoxically, it is the system's needs to maintain itself that may lead it to become something new and different. A living system changes in order to preserve itself.

Self-reference is the key to facilitating orderly change in the midst of turbulent environments. In organizations, just as with individuals, a clear sense of identity -- the lens of values, traditions, history, dreams, experience, competencies, culture -- is the only route to achieving independence from the environment.

(3) *stability over time…* The total system achieves stability by supporting change within itself. Small, local disturbances are not suppressed; there is no central command function that stamps out these local fluctuations. It is by supporting them that the global system preserves its overall stability and integrity.

"The natural dynamics of simple dissipative structures teach the optimistic principle of which we tend to despair in the human world: *the more freedom in self-organization, the more order*" (19980, 40; italics added).This is, for me, the most illuminating paradox of all. The two forces that we have placed in opposition to one another -- freedom and order -- turn out to be partners in generating healthy, well-ordered systems. Effective self-organization is supported by two critical elements: a clear sense of identity, and freedom. In organizations, if people are free to make their own decisions, guided by a clear organizational identity for them to reference, the whole system develops greater coherence and strength. He organization is less controlling,m but more orderly.

In science, this is known technically as a bifurcation point.

I can think of several organizations, particularly customer-oriented ones, that brag about how a single customer inquiry or the suggestion of one employee directed them into entirely new product lines that became very successful. There was no preplanning, no long-range strategic objectives, that let them into these markets. Just the creativity of one or a few individuals who succeeded in getting the attention of the organization and then watched the suggestion amplify to the level where the company reorganized to respond to it.
In describing self-organization, I am always struck by the great partnering that exists, it also affects its environment. No participant in this dance is left unaffected by changes that occur in another. Scientists call this *co-evolution*.

!! All life lives off-balance in a world that is open to change. And all of life is self-organizing. We do not have to fear disequilibrium, nor do we have to approach change so fearfully. Instead, we can realize that, like all life, we know how to grow and evolve in the midst of constant flux. There is a path through change that leads to greater independence and resiliency. We dance along this path by maintaining a coherent identity and by honoring everybody's need for self-determination.

And there is much we can learn from clouds. They are spectacular examples of fluid and responsive systems, structured in ways we never imagined possible: "After all, how do you hold a hundred tons of water in the air with no visible means of support? You build a cloud" (Cole 1985, 38).

"Whether an order is formed or not depends on whether or not information is created… the essence of creating order is in the creation of information." - Ikujiro Nonaka

Chapter 6 -
The Creative Energy of the Universe--Information

! All life uses information to organize itself into form. A living being is not a stable structure, but a continuous *process* of organizing information.

! At any point in the bodymind, two things come together -- a bit of information and a bit of matter. Of the two, *the information has a longer lifespan than the solid matter it is matched with…* This fact makes us realize that memory must be more permanent than matter. What is a cell, then? *It is a memory that has built some matter around itself, forming a specific pattern. Your body is just the place your memory calls home.* (Chopa 1989, 87; italics added)

[Jantsch] concludes that self-organizing systems are better thought of as energy processes that manifest themselves as physical forms (1980, 35).

! For a system to remain alive, for the universe to keep growing, information must be continually generated. If there is nothing new, or if the information merely confirms what already is, then the result will be death. Closed systems wind down and decay, victims of the Second Law of Thermodynamics. The source of life is new information -- novelty -- ordered into new structures.

Information is unique as a resource because it can generate itself. It's the solar energy of organization -- inexhaustible, with new progeny possible with every interpretation. As long as communication occurs in a shared context, fertility abounds. These new births require freedom; information must be free to circulate and find new partners. The greatest generator of information is the freedom of chaos, where every moment is new.

Of course, such freedom is exactly what we try to prevent. We have no desire to let information roam about promiscuously, procreating where it will, creating chaos. Management's task is to enforce control, to keep information contained, to pass it down in such a way that no newness occurs. Information chastity belts are a central management function. The last thing we need is information running loose in our organizations.

