

# **MASTERING THE NEW REALITIES: CHAOS, COMPLEXITY AND CHANGE THAT NEVER STOPS**

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*Question: What's behind our failure to live up to the mandate for profound change?*

*Answer: A dangerously obsolete view of reality so deeply entrenched in the Western psyche, most of us don't even know it's there.*

On this eve of a brand new millennium, management is confronted with a mandate for change of unprecedented proportions. Contrary to the conventional wisdom, not just any old change will do. Neither tweaks nor modifications will suffice. Incremental improvements and alterations are inadequate. A new reality is looming---a universe rife with pulsating chaos, escalating complexity, and discontinuous change---that makes any adaptation short of profound transformation not only futile but increasingly dangerous. The message is clear.....

***If survival is the aim, change is the game.***

Unfortunately, if the track record of Western management for making change is any indication, our prospects for prevailing in the "brave new world" are dismal at best. Consider for example, the waxing rate of turnover on America's annual list of top performing corporations. Companies that for years resided at the top of the "Fortune 500" suddenly find themselves on an agonizing slide into the oblivion of insolvency. "Stealth" competitors---faster and fleeter start-up firms---arise out of nowhere it seems, stealing away large chunks of the market the aged corporate giants once dominated. Of course, the newcomers rarely last long themselves. Inevitably, they too are overtaken by yet another wave of new entrants to the fiercely competitive global marketplace.

## **SCIENTIFIC MANAGEMENT IS DEAD, LONG LIVE THE NEW SCIENTIFIC MANAGEMENT!**

Virtually all of Western society has been schooled in a way of thinking and doing known as "scientific management." The "Father" of this ubiquitous doctrine was one Frederick Winslow Taylor, a 19th century American industrial engineer who successfully codified a three century old explanation of reality into a managerial worldview that continues to predominate to this very day.

The central most tenet underpinning the practice of scientific management is this: Order and chaos are alternatives from which to choose. One....guess which!...is inherently "good" while the other is "bad." As a result of this dichotomous thinking, the primary mission of scientists and of their counterparts in the business world, that is "scientific" managers, became the imposition of order and the elimination of any vestige of turbulence or flux from the universe.

However, even as Mr. Taylor spoke, an astounding new picture of reality was being unveiled behind the closed laboratory doors of the 20th century scientific establishment. Mind-boggling but nevertheless irrefutable scientific evidence uncovered in the first three decades of this century has shattered beyond repair the conceptual foundations of both classical science, and

the managerial practice it had spawned. It turns out that chaos and order are not opposites at all but one and the same. Like two sides of a coin, they are bonded together inseparably to form a whole. Wherever one is, so too is the other.

This singular realization has engendered an astounding new conceptualization of reality. The scientific community albeit with certain reluctance, is being compelled by the weight of the evidence uncovered by their very own inquiries into the nature of the universe, to watch as the conceptual infrastructure of classical physics disintegrated before their eyes. Even scientists who as a group, pride themselves on their ability to maintain objectivity, have found it enormously difficult to give up the sense of certainty, constancy and control once derived from the view of reality framed by the "old" science. Today, practitioners of every scientific discipline ranging from astrophysics to molecular bio-genetics, have relinquished their belief in the "old" in order to embrace the "new" realities of chaos, complexity, and discontinuous change--just about every science that is, with the peculiar exception of "scientific" management. Unfortunately, practitioners of the science of organization have managed to sequestered themselves behind the impenetrable walls of the corporation, where they continue to enjoy the bliss of ignorance.

### **CLASSROOM IN THE PARK**

Crichton's 1990 bestseller transformed by the genius of Spielberg into the cinematic blockbuster of this century, has succeeded in bringing the "new" science to the attention of mainstream culture, where seventy years of scientific publications has failed. The story is chock full of insights about the nature of the universe and, more importantly, that corner of the universe that is the business enterprise. Jurassic Park recounts the tragedy that befalls a powerful CEO whose vision of a hugely profitable prehistoric zoo is suddenly and violently shattered beyond repair. So mesmerized was he by the promise of certainty and control implicit in the doctrine of scientific management, that he spurned the warnings of Malcolm, a disciple of the most powerful and elegant conceptualization of the nature of reality ever known. By so doing, his painful fate---to become dinner for the very same prehistoric monsters he reclaimed from extinction---was sealed.

