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Margaret Wheatley's *LEADERSHIP and the NEW SCIENCE: Discovering Order in a Chaotic World*—a Subjective Summary

First published in 1992 and now in its third edition, *Leadership and the New Science: Discovering Order in a Chaotic World*[1] has sold over 300,000 copies, has been translated into 17 languages, and has been the subject of many articles and reviews.[2] And yet, in our information-saturated, hyper-connected world, many more people have heard and talked about this marvelous book than have actually read it.

Let's get my bias out of the way: I was enthralled when I finally got around to reading *Leadership and the New Science* last summer. The work is astonishing in the scale and scope of its ideas, and in the clarity and elegance of its writing. In just over 200 pages Wheatley covers 10 chapters, each loaded with enough big ideas to fill a book of its own:

1. Discovering an Orderly World
2. Newtonian Organizations in a Quantum Age
3. Space Is Not Empty: Invisible Fields That Shape Behavior
4. The Participative Nature of the Universe
5. Change, Stability, and Renewal: The Paradoxes of Self-Organizing Systems
6. The Creative Energy of the Universe—Information
7. Chaos and the Strange Attractor of Meaning
8. Change—the Capacity of Life
9. The New Scientific Management
10. The Real World

All that, plus a prologue, introduction and epilogue!

It would have been far easier for Wheatley to write an academic treatise, exploring theoretical connections between modern scientific principles and the organization of human affairs. But instead, she chose to share her fears and hopes for civilization as it is and could be, and her vision and wisdom in explaining how we might transform one into the other:

> *Here is the real world as I experience it. It is a world where small groups of enraged people alter the politics of the most powerful nations on earth. It is a world where very*

[1] Wheatley, Margaret J. *Leadership and the New Science: Discovering Order in a Chaotic World (3rd Ed)*. San Francisco: Berrett-Koehler Publishers, Inc., 2006

[2] Including: features in the Los Angeles Times, Washington Post, Miami Herald, Harvard Business Review, Fast Company and Fortune; and 1,545 ratings and 70 reviews in Goodreads. See: http://www.goodreads.com/book/show/270897.Leadership_and_the_New_Science (accessed September 8, 2016).

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slight changes in the temperature of oceans cause violent weather that brings great hardship to people living far from those oceans. It is a world where pandemics kill tens of millions and viruses leap carelessly across national boundaries. It is a world of increased fragmentation where people retreat into positions and identities. It is a world where we have very different interpretations of what's going on, even though we look at the same information…

This dramatic and turbulent world makes a mockery of our plans and predictions. It keeps us on edge, anxious and sleepless. Nothing makes sense anymore. Meaning eludes us. Some offer explanations that this is the end of times or the age of destruction.

Whatever your personal beliefs and experiences, I invite you to consider that we need a new worldview to navigate this chaotic time. We cannot hope to make sense using our old maps. 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.

Now that I've spent years applying the lens of new science to organizations, communities, governments, nation states, and to myself and family. I can report on the gifts available with a new paradigm. I have discovered insights about why things are unfolding as they are. I have been inspired to experiment with new ideas and solutions. I feel I am learning how to move more effectively and gracefully through this time.

But I have also discovered how hard it is to surrender a worldview. When scientists confronted this challenge at the beginning of the 20th century, they couldn't accept the world revealed to them in their experiments. They described this new world as strange, puzzling, troubling, bizarre, absurd…

It was only when scientists were willing to accept their confusion instead of fleeing from it and only when they changed the questions they were asking, only then could they discover the insights and formulations that gave them great new capacity. Once this new worldview came into focus, scientists reengaged with their work with new energy. Wonder, curiosity, and the delight of discovery replaced their fatigue and frustration. I am hopeful that we too can regain our energy and delight by looking at the world of organizations through their worldview. I believe their maps are reliable guides to lands of promise, where human creativity, wisdom and courage can be fully engaged in creating healthy and enduring organizations and societies.