We have to create much freer access to [information], and become much more astute at noticing new information as it emerges. No other species seems to suffer from the delusion that they can manage information. Instead, they stay alert to what's happening all the time.

If a system has the capacity to process information, to notice and respond, then the system possesses the quality of *intelligence*. It has the means to recognize and interpret what is going on around it.

An organism doesn't even need a brain in order to be intelligent.

Gregory Bateson (1980) specified similar criteria in defining "mind." Any entity that has capacities for generating and absorbing information, for feedback, for self-regulation, possesses mind. These definitions offer us a means to contemplate organizational intelligence: why some organizations seem so smart, why others fail to survive for long, and why still others get stuck in repeating the same mistakes. We can begin to see that organizational intelligence is not something that resides in a few experts, specialists, or leaders. Instead, it is a system-wide capacity directly related to how open the organization is to new and disconfirming information, and how effectively that information can be interpreted by anyone in the organization.

Everybody needs information to do their work. We are so needy of this resource that if we can't get the real thing, we make it up. When rumors proliferate and gossip gets out of hand, it is always a sign that people lack the genuine article -- honest, meaningful information.

We live in a society that believes it can define *normal* and then judge everything against this fictitious standard. We struggle to smooth out the differences, conform to standards, measure up.

Even when we do notice new information, we too often rush in to kill it off.

I know one organization that thinks of information as salmon. If its organizational streams are well-stocked, they believe, information will find its way to where it needs to be. It will swim upstream to where it can spawn. The organization's job is to keep the streams clear so that information has an easier time of it. The result is a harvest of new ideas and projects.
Lb: information analogy #1

Another organization was able to change its approach to information by changing its metaphors. Instead of the limiting thought that "information is power," they began to think of information as "nourishment."
Lb: information analogy #2

Few things make us more frantic than increasing ambiguity. And although we say we've come to tolerate ambiguity rather well over the past years (because we had no other choice -- it wasn't going away), it often appears that we don't tolerate it as much as we shield ourselves from it. We have a hard time with lack of clarity, or with questions that have no easy answers. We move hurriedly out of these discomforts by focusing on one element, coming up with a narrow solution, and pretending not to notice everything else that's not getting dealt with.

We refuse to accept ambiguity and surprise as part of life because we hold onto the myth that prediction and control are possible. We still believe that it is possible to control every part of the machine. We still believe that we can (and must) know what's going on everywhere. We still believe that what holds a system together is us, our leadership. It is *our* intelligence -- not the intelligence distributed broadly throughout the organization -- that brings order to everything.

It is only the *meaning* of information that makes it potent or not. When information is identified as meaningful, it is a force for change
Lb: this shifts SBS for me!

Fractals are… complex by virtue of their infinite detail and unique mathematical properties (no two fractals are the same), yet they're simple because they can be generated through successive applications of simple iterations… It's a new brand of reductionism… utterly unlike the old reductionism, which sees complexity as built up out of simple forms, as an intricate building is made out of a few simple shapes or bricks. *Here the simple iteration in effect liberates the complexity hidden within it, giving access to creative potential*. The equation isn't the plot of a shape as it is in Euclid. Rather, the equation provides the starting point for evolving feedback. (Briggs and Peat 1989, 104; italics added)

The process of fractal creation suggests some ways organizations can work with the paradox that greater openness is the path to greater order. A fractal reveals its complex shape through continuous self-reference to a simple initial equation. Thus, the work of any team or organization needs to start with a clear sense of what they are trying to accomplish and how they want to behave together. I think of these agreements as the initial equations (see also Chapter Seven). Once this clarity is established, people will use it as their lens to interpret information, surprises, experience. They will be able to figure out what and how to do their work. Their individual decisions will not look the same, and there is no need for conformity in their behavior. But over time, as their individual solutions are fed back into the system, as learning is shared, we can expect than an orderly pattern will emerge.