Perhaps the reason the lessons of the Park (a superb case study in management if there ever was one) have gotten little notice from the corporate world, is that the film has been officially classified as sci-fiction. Even so, the science it so dramatically introduces, is solidly and completely sci-fact. Chaos, eloquent and succinct catchword for this new science of the universe, has emerged from the most extraordinary scientific discovery of our time---that chaos and order, like two sides of the same coin, are inseparable. To those intent on sustaining their enterprises into the flux of the next millennium, Chaos is a "pair of lenses" to enables them to see their organizations as the chaotic systems they truly are.

What "Big-C" Chaos teaches us is that the "little-c" chaos, i.e., disorder, turmoil and messiness, of which we most complain, is a monster of our own making no different than the Jurassic dinosaurs revived by the lamentable founder of the Park. "Little-c" chaos, that exceedingly unpleasant in-your-face brand of bedlam, is but the inevitable counter-invention of our own attempts to dominate our systems by separating the inseparable---the magically intertwined and miraculously interpenetrated essences of life that are chaos and order.

## **CHAOS**

Chaos came into being in 1977 when a group of students at the University of California at Santa Cruz pursuing doctorates in the physical sciences discovered a mutual interest in grasping the process by which order emerges from chaos. Referring to themselves as the "Chaos Cabal," the alliance of young scientists commenced a course of impassioned research, the product of which is a set of theoretical constructs and models that is known today under the general heading of Chaos. Perhaps the most profound of their insights is this: The universe is vibrant and vital chaotic system and not a static machine subject to our control; that this dynamical system is reducible not to "parts" as the machine metaphor implies, but to a few certain properties (five to be exact); and that implicit within these core qualities are the "laws" of Nature. Without a doubt, the relevance of Chaos for modern management is awesome indeed, for the code that governs the cosmos is the code that governs every microcosm of the universe. The enterprise is no exception.

## **CONSCIOUSNESS**

Seventeenth century French mathematician and philosopher Ren, Descartes started it all when he opined that humanity inhabited a "clockwork universe." His English contemporary, the brilliant physicist Isaac Newton, further embedded the machine metaphor in the human psyche with his portrayal of the universe as a mechanical system comprised of hard bodies of matter, that produces well-defined, precise, predictable, and above all controllable outcomes. Until Chaos came along, the ubiquitous image of ourselves as operators of this enormous machine, living on but not in our inanimate clock-world, has remained unquestioned.

By verifying the universal property of Consciousness, Chaos has effectively challenged the central most axiom of Newtonian physics---the existence of matter--- and won. Shortly after the turn of this century, the eminent Albert Einstein had proved the equivalence of mass and energy: In other words, he demonstrated conclusively that although we may perceive the universe as clumps of solid matter, it is in fact a vast ocean of energy in constant motion. So the question arises, "What exactly is the force that causes bits of energy from this enormous field of "quantum stuff" to condense into something that seems solid to the touch. Chaos answers with confidence, "It is the force of the mind as it engages in its primary activity, thinking."

Translated into the lexicon of management, the Principle of Consciousness tells us that our organizations are not instruments of production by any stretch of the imagination: The essential "substance" of the enterprise is human thought, a creation of human thinking. However they may seem, the company's headquarters, its stock certificates, its equipment, its annual reports, etc. are not the organization but only physical manifestations of thought. It is by and through human participation in the process of thinking, we are endowed with the capacity to bring a chaotic system. More importantly, we are empowered to change it profoundly and at will. The quintessential act of organizational change is the act of changing our minds, or more to the point, changing the mind of the enterprise, the orgmind.

## **CONNECTIVITY**

Late in the 1920s, Einstein and Danish physicist Niels Bohr, became embroiled in a pivotal scientific disputation now known as the Copenhagen Debates. At issue was the Dane's finding that two particles separated by a vast distance, were able to behave coherently as if they could somehow "communicate" with each other instantaneously. Einstein dismissed the claim as ludicrous. He argued that since information would have to be transmitted between the two units

at a rate exceeding the speed of light, Bohr's assertions were preposterous. "Quite true," the Dane rebutted, "if one assumes that the two particles are separate and independent units." He went on to prevail in the dialectic by convincing Einstein that his fundamental assumption, the separateness of the particles, was in error. By showing the only conceivable explanation of the phenomenon of "instantaneous communication" that is that the two particles were in fact one, Bohr had proven the absolute connectivity of the universe.

Although reality may present itself as numerous "things" existing separately and independently, this re-presentation is an illusion. All "things" are absolutely connected to each other and to the whole of which they are part. Units have no meaning in a chaotic system and therefore, do not exist. This notion of "oneness" is pivotal when it comes to designing and building the kind of enterprises we expect to flourish in a context of turbulence and flux. Organizations "engineered" (or "reengineered" for that matter) as if they were machines-- orderly arrangements of parts--- simply cannot endure. On the other hand, business systems in which the connections are sufficiently dense and strong are imbued with enough internal resilience to thrive in the most chaotic of conditions.

## **INDETERMINACY**

Most of us would claim to know this particular feature of reality when we see it. However, Chaos shows us that our comprehension of the complexity of our world has been quite limited as a result of our programming in the tenets of science and scientific management. We are admittedly adept at recognizing one form of intricacy called detail complexity. A system is complex in detail when it is determined by a multitude of factors in its internal and external environments. For example, few would argue the complexity of a 1,000-piece jigsaw puzzle: it is complex to the 1,000th degree of detail. Given that fact, a bit of experience at puzzle piecing, and a box with a picture of the final product, and one could predict with relative accuracy how long it will take to complete the puzzle.

The problem with this example is the motionlessness of the "details." Chaos holds that there exists another kind of complexity at play in chaotic systems. Dynamical complexity is complexity in motion; it exists whenever the multiplicity of factors influencing a chaotic system are also each influencing each other by virtue of their absolute connectivity. According to Chaos, this is virtually always the case. The condition of a vast complexity of details none of which is ever "at rest," is the normal state of a chaotic system. Dynamically detailed complexity is astonishingly difficult to see, especially for disciples of the Newtonian view of the world.

Newton acknowledged the former kind of complexity but believed that the details were related by virtue of direct lines of cause and effect. Therefore, if one could figure out the initial conditions, one could ultimately predict the future with absolute precision and accuracy. To this day, those of a Newtonian persuasion go about their managerial duties with total confidence that one day they will succeed in putting the last piece of the organizational puzzle in place. All they have to do is identify all the details, analyze them to determine their linear effects, and then organize their findings in a "strategic plan" of precise actions to be taken and objectives to be reached. Before long, the illustration on the puzzle box known in their lexicon as the "corporate vision," will be the reality they have worked so hard to achieve.

Sadly, stinging disappointment is in store for these true believers due to the inexorable reality of dynamical complexity. It's as if all the pieces of the puzzle of the enterprise have been put into a continuously gyrating lottery ball cage that is set on a car of a constantly moving roller coaster. There we sit with our "vision statement" and "strategic plan" facing the reality of our

plight: The unequivocal uselessness of these cherished tools and the utter impossibility of predicting what will happen next let alone at the end of our three-year plan.

Chaos proves the fact of the dynamically detailed complexity of the universe. But there is a more important reason for management to relinquish their stubborn faith in the Newtonian promise of certainty. Even if every initial detail could be known, it is still not possible even in principle to predict the future because the future is undetermined.

## **DISSIPATION**

The very thought of "dissipation" tends to conjure in the managerial mind, anxiety-producing images of decay, deterioration, and eventual collapse. In fact, there is cause for concern, for scientific managers that is, due to the inexorable fact that all systems are inherently dissipative--structures of mass that inevitably fall apart. According to Chaos, the universe is governed by a law which ordains that every system is subject to limits to its own growth: over time, the conditions that once fostered growth, change or cease to exist and growth must stop. The Law of Limits does not discriminate. Regardless of how solid, durable or permanent they may appear, chaotic systems are of their essence, transient materializations of energy. In time, every system will encounter its limits and dissipate releasing the energy it had once held captive back into the environment.

This notion can and does cause despair and gloom among those schooled in the Newtonian view of the world. What they do not know, is that how and when their enterprises "fall apart" is up to them. The point at which a system encounters its limits, is a point of choice; a moment Chaos calls bifurcation. It works like this: At the instant of genesis in the minds of its founders, the organization embarks on a journey through a vast field of dynamical energy. The path it weaves leads to a setting far- from-equilibrium (FFE) at "the edge" of chaos, where it is confronted with a choice of fates: The system can either "leap" to a higher order of complexity, or it can "fall" to ruin. Emergence to higher order can be attained only by choosing profound change. Tragically, although it is not their intention to do so, scientific managers more often than not choose the distasteful alternative, the demise of the enterprises they have labored so long to grow. What accounts for this madness? Ignorance of the options, and the refusal to relinquish our abiding faith in the central values espoused by scientific management---our belief in certainty, constancy, and above all, control.

Chaos proves that it is through the process of dissipation, that the energy once "locked up" in the "cage" of equilibrium---a "cage" Chaos scientists call a "strange attractor"---manages to "escape" back into the environment. There it becomes available to any system that so chooses, to be reconfigured in a new and more complex form. Managerial "captors" who maintain that their choice is between chaos and order and so choose equilibrium, fail to understand that death (scientific jargon for equilibrium) is the ultimate strange attractor. By acting in ways to fix their systems as far from "the edge" as they can in order to preserve the equilibrium they cherish, are choosing death.

## **EMERGENCE**

So far, students of the universe failed to find in a single chaotic system aside from the peculiar exception of the business enterprise, an iota of evidence of an "executive" element---an atom, a cell, a molecule that tells the other elements what to do and how to do it. So what is it these other entities know that those who manage our organization apparently do not? Chaos says that every system in the universe is the manifestation of a powerful life force, an intrinsic drive that continuously thrusts it to ever-higher planes of dynamical complexity, new configurations of

order and chaos. Every system is endowed with a trio of capacities that enable it to do so at will: Chaotic systems are 1) self-organizing: capable of generating order out of chaos, of creating something out of nothing all by themselves. They are 2) self-referencing: capable of changing profoundly while simultaneously maintaining an implicit identity embedded deeply in the core of the consciousness all by themselves. And lastly, they are 3) self-replicating: capable of generating patterns of behavior that are self-similar and at the same time, wholly unpredictable all by themselves.

As a matter of fact, even the commercial enterprise enjoys these capabilities. Unfortunately, the threesome and consequently, the source of the organization's life, is repeatedly hindered, thwarted, and frustrated by managers who have learned to treat their enterprises as a pile of parts, a machine subject to their control and will. They do because they do not "get it"---that their system is intrinsically emergent. It seeks life. It "wants" to move far-from-equilibrium where it can choose life. This practice of putting some elements, i.e., people called managers, in charge of other elements, i.e., people called subordinates, is not only wasteful of the systems' natural assets, but strangely illogical for those who pride themselves on their mastery of rationality.

### **RULES FOR LIFE IN CHAOS**

Chaos cites three simple rules underpinning the property of emergence that, if followed, will allow managers to tap the rich capacity of their enterprises to ascend continuously to new levels of life, of vitality and vibrancy:

**Rule #1:** Give up your historical (and often hysterical) preoccupation with organizing things. You'll get all the order you'll ever need gratis if only let your system do its thing. Keep trying to impose order, and you'll pay dearly by suffering a terrible chaos of your own making. (Remember, the unfortunate protagonist of Jurassic Park?)

**Rule #2:** If you feel you must do something once you're in compliance with Rule #1, invest your time and energy in the fundamental work of leadership, that is embedding a compelling and meaningful vision as deeply as you can in the core of the orgmind. This is the central point of reference essential to the sustainability of your enterprise as it moves closer and closer to "the edge" of chaos. Neglect any member of your enterprise as you go about this crucial embedding process, and the whole system to wander aimlessly through its field of complexity.

**Rule #3:** If you still crave a hint of predictability about the future of your enterprise and the form it will take as it leaps to ever higher levels of complexity, look closely into the orgmind where you will discover the archetypal pattern your system has the ability to replicate into eternity. But remember: Anything more than a tiny dose of certainty can be fatal.

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