You will find maps of many varieties in this book. Some describe specific new science findings in enough detail that, hopefully, you understand their terrain. Others point out less explored places that need further inquiry. Still others are very detailed, drawing deliberate connections between science and organizational life. And finally, there are records of my personal journey, what I felt and experienced as I brought back questions and insights and applied them in my own work.

> *Like anyone else, my own training and worldview bias me. I have focused on the scientific discoveries that intrigued my organizational mind and have ignored many others. This is neither a comprehensive or technical guide to new science. It recounts, instead, the voyages I took to but a few of the emerging areas in science, those that enticed me. I was intrigued by three different areas of science: quantum physics, self-organizing systems, and chaos theory…* (*Prologue*, x – xii)

Too often, technical books either march relentlessly or wander aimlessly through a blizzard of detail—with neither a narrative arc nor a writer's voice to guide the reader's search for meaning—and are abandoned unfinished by their busy, weary readers. This isn't one of those books. While technically strong, *Leadership and the New Science* is also a riveting page-turner. Wheatley's writing is clear and direct throughout; she develops the themes laid out in her introduction with elegant coherence; and she brilliantly weaves practical applications, examples and implications into her science-based insights.

As an example, consider Wheatley's use of a quantum physics thought problem (Schroedinger's cat) to illustrate why organizational leaders are as vulnerable as scientists to what she calls the "observational dilemma;" and how that addressing that dilemma can strengthen organizational strategy and leadership:

> *Physicist Erwin Schroedinger constructed the problem in 1935 to illustrate that in the quantum world nothing is real. We cannot know what is happening to something if we are not looking at it, and, stranger yet, nothing does happen to it until we observe it…*
>
> *A live cat is placed in a box. The box has solid walls, so one outside the box can see into it… Inside the box, a device will trigger the release of either poison or food; the probability of either occurrence is 50/50. Time passes. The trigger goes off, unobserved. The cat meets its fate.*
>
> *Or does it? Just as an electron is* ***both*** *a wave and a particle until our observation causes it to collapse as either a particle or a wave, Schroedinger argues that the cat is both alive* ***and*** *dead until the moment we observe it. Inside the box, when no one is watching, the cat exists only as a probability wave. It is possible to calculate mathematically (as a Schroedinger wave function) all of the cat's possible states. But it is impossible to say that the cat is living or dead until we observe it. It is the act of observation that determines the collapse of the cat's wave function and makes it either dead or alive. Before we peer in, the cat exists as probabilities. Our curiosity kills the cat. Or brings it back.*
>
> *I have* ***never*** *understood the quantum logic of Schroedinger's cat, but I have let the problem ramble aimlessly in my mind, content not to engage with its counterintuitive nature. Yet just like a wave function, the possibilities of this idea grew unobserved until one day, in true quantum fashion, they "popped" and I had a moment of concrete recognition. I realized that I had been living in a Schroedinger's cat world in every organization I had ever been in. Each of these organizations had myriad boxes, drawn in endless renderings of organizational charts. Within each of those boxes lay a "cat,"*

> *a human being, rich in potential, whose fate was determined, always and irrevocably, by the act of observation.*
>
> *It common to speak of self-fulfilling prophecies and the effect these have on people's behaviour. 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…*
>
> *In the quantum world, what you see is what you get. In human organizations, we play with Schroedinger's cat daily, determining the fate of all of us—our quality of aliveness or deadness—by what we decide to observe in one another.*
>
> *No one, not scientists 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…*
>
> *For leaders, being alert to the* ***observational dilemma*** *(emphasis added) is critically important. Management is addicted to numbers, taking frequent pulses of the organization in surveys, monthly progress checks, quarterly reports, yearly evaluations. It is important to stay aware to the realization that no form of interpretation is neutral. Every act of measurement loses more information than it gains…* (Ch. 4, 61-65)

Wheatley then applies her own quantum interpretation to explain the effectiveness of participation as organizational strategy, teasing out elements of the wisdom of crowds, generative dialogue, co-creation, and relationship theory:

> *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…*
>
> *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 one interpretation is then passed down to others in the organization.*
>
> *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. An organization rich with many interpretations*

> *develops a wiser sense of what is going 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 behaviour, 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.*
>
> *The truly miraculous organizational events I have participated over the past several years are change efforts where the whole system is involved… The miraculous enters in as the diversity of the group coalesces into a complex but unified vision of what they want to create together. This future vision is always far more powerful and ingenious than any individual could possibly have imagined…*
>
> *We know that the best way to create ownership is to have those responsible for implementation develop the plan for themselves… 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.*
>
> *This is where the observation phenomenon of quantum physics has something to teach us. 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 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 co-created it. People can only experience a proposed plan by interacting with it, by evoking its possibilities through their personal processes of observation… [I]t is the participation process that makes the plan come alive as a personal reality. People can commit themselves because it has become real for them.*
>
> *Participation, ownership, subjective data—each of these organizational insights that I gain from quantum physics quickly returns to a central truth. We live in a universe where relationships are primary. Nothing happens in the quantum world without something encountering something else. 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. This is a world of process, the process of connecting, where "things" come into temporary existence because of relationship.* (Ch. 4, 66-69)

I hope this passage on the creative power of participation, connectivity and relationships was sufficiently well chosen and proportioned to reveal at least some the genius of the thinking that connects and illuminates Wheatley's words. Literally every page of this book seems to offer the reader at least one nugget; and as we turn those pages and allow ourselves to reflect on the implications of their contents in our own lives, we find ourselves participating in the polishing of the cascading nuggets into jewels of insight we can claim as at least partly our own.

Consider this passage from Ch. 7, *Chaos and the Strange Attractor of Meaning*, offering a series of insights and lessons on the power of nonlinearity:

> *The shape of chaos materializes from information feeding back on itself and changing in the process. This is the familiar process of iteration and feedback described so much in the new science. It is the same process that results in self-organization, and also the creation of fractals (as noted in preceding chapters). This process succeeds in creating newness because it takes place in a system that is nonlinear…*
>
> *In a nonlinear world, very slight variances, things so small as to be indiscernible, can amplify into completely unexpected results…*
>
> *From classical science, our culture has come to believe that small differences average out, that slight variances converge towards 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 world, the slightest variation can have catastrophic consequences…*
>
> *Edward Lorenz, a meteorologist, first drew public attention to this with his now famous "butterfly effect." Does the flap of a butterfly wing in Tokyo, Lorenz queried, affect a tornado in Texas (or a thunderstorm in New York)? Though unfortunate for the future of accurate weather prediction, his answer was "yes." And in organizations, we frequently experience these "flaps." A casual comment at a meeting flies through the organization, growing and mutating into a huge misunderstanding that requires enormous time and energy to resolve. And many organizations have learned that events occurring in a relatively minor part of their business suddenly grow to threaten their overall viability. Before disaster struck in Union Carbide's plant at Bhopal, India, the plant contributed a mere 4% to corporate profits. However, this horrific tragedy led to a major restructuring of the entire company and a serious decrease in its overall valuation. And in Alaska, how much ecological and cultural devastation on a grand scale was created from the actions of one oil tanker, the Exxon Valdez?* (120-122)

And for still more jewels, let's turn to Ch. 5, *Change, Stability, and Renewal: The Paradoxes of Self-Organizing Systems*, where Wheatley reflects on the universality of self-organization, and the accompanying qualities of openness, viability and resiliency:

> *There are many examples of chemical reactions that exhibit extraordinary self-organizing behaviour. One of the most beautiful in the Belousov-Zhabotinsky reaction, where chemicals, in response to changes in temperature and mix, form into swirling spiral patterns that rival the beauty of a Ukrