

A Different Perspective on Quality: Bringing Management to Life ©

keynote presentation to

The Deming Institute Fall 1997 Meeting

Washington, D.C.

October 11, 1997

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Despite the impression given by my title, "professor of quality management," I do not speak to you as a trained or certified authority on the subject of quality management. I adopted that title more or less casually after giving a presentation to an audience of Oregon business executives just over six years ago. That presentation described how my thinking had changed in the five years since I coauthored the 1987 book *Relevance Lost: The Rise and Fall of Management Accounting* (Boston: Harvard Business School Press). In the talk, which presaged my 1992 book *Relevance Regained: From Top-Down Control to Bottom-Up Empowerment* (New York: The Free Press), I told how I had come to believe that management accounting, a subject I had pursued and practiced for over 30 years at that point, could no longer provide useful tools for management. I said, in essence, that instead of managing by results--instead of driving people with quantitative financial targets--it was time for people in businesses to shift their attention to how they organize work and to how they relate to each other as human beings. I suggested that if companies organize work and build relationships properly, then the results that accountants keep track of will take care of themselves.

In the talk I referred to the ideas of Dr. Deming as an example of the viewpoint I was espousing. At that time, early 1991, my knowledge of Dr. Deming's ideas went no further than cursory reading in *Out of the Crisis* and conversing with a few of the consultants who worked with him. I was skating on thin ice, perhaps, but I charged ahead anyway and brashly referred to his ideas as though I knew what I was talking about. However, I was very confident that further reading and experience would only sharpen the outline and would enrich, but would not change, the essential message I was giving about the implications of Dr. Deming's ideas for the practice of management accounting. I believed then, as I still do, that Dr. Deming ranks among those few great thinkers whose ideas build fractally upon profoundly simple patterns that replicate again and again at varying orders of magnitude. Therefore, if you are alert to those patterns you can see the whole reflected in any of the parts--just as studying the branching pattern of the creeks and brooks that flow from a small mountain stream can give you a very clear idea of the pattern in the whole system of tributaries and river arteries that comprise an entire watershed.

After I gave that speech in 1991, one of the listeners, Herbert Retzlaff--the man who endowed the chair in management accounting that I had held since 1988 in Portland State University's School of Business--came up to me and said "I don't think you are any longer committed to studying and teaching management accounting." I didn't know what to say, but to my relief before I could speak he said "I think we should change the name of your chair from management accounting to quality management." I was delighted by his positive reaction to my critique of management accounting, but I don't think either of us at that time knew very much about the quality management profession. Certainly I knew little about the various professional groups in the quality management arena. Nevertheless, we went ahead and changed the name of my chair. In the meantime, I have never become a member of any organization of quality management professionals. My

reluctance has stemmed, in large part, from a growing belief that most of those organizations define quality very differently than I do.

Indeed, I do not use the word quality to refer to features of organizational processes, products, or services. Instead, I use the term to refer to the ability of Earth's ecosystem to combine the sun's energy with zero marginal material input in a process that perpetually generates increasing variety, diversity, and richness of output. This process began just over four billion years ago with dancing water-borne chains of self-replicating carbon molecules and has culminated most recently in the production of springtime floral bouquets on grassy plains, dolphins leaping in the sunset, and an intelligent primate species that is capable of contemplating whether its collective economic pursuits threaten its survival as a species in this creative dance we call life. In short, I believe life is quality, and anything that threatens Earth's natural life processes is non-quality. By that definition, I conclude that some of the organizations winning national quality awards around the world in recent years are among the most voracious destroyers of quality ever seen on Earth.

Today I want to talk about how the ideas of two 20th-century thinkers, W. Edwards Deming and Gregory Bateson, helped bring me to this way of thinking about quality. My views on quality have been particularly influenced by what each man said about two topics--variation and sustainability. I will discuss each topic separately and then wrap up with a few concluding remarks.

1. Variation.

I realized that there is more to what Dr. Deming said about variation than most people think the first time I read the opening chapters of Walter Shewhart's 1931 book *Economic Control of Quality of Manufactured Product*. For several years, after reading Fritjof Capra's book *The Turning Point*, I had been convinced that management science and the study of organizations would never be on the right track until they abandoned their long-standing commitment to Newtonian thinking and started to view human organizations through the lens of modern science, especially quantum physics and evolutionary biology. To express that belief I always like to quote a phrase attributed to Gregory Bateson that says "most of our problems arise from the difference between the way man thinks and the way nature works." I was delighted to see how Shewhart had couched his early explanation of statistical process control in terms of the way nature works.

Indeed, the opening chapters of his book ground the discussion of variation in the ideas of early-20th century scientists concerning the probabilistic nature of reality in the universe. He quotes from journals such as *Nature*, one of the oldest and most respected outlets for publishing state-of-the-art scientific research, and he cites passages from then recent works by physicists Arthur Eddington and Percy Bridgman. It is clear that Shewhart probably had at least a passing familiarity with new relativistic thinking and with ideas that were leading to what later would be known as quantum physics. When he referred to "modern" science he obviously meant recent 20th-century science, and he unmistakably differentiates that science from the Newtonian varieties that had prevailed until that time.

The key distinction Shewhart focuses on is the contrast between the Newtonian scientists' belief in certainty and the modern scientists' recognition that nature's laws seem to be probabilistic. Whereas scientists of the Newtonian persuasion believe that outcomes of natural processes can be predicted with pinpoint accuracy, if only we know all the underlying forces at work, Shewhart clearly understood that natural processes are inherently variable. More importantly, I think, he also recognized that natural process always seem to vary within limits. He saw the upshot of modern science, then, as understanding that the outcome of natural processes can be predicted, but only within a range, not with the accuracy of a bullet hitting a target.

Most remarkably, he then makes a leap and asserts that business processes, especially in manufacturing settings, should be viewed in the same new light with which modern scientists view natural processes. To back up this claim, he cites evidence gathered from several manufacturing processes at Western Electric showing that variation in a well-run process is to expected, but is confined to statistically definable limits. In this way, the science of statistical process control is born out of Shewhart's conviction that commerce not

only mirrors nature, but commerce must run according to the same principles that scientists observe in natural systems if it is to operate properly. If the scientific world has transcended Newton's explanation of natural processes, then the business world, according to Shewhart, must make the same transition in thought or else it presumably risks being irrelevant, at best, or possibly dangerous, at worst.

In the 1990s we have seen a virtual flood of books by organizational scientists and management authorities, most of them probably the age of Shewhart's grandchildren, who have recently discovered the world of quantum physics and evolutionary biology. Usually following the lead of Fritjof Capra, who began articulating this message in the late 1970s, they advocate grounding our view of organizational life in the so-called "new science" as if the idea were being enunciated for the first time. In fact, Walter Shewhart was already there with the same message nearly 70 years ago. I think it is unfortunate that this fact seems to go unrecognized in the quality literature. In my opinion, most quality professionals of the past fifty years or so missed this message, and thereby passed up a golden opportunity to promote the first real breakthrough into new thinking about management since the onset of the Industrial Revolution.

However, this breakthrough is implicit, in my opinion, in the writings and ideas of Dr. Deming, who of course was deeply influenced by his early association with Walter Shewhart. Moreover, Dr. Deming himself must have had more than passing familiarity with the latest scientific thinking as his doctoral program at Yale, completed in the late 1920s, focused on physics and his dissertation dealt with a study of Brownian motion, a phenomenon that cannot be understood using the categories of Newtonian thinking. Dr. Deming spoke in unmistakably quantum terms when he referred to "the crisis" in our organizational lives as a crisis of perception. The crisis would not be resolved, in his view, with mere tools and techniques--only with new thinking. He made it quite clear that the way "out of the crisis" was only through a deep transformation in the way we think about ourselves, about other humans, and about the world we inhabit. Undoubtedly he was expressing the same view as Gregory Bateson did when he attributed human problems to the difference between the way man thinks and the way nature works.

So, when I tell my students what Dr. Deming taught us about variation, I say that he was telling us to think about variation in human systems in the same way as we observe it occurring in nature. Most importantly, I think he was telling us to tolerate variation, not strive to eliminate it, because variation gives us a marvelous window through which to understand how processes work--both natural and human processes. Put another way, he was saying, I believe, that a human process becomes more robust to the extent that it emulates nature by being allowed to manifest through its variation a unique voice that blends, resonates, and harmonizes with the voices of other interrelated processes.

Once I understood variation in this context, I became disturbed at how often I heard quality management consultants and corporate quality administrators say that a goal of process management is, ultimately, to drive variation in any process as close to zero as is economically feasible. I have sometimes heard such authorities describe the concept of continuous improvement as relentlessly driving process variation toward zero. When I ask why we should do this, the answer is that variation is bad. Variation, I am told, means that something does not fit as tightly as it might or that more of something is consumed than might otherwise be the case. Any way you cut it, variation means that customers are not as pleased as can be and costs are higher than can be. Variation is bad. But if I press further and ask why is there variation, not why is it bad, I find I get blank stares. Finally, I ask "if variation is so bad, then why is there so much of it in nature?" Again, no answer.

The answer, it would seem, is that natural processes somehow depend on variation. Indeed, they depend on variation to survive, as Gregory Bateson often observed. The relationship between variation and survival is evident on at least two levels, one short-term and the other long-term. In the short term, living systems demonstrate enormous capacities for adapting to change, and surviving, by engineering myriad forms of variation in their parts. The human body, for example, adapts to changes in outside temperature, at least within limits, by inducing shivering, perspiration, and a change in metabolic rate. In this way, by constantly varying internal conditions, the body increases its chances of survival by maintaining a more or less constant temperature over wide changes in outside temperature. Similarly, the human blood system is capable of adjusting the red cell count to accommodate large changes in altitude that could overtax the

respiratory system and starve the system of oxygen (say when climbing a very high mountain, or when traveling from San Diego or London to Mexico City or Johannesburg). These homeostatic processes exist in all life forms, down to the simplest forms of bacteria. In all cases these life system processes seem to reflect a capacity for insuring survival by using variation to adapt to any short-term change that threatens the constancy of some condition that is vital for the system's survival.

I have not searched the literature to see if quality professionals have drawn on this phenomenon to explain the need for variation in organizational systems. I would be surprised if no one writing about quality had ever touched on this issue. However, I would judge that their work has not had much influence on quality management, given how often I hear practitioners say that variation is an evil to be eliminated as much as is economically feasible. If natural processes had manifest the same viewpoint, it is likely that life systems on Earth would not have lasted very long--certainly not the four and one-half billion years they have existed so far. As Gregory Bateson often said, the survival of life systems suggests the presence of a force that contradicts the oft-quoted French saying that "the more things change, the more they stay the same." Bateson suggested that modern biologic science tells us, instead, that the more a thing stays the same--i.e., the more it demonstrates a capacity to survive--the more it must and does change. In other words, variation and survival go hand in hand in natural systems.

Of course, variation in natural systems occurs within limits. But the point is that the flexibility, adaptability, and survivability of any smoothly functioning complex natural system depends on having the state of all the parts constantly varying, at least to some degree. Indeed, Bateson went on to point out that if only one part of a complex system stops varying enough, or if it begins to vary too much in one direction--say the present growth of human population in the Earth's ecosystem--then undue pressure is put on all the other parts of the system, causing systemic stress and, eventually, breakdown. Ecologists are now quite familiar with this concept, but I seldom hear quality professionals talk about increasing the variability in some parts of a system, in order to relieve stress in other parts. Indeed, one candidate for increased variability that I would promote to the top of the quality profession's list is bottom-line financial performance. The idea of constant increase in profitability or constant decrease in costs would seem to be a surefire recipe for systemic breakdown in any natural system. Although this idea is not likely to be popular among management consultants today, I certainly do not think that present-day business organizations stand any better chance than non-human natural systems have to survive the pursuit of "continuous improvement" defined in such terms.

2. Sustainability

Long-term change--also necessary for the survival of natural systems--is manifest in the process we call evolution. Evolution is a remarkable homeostatic process that has for four and one-half billion years preserved Earth's mother-of-all life systems, the ecosystem. Gregory Bateson believed that the first person ever to perceive evolution as a cybernetic, homeostatic process that works to sustain the existence of the evolving ecosystem was Alfred Russell Wallace. A contemporary of Charles Darwin, Wallace is the man whom many scholars argue was the first to use the concept of natural selection to explain the evolution of life forms on Earth, even though Darwin was the first to "go to press" with the idea. But as Bateson showed, Darwin's and Wallace's interpretations of natural selection were quite different. Darwin saw it in terms of a competitive struggle that pitted species against an external environment, a struggle that was described by Darwin's followers with phrases such as "survival of the fittest" and "red in tooth and claw."

Wallace, on the other hand, explained evolution not in terms of competitive struggles between species and the environment, but in terms of the governor that regulates the speed of a steam engine by maintaining constancy in the angular velocity of a flywheel. As Bateson puts it, building on Wallace's idea, the job of evolution is to maintain the constancy of something--specifically, the survival of the entire system comprised of all species and the environment. Darwin, according to Bateson, focused on the wrong subject--the individual species--when in fact the real subject of evolution is the species plus environment. In fact, the species and the environment co-evolve, to use a term that is popular among management writers today.

Moreover, if you add the remarkable findings reached in the past thirty years by biologist Lynn Margulis, this process of co-evolution sustains the total system through cooperative symbiotic relationships, not competitive knock-outs.

This new thinking about evolution, presaged 40 to 50 years ago in Gregory Bateson's writings, lends powerful support to certain ideas that were central to Edwards Deming's work. It is unfortunate that Bateson and Deming never collaborated. As far as I know the two never met, nor is there any sign that either one was aware of the other's work. Since becoming aware of Bateson's work myself, I am increasingly mindful of how his works might have put to rest criticisms of Dr. Deming's ideas that are often voiced by modern management thinkers who are steeped in the analytic Newtonian/Enlightenment mode of rationalism. For example, when Dr. Deming spoke of win/win cooperation, of replacing fear with trust, of putting aside competitive performance criteria, of finding fault in the system--not in the person, etc. --the reaction all too often is "that sounds nice, but it just isn't the way the real world works." I say, nonsense!

How the world we perceive works depends on how we think. The world we perceive is a world we bring forth through our thinking. As management professor Karl Weick puts it, "believing is seeing." Which brings us back again to Dr. Deming's central message in *Out of the Crisis* and to Gregory Bateson's remark that most of our problems arise because of the difference between the way we think and the way nature works. If we think like an 18th-century Enlightenment rationalist, steeped in a Newtonian view of reality, then, of course, it is easy to believe that humans are independent objects in the universe, moved only by external force or impact and subject to external laws of motion. Perhaps there is no better example of this type of thinking than the laws of economic behavior that have been formulated by those quintessential modern-day descendants of 18th-century Enlightenment thinking, the grand masters of neoclassical economic thought at institutions such as the University of Chicago. It is natural for those who believe in such a world to argue that the person, not the system, makes the difference, and that order arises from the efforts of powerful individuals to impose control on a naturally entropic environment. For such persons, Dr. Deming's ideas are nice to talk about, but as an agenda for action they border on lunacy (as I have heard some Chicago-style economists say when you mention Dr. Deming's ideas to them).

Dr. Deming's writings, and those of many of his followers, do rather successfully answer such criticisms. The most comprehensive of these answers is provided, of course, in the theory of profound knowledge that began to take shape in the last few years of his life. However, it has crossed my mind many times in the past two years or so that the impact of these writings could be made even more forceful were they to incorporate explicitly some of Gregory Bateson's key insights. Frequently I have had that very thought while writing chapters of my next book during the past 7 or 8 months. The book, which is a collaborative effort with Anders Bröms, a friend in Sweden, attempts to show how we might have addressed the subject of management in the past fifty years had we started from the premise that a business organization is a life system, not a mechanical system. In short, the book discusses the difference between how we think about business and how nature works. To explain how nature works I draw not only on Gregory Bateson's writings, but on modern evolutionary biology and modern biological and cosmological thinking about living systems. To explain how we think about business I describe and assess the practice of managing by results--a practice that Dr. Deming abhorred passionately and one that manifests what Bateson described as mankind's fatal pursuit of conscious purpose. The book draws upon my four decades of experience with management by results as an accountant and economist. Moreover, it draws on my many years of field research in two of the world's most robust and successful companies, Toyota and Scania, where I believe management practices exemplify the way nature works, not management by results.

Again and again, I find that what I am writing, about the need for transformation in businesses, is enhanced by some reference to Bateson or Deming. What is striking to me is how often those references are mutually supportive--almost as though they came from the same source. And always they focus attention on new questions, not on new and more clever answers to the same old questions. In particular, both men entreat us to reject mechanistic modes of thought--especially the idea that we humans impose order on the world--and to transcend to a mode of thought that sees pattern and order immanent in the world, a gift that is ours for the taking if only we will surrender our illusions of control. The artist Henry Miller once expressed this idea beautifully when he said "the world is not to be put in order, the world is order incarnate. It is for us to put

ourselves in unison with this order." The same idea is, of course, close at hand in the opening chapters of Walter Shewhart's 1931 book. I once heard Dr. Deming express the idea succinctly and humorously when he took the classic shop foreman's outburst "don't just sit there; do something!" and transposed it into "don't just do something; sit there!" I can't think of a more forceful way he might have expressed his injunction against tampering.

All of this comes back to my remarks about sustainability, evolution, and change. In the context of sustainability and evolution I think often about Bateson's admonishments against human pursuit of conscious purpose and Deming's injunctions against tampering. It came to me earlier this year when reading Stephen Ambrose's *Undaunted Courage*, his best-seller about the Lewis and Clark expedition nearly 200 years ago. I envisioned Meriwether Lewis and his intrepid band of 30 or so men at the point when they would have realized for the first time they were walking on soil where no white man's feet had ever stepped before. Undoubtedly it was along the Missouri River, perhaps 200 miles or so West of St. Louis. What if, as they looked out across what turned out to be about 1500 miles of unbroken prairie grassland—one of the most remarkable ecosystems ever to evolve on Earth—what if at that point they had said "don't just do something; sit there!" Sit there, contemplate the system that sustains human life and before doing anything more, ask if your actions will harmonize with the imperatives of that system.

What if that injunction were paramount on the mind of every business and political leader in today's world? My own belief is that our manage-by-results culture, as it is in business and in governmental economic policy making, drives activities that clash with the way nature works at almost every turn. In particular, driving people to mindlessly achieve targets—especially quantitative, financial targets—promotes relentless consumption of natural resources in order to grow and accumulate man-made stuff, all at the expense of nature's ability to continually generate increasingly rich diversity (what Paul Hawken refers to as a process of take, make, waste). The alternative to this might be to concentrate attention on nature's restorative, cyclical means, not on aggressively linear human ends. The alternative might ask us to consider how, by pursuing conscious purpose with high technology in our business and economic organizations, we have compromised a system that seems not to pursue goals or purposes, but only to pursue the continual unfolding of a few basic patterns through which the constant and unchanging supply of matter in Earth's ecosystem is transformed over time into a richer array of more diverse, and hence more robust, "results."

It might help to promote the cause of sustainability more than we realize if we were to apply the word quality only to organizations that truly act according to the way nature works. I think it is time to stop using the word quality to describe organizations that systematically compromise the natural systems which sustain life. This is the message one comes to, surely, when one draws out the full implications of what Walter Shewhart said about variation in nature 70 years ago, what Gregory Bateson said about the consequences of pursuing conscious human purpose with high technology, and what Edwards Deming said about respecting the voice of the system and not tampering with the system in a futile effort to manage results. Our failure to heed these messages has brought us to a point where our business and economic activities are systematically causing what poet Gary Snyder calls the "death of birth." By reversing evolution and reducing life's diversity, our economic pursuits are destroying the only source of real quality that exists on Earth.

Wrap-up

Were I asked to put in one short sentence the essence of the messages that we have inherited from Bateson, Deming, and Shewhart, the sentence would say "Since nature seems never to go off on tangents, neither should human beings go off on tangents." Always nature seems to link positive feedback processes, which are potentially tangential, with negative feedback processes, to produce the net outcome that Walter Shewhart observed in nature—ubiquitous variation that is bounded. Nature is not lineal; nature is cybernetic. And cybernetic systems seem to be inherently self-regulating. With recursive communication processes, they also can be self-identifying. Life is a self-identifying cybernetic system par excellence. Bringing management to life is, in my opinion, the greatest challenge and the greatest opportunity any of us faces today.

Speaking as a recovered economist, I am struck by how few people today recognize the way that our economic system--driven by the narrow Newtonian focus of neoclassical economic theory--relentlessly squeezes life out of our social and natural environment. Modern economic theory applies only to systems that move toward stable equilibrium. Such systems, by definition, are mechanical, entropic and non-living. Living systems dissipate entropy and sustain order in conditions far from equilibrium. Modern economic theory, by attaching itself parasitically to living human organizations in the realm of trade and commerce in the past fifty years or so, has transformed the human economic system from a potentially cyclical and self-balancing part of Earth's ecosystem into a linear and destructive instrument that threatens, if not all of nature, then at least mankind's place in nature's system.

This transformation is no more evident than it is in the relentless drive toward homogenization and mass uniformity manifest in today's global economic culture. Mistakenly, we view our time in human history as an era of unprecedented change. Nothing could be farther from the truth! Like an insidious cloud of invisible gas, our current economic system is snuffing out change--the flame of life. In the name of economic growth and financial wealth maximization it is destroying in our social, cultural, and natural systems the variation and the diversity that sustain life. To repeat the phrase by Gary Snyder, our economic system, by reversing evolution, is causing "the death of birth."

We truly honor the legacy of Edwards Deming and Gregory Bateson if we begin to recognize that our business and economic organizations should be viewed as life systems, not mechanical systems, and begin to act accordingly. It is time to see these organizations as more than mechanical systems that serve only as instruments of conscious human purpose that we can describe with metaphors from life systems--they are in fact life systems and must be dealt with accordingly if our economic activities are to be sustainable. To come to that point of view is quality--anything less is a destructive sham.