Restricting information and carefully guarding it doesn't make us good managers. It just stops good people from doing good work.

Although it has been difficult for some older commanders to turn over so much control, the evidence is very clear that a network form of organization, where people are linked together by technology and shared meaning, makes soldiers more effective.

! As this Army story illustrates, an organization that wants to learn has to be willing to look at information that disconfirms its past beliefs and practices.

Jantsch, as a scientist, urges managers to a new role, that of "equilibrium busters." No longer the caretakers of control, we become the grand disturbers.

The analytic thought processes we learned in school and business have not prepared us to deal with the quantity of information that bombards us.

Many organizations are experimenting with new organization charts that describe more fluid patterns of relationship. While none of these quite succeed in describing the true complexity of the relationships, each attempts to communicate a more accurate picture of organizational life. Francis Hesselbein, Chairman of the Leader to Leader Institute, believes we are again learning "to manage in a world that is round," a world not of hierarchies but of encircling partnerships (Hesselbein and Cohen 1999, Ch. 2). Buckman Labs is moving from "a chain of command to a web of influence" (Willett 1999, 2). And Gore Associated, manufacturers of GoreTex(R), describes itself as a "lattice organization." These images describe organizations where roles and structure are created from need and interest, where relationships among workers are nurtured as the primary source of organizational creativity and success. One observer of Gore has noted that the issue is not who or what position will take care of the problem, but what energy, skill, influence, and wisdom are available to contribute to the solution.

! As I read further into new science, I recognize that living systems engage with life differently than we do. We struggle to carefully build order, layer upon layer, while life's order emerges. We labor hard to hold things together, while life participates together openly and self-organized structures emerge. Jantsch contrasts our traditional approach of building block by block to nature's process of "unfolding" (1980, 75). From the "interweaving of processes" new capacities and structures emerge. Order is never imposed from the top down or from the outside in. Order emerges as elements of the system work together, discovering each other and inventing new capacities.

"What is needed," writes Bohm, "is an *act of understanding* in which we see the totality as an actual process that, when carried out properly, tends to bring about a harmonious and orderly overall action, in which analysis into parts has no meaning (1980, 56).

In quantum physics, a homologous process is described as *relational holism*, where whole systems are created by the relationships among subatomic particles.

"The whole will, as a whole, possess a definite mass, charge, spin, and so on, but it is completely indeterminate which electrons are contributing what to this. Indeed, it is no longer meaningful to talk of the constituent electrons' individual properties, as these continually change to meet the requirements of the whole" (Zohar 1990, 99).

"Thus before all else, there came into being the Gaping Chasm, Chaos, but there followed the broad-chested Earth, Gaia, the forever-secure seat of the immortals… and also Love, Eros, the most beautiful of the immortal gods, he who breaks limbs." -- Hesiod

Chapter 7 -
Chaos and the Strange Attractor of Meaning

The system does not wander off into infinity. It is important to note that this boundary is not defined *for* the system; scientists do not create it.

“What rushes in under the guise of chaos whenever scientists try to separate and measure dynamical systems as if they were composed of parts…” (1989, 74-75). The strange attractors that form on our screens, Briggs and Peat suggest, are not the shape of chaos. They are the shape of wholeness. When we concentrate on individual moments or fragments of experience, we see only chaos. But if we stand back and look at what is taking shape, we see order. Order always displays itself as patterns that develop over time.

In much of new science, we are challenged by paradoxical concepts -- matter that is immaterial, disequilibrium that leads to stability, and now chaos that is ordered. Yet the paradox of chaos and order is not new. As ancient myths and new science both teach, every system that seeks to stay alive must hold within ti the potential for chaos, “a creature slumbering deep inside the perfectly ordered system” (Briggs and Peat 1989, 62).

We have held in us the dance of creation and learned that growth always requires passage through the fearful realms of disintegration.
Chaos’ role in the emergence of new order is so well-known that it seems strange that Western culture has denied it’s part so vehemently. In the dream of dominion over all nature, we believed we could eliminate chaos from life. We believed there were straight lines to the top. If we set a goal or claimed a vision, *we would* get there, never looking back, never forced to descend into confusion or despair. These beliefs led us far from life, far from the processes by which newness is created. And it is only now, as modern life grows ever more turbulent and control slips away, that we are willing again to contemplate chaos (see Hayles 1990).

Is this a deterministic world where our lives are predetermined? But if this is true, what about free will? It was this unresolved tension between predictability and freedom that attracted some early scientists of chaos. The science seemed to resolve this argument; it provided an explanation for how freedom functions in an orderly universe. The shape of the entire system is predictable or predetermined.

“Getting more than you bargained for” (1990, 184). In the past, science tended to ignore nonlinearity because it was just too hard to deal with. Science was focused on prediction, and nonlinear systems refuse prediction. To avoid the messiness and pursue the dream of determinism, nonlinear equations were “linearized.” Once they were warped in this way, they

could be handled by simpler mathematics. But this process of linearizing nature's nonlinear character blinded scientists to life's processes.

In a nonlinear world, there is no relation between the strength of the cause and the consequence of the effect.
From classical science, our culture has come to believe that small differences average out, that slight variances converge toward a point, and that approximations can give a fairly accurate picture of what might happen. But chaos theory exposes the world's nonlinear dynamics, which in no way resemble the neat charts and figures we have drawn so skillfully. In a nonlinear system, the *slightest* variation can lead to catastrophic results.

We could do better to abandon that search entirely. In nonlinear systems, iteration helps small differences grow into powerful and unpredictable effects.

One primary lesson I have learned from fractals is that a world ordered by patterns does not explain itself through traditional measures.

Since fractals resist definitive assessment by familiar tools, they require a new approach to observation and measurement.

When we study the individual parts or try to understand the system through discrete quantities, we get lost. Deep inside the details, we cannot see the whole. Yet to understand and work with the system, we need to be able to observe it as a system, in its wholeness. Wholeness is revealed only as shapes, not facts. Systems reveal themselves as patterns, not as isolated incidents or data points (see Capra 1996, Ch. 3).

The first step is to realize what we are looking for. A pattern has been defined rather succinctly as any behavior that occurs more than once.

Often patterns become discernible if we ask simple questions: "Have we seen this before?" "What feels familiar here?" To see patterns, we have to step back from the problem and gain perspective. Shapes are not discerned from close range. They require distance and time to show themselves. Pattern recognition requires that we sit together reflectively and patiently. I say patiently not only because patterns take time to form, but because we are trying to see the world differently and there are many years of blindness to overcome.

Fractal complexity originates in simplicity.

As a consultant, I was taught that I would be able to spot the dominant issues of the client system by noticing how the client interacted with me.
Fractal order originates when a simple formula is fed back on itself in a complex network. Except for the shape that is contained within this simple formula, there are no other constraints on behavior. **Organizations that display a strong commitment to their values make good**

use of this fractal creation process. In these organizations, it doesn't matter where you go, whom you talk with, or what the person's role is. By observing the behavior of a production floor employee or a senior executive, you can tell what the organization values and how it chooses to do its work.

Self-similarity is achieved not through compliance to an exhausting set of standards and rules, but from a few simple principles that everyone is accountable for, operating in a condition of individual freedom.

Organizations with integrity have truly learned that there is no choice but to walk their talk.

<u>It is the nature of life to organize into patterns.</u>

!!! These ideas speak with a simple clarity to issues of effective leadership. They recall us to the power of simple governing principles: guiding visions, sincere values, organizational beliefs -- the few self-referential ideas individuals can use to shape their own behavior. The leader's task is first to embody these principles, and then to help the organization become the standard it has declared for itself. This work of leaders cannot be reversed, or either step ignored. In organizations where leaders do not practice what they preach, there are terrible disabling consequences. Barbara Ley Toffler, a consultant specializing in ethics, reports that employees respond with "less commitment to the institution, less commitment to the institution's goals, customers, and clients." She comments that senior executives "have got to really, genuinely, walk the talk, practice what they preach, live out what they say" (in McLenahen, 1999).

! Leaders are also obligated to help the whole organization look at itself, to be reflective and learningful about its activities and decisions. Mort Meyerson, a retired CEO, says that one of the primary tasks of a leader is to make sure the organization knows itself (in "Everything I Knew About Leadership Is Wrong" (1996). The leader's role is not to make sure that people know exactly what to do and when to do it. Instead, leaders need to ensure that there is strong and evolving clarity about who the organization is. When this clear identity is available, it serves every member of the organization. Even in chaotic circumstances, individuals can make congruent decisions. Turbulence will not cause the organization to dissolve into incoherence.

As the universe keeps revealing more of its ordering processes, hopefully we will understand that systems achieve order from clear centers rather than imposed restraints.

But by far the most powerful force of attraction in organizations and in our individual lives is *meaning.* Our greatest motivation in life, writes Viktor Frankl in his stunning presentation of logotherapy, "is not to gain pleasure or to avoid pain but rather to see a meaning…" (1959, 115)

"What called you here? What were you dreaming you might accomplish when you first came to work here?"

Chapter 8 -
Change: The Capacity of Life

#1 The first great shift is this. A system is composed of parts, but we cannot understand a system by looking only at its parts. We need to *work with the whole of a system,* even as we work with individual parts or isolated problems.

Analysis narrows our field of awareness and actually prevents us from seeing the total system.

Hans-Peter Dürr, former director of the Max Planck Institute, once remarked to me, “There is no analytic language to describe what we are seeing at the quantum level. I can only say that it does not help to analyze things in more detail. The more specific the information, the less relevant it is.”

As I have struggled to understand a system as a system, I have been drawn to move past cognition into the realm of sensation. The german Philosopher Martin Heidegger describes this as a “dwelling consciousness.” When we dwell with a group or a problem, we move quietly into our senses, away from our sharpened analytic skills. Now I allow myself to pick up impressions, to notice how something feels, to sit with a group or with a report and call upon my intuition. I try to encourage myself and others to look for images, words, patterns that surface as we focus on an issue. (The Army has been aware that intuition plays a role in their effectiveness; a few years ago, they began studying “commander intuition.”)

We inquire into the part as we hold the recognition that it is participating in a whole system. We hold our attention at two levels simultaneously.

As good engineers, we’ve been trained to identify the problem part and replace it. Btu a systems sensibility quickly explains why this repair approach most often fails. Individual behaviors co-evolve as individuals interact with system dynamics. If we want to change individual or local behaviors, we have to tune into these system-wide influences. We have to use what is going on in the whole system to understand individual behavior, and we have to inquire into individual behavior to learn about the whole.

Seeing the interplay between system dynamics and individuals is a dance of discovery that requires several iterations between the whole and its parts.

Wen keep dancing between the two levels, bringing the sensitivities and information gleaned from one level to help us understand the other. If we hold awareness of the whole as we study

the part, and understand the part in its relationship to the whole, profound new insights become available.

[People] are able to see how their personal patterns and behaviors contribute to the whole. The surprise is that they then take responsibility for changing themselves.

#2 To become effective at change, we must leave behind the *imaginary organization* we design and learn to work with the *real organization*, which will always be a dense network of interdependent relationships.

!! nothing living lives alone.

! If a system is in trouble, it can be restored to health by connecting it to more of itself. To make a system stronger, we need to create stronger relationships. This principle has taught me that I can have faith in the system. The system is capable of solving its own problems. The solutions the system needs are usually already present in it. If a system is suffering, this indicates that it lacks sufficient access to itself.

! To bring health to a system, connect it to more of itself.

#3 Any living thing will change only if it *sees change as the means of preserving itself.*

Self-reference explains *why* any living system is motivated to change. It will change to stay the same.

We need to understand that all change results from a change in meaning. Meaning is created by the process of self-reference. We change only if we decide that the change is meaningful to who we are.

LB: SBS reference to meaning

From becoming attuned to this dynamic, I've come to believe that both individual and organizational change start from the same place. People need to explore an issue sufficiently to *decide whether new meaning is available and desirable*. THey will change only if they believe that a new insight, a new idea, or a new form helps them become more of who they are. If the work of change is at the level of an entire organization or community, then the search for new meaning must be done as a collective inquiry.

Now my first desire with a group is to learn who they are, what self they are referencing. I can never learn this by listening to some self-reports, or taking the word of a few people. I discover who they are by noticing what's meaningful to them as they are engaged in their work. What issues and behaviors get their attention? What topics generate the most energy, positive and negative? I have to be curious to discover these answers. And I have to be *working with them*,

not sitting on the side observing behavior or interviewing individuals. In the process of doing actual work, the real identity of the group, not some fantasy image, always becomes visible. There's another aspect to this work that is important to me. I assume that even in the presence of a group of collective identity, there are as many different interpretations as there are people in the group. I assume I will discover multiple and divergent interpretations for everything that occurs. So I try to put ideas and issues on the table as experiments to discover these different meanings, not as my recommendations for what *should* be meaningful.

I've come to appreciate that real change happens in personal behaviors, or at larger scale in entire organizations, only when we take time to discover this sense of what's worthy of our shared attention. We don't accept an organizational redesign because a leader tells us it is necessary. We choose to accept it if, and only if, we see how this new design enables us to contribute more to what we've defined as meaningful.

<u>We sing better when we know we're not alone</u>.

In working with networks, size is not the issue. The same fundamental dynamics are always at work in any living system, no matter how small or large. Self-reference and meaning-making never cease; therefore, change is always possible through those processes.

We need to find ways to get their attention; we need to discover what's meaningful to them. Size doesn't matter, but meaning does.
As we contemplate how networks change themselves, it helps to remember that we are working with energy, not matter.

"I start anywhere and follow it everywhere."

#4 we must look for these *invisible processes rather than the things that they engender*

We must look behind the things of organizations to work with the processes that gave them birth.

It's a completely new way to be. Life demands that I participate with things as they unfold…

His ability came not from superior balance, but from superb levels of self-awareness. As he described it, he was quicker to notice when he was off-balance, and faster at returning to center. He perfectly describes how to move in harmony with life rather than to resist it. First, we must know what "center" feels like. We must know who we are, our patterns of behavior, our values, our intentions. The ground of our identity and experience must feel familiar to us; we must know what it feels like to be standing in it.

Being present in the moment doesn't mean that we act without intention or flow directionless through life without any plans. But we would do better to attend more carefully to *the process* by

which we create our plans and intentions. We need to see these plans, standards, organization charts not as objects that we complete, but as processes that enable a group to keep clarifying its intent and strengthening its connections to new people and new information. We need less reverence for the objects we create, and much more attention to the processes we use to create them. Healthy processes create better relationships among us, more clarity about who we are, and more information about what's going on around us. WIth these new connections, we grow healthier. We develop greater capacity to know what to do. We weave together an organization as resilient and flexible as a spider's web.

Chapter 9 -
The New Scientific Management

Physicist David Peat traces how the understanding of light evolved in parallel ways in both art and science over the centuries, a relationship that continues to this day.

The work of Frederick Taylor, Frank Gilbreth, and hosts of followers initiated the era of "scientific management." This was the start of a continuing quest to treat work and workers as an engineering problem. Enormous focus went into creating time-motion studies and breaking work into discrete tasks that could be done by the most untrained of workers. I still find this early literature frightening to read. Designers were so focused on engineering efficient solutions that they completely discounted the human beings who were doing the work. They didn't just ignore them, as had been done more recently with contemporary reengineering efforts. They disdained them -- their task was to design work that would not be disrupted by the expected stupidity of workers.

Nobel Prize winner Sir Peter Medawar said that scientists build "explanatory structures, telling stories which are scrupulously tested to see if they are stories about real life" (in Judson 1987, 3). I like this idea of storytellers. It works well to describe all of us. We are great weavers of tales, listening intently around the campfire to see which stories best capture our imagination and the experience of our lives. If we can look at ourselves truthfully in the light of this fire and stop being so serious about getting things "right" -- as if there were still an objective realityout there -- we can engage in life differently, more playfully.

Surprise is the only route to discovery.

And even reality is evoked through acts of participation between us and what we choose to notice.

!! We are terrified of the emotions aroused by conflict, loss, love. In all of these struggles, it is *being human* that creates the problem. We have not yet learned how to be together. I believe we have been kept apart by three primary Western cultural beliefs: individualism, competition, and a mechanistic world view. Western culture, even as it continues to influence people everywhere, has not prepared us to work together in this new world of relationships.

While information may be immaterial, we are all suffering under its weight. Information overload is a major problem. We aren't struggling with this problem just because of technology, and we won't solve our information dilemmas just by using more sophisticated information-sorting techniques. Something much grander is being asked of us. We are moving irrevocably into a new relationship with the creative element of life. However long we may hope it isn't true, we will be forced to accept that information -- freely generated, freely communicated, and freely interpreted -- is our only hope for self-organized order in a world that no longer waits for us to respond. If we fail to recognize information's essential role in supporting self-organization, we will be unable to survive in this new world.

While new in science, self-reference has been an enduring concept in human thought. In Greek times, the Delphic Oracle greeted supplicants with this principle engraved in marble: "Know Thyself." And Shakespeare counseled, "This above all, to thine own self be true." So contemporary science is merely bringing to light a wisdom that has been with us for millennia. We see the world through who we are. All living beings create themselves and then use that "self" to filter new information and co-create their worlds. We refer to this self to determine what's important for us to notice. Through the self, we bring form and meaning to the infinite cacophony of data that always surrounds us.
Yet it is very important to note that in all life, the self is not a selfish individual. "Self" includes awareness of those others it must relate to as part of its system. Even among simple cells, there is an unerring recognition that they are in a *system*; there is a profound relationship between individual activity and the whole.

Chapter Ten -
The Real World

People often comment that the new leadership I propose couldn't possibly work in "the real world." I assume they are referring to their organization or government, a mechanistic world managed by bureaucracy, governed by policies and laws, filled with people who do what they're told, who surrender their freedom to leaders and sit passively waiting for instructions. This "real world" craves efficiency and obedience. It relies on standard operating procedures for every situation, even when chaos erupts and things spin out of control.
This is not the real world. This world is a manmade, dangerous fiction that destroys our capacity to deal well with what's really going on. The real world, not this fake one, demands that we learn

to cope with chaos, that we understand what motivates humans, and that we adopt strategies and behaviors that lead to order, not more chaos.
In this historic moment, we live caught between a worldview that no longer works and a new one that seems too bizarre to contemplate.

But it is also a world that seeks order. When chaos erupts, it not only disintegrates the current structure, it also creates the conditions for new order to emerge. Change always involves a dark night when everything falls apart. Yet if this period of dissolution is used to create new meaning, then chaos ends and new order emerges.

In this world, the “basic building blocks” of life are relationships, not individuals. Nothing exists on its own or has a final, fixed identity. We are all “bundles of potential.” Relationships evoke these potentials. We change as we meet different people or are in different circumstances. And strangest of all, scientists cannot find any independent reality that exists without our observations. We create reality through our acts of observation. What we perceive becomes true for us and this version of reality becomes the lens through which we interpret events. This is why we can experience the same event or look at the same information and have very different descriptions of it.

Leadership in Disasters: Learning from Katrina

This is a familiar yet troubling example of paradigm blindness, where people are unable to see information that threatens and disconfirms their worldview. No matter how much data is in front of them, their lens filters it out or distorts it to mean something else. And in some cases, people literally do not see the information, even if it’s right in front of them (see Kuhn 1969).

Their independence made them extremely resilient. If one person could no longer transmit, another picked up quickly. “Each one is a mobile, independent unit working in cooperation for a common goal” (Sky, 83). They acted freely, but from a clearly shared intent. These are the conditions that make it possible to bring order out of chaos.

Let us hope we learn from Katrina that the only way to restore order out of chaos is to rely on people’s intelligence, love, and capacity to self-organize, to accomplish what they care about.

Leadership of Networks: Learning from Terrorist Groups

What are the criteria we use to judge effective leaders? They include the abilities to communicate a powerful vision, to motivate people to work hard for them, to achieve results, exceed plans, and implement change. We want their leadership to result in a resilient

organization able to survive disruptions and crises, one that grows in capacity, that doesn't lose its way even after the leader retires. If we apply these criteria to the leaders of terrorist networks, they come out with high marks. It's difficult to acknowledge them as our teachers, but we have much to learn from them about innovation, motivation, resiliency, and the working of networks.

Although these groups appear leaderless, they in fact are well-led by their passion, rage, and conviction. They share an ideal or purpose that gives them a group identity and which compels them to act. They are geographically separate, but "all of one mind" (Arquilla, 9). They act free of constraints, encourages to do "what they think is best" to further the cause. This combination of shared meaning with freedom to determine one's actions is how system's grow to be more effective and well-ordered. The science thus predicts why terrorist networks become more effective over time. If individuals are free to invent their own ways to demonstrate support of their cause, they will invent ever more destructive actions, competing with one another for the most spectacular attack.
People who are deeply connected to a cause don't need directives, rewards, or leaders to tell them what to do. Inflamed, passionate, and working with like-minded others, they create increasingly extreme means to support their cause.

And human networks always organize around shared meaning. Individuals respond to the same issue or cause and join together to advance that cause.

Many analysts arrive at a similar conclusion -- we can only win the war on terror by eliminating the causes of rage. As long as our actions provoke their anger, we can expect more terrorists, more extreme attacks, and the continuing destabilization of the world by a small group of people. Barabisi states: "If we ever want to win the war, our only hope is to tackle the underlying social, economic, and political roots that fuel the network's growth. We must help eliminate the need and desire… to form links to terrorist organizations by offering them a change to belong to more constructive and meaningful webs." We might win small and discrete battles, we might break up different cell groups, but if we do nothing to eliminate their rage, people will continue to form these deadly networks and "the netwar will never end" (224)

Their economic poverty has serious consequences because, since the end of the Cold War, "all the wars and civil wars and genocide have occurred within the Gap."

Epilogue -
Journeying to a New World

I was in this work a few years before I was able to identify its real nature. I realized that I an others weren't asking people simply to adopt some new approaches to leadership, or to think

about organizations in a few new ways. What we were really asking, and what was also being asked for us, was that we change our thinking at the most fundamental level, that of our world view.

Dark times are normal to life; there's nothing wrong with us when we periodically plunge into the abyss.

They would set sail and bring back to us the answers and riches we coveted. We still want it to work this way; we still look to take what others have discovered and adopt it as our own. But we have all learned from experience that solutions don't transfer. These failures have been explained by quantum physics. In a quantum world, everything depends on context, on the unique relationships available in the moment. Since relationships are different from place to place and moment to moment, why would we expect that solutions developed in one context would work the same in another?

In this new world, you and I have to make it up as we go along, not because we lack expertise or planning skills, but because that is the nature of reality. Reality changes shape and meaning as we're in it.

This is a strange world, and it promises only to get stranger. Niels Bohr, who engaged with Heisenberg in those long, night-time conversations that ended in despair, once said that great ideas, when they appear, seem muddled and strange. They are only half-understood by their discoverer and remain a mystery to everyone else. But if an idea does not appear bizarre, he counseled, there is no hope for it (Wilber 1985, 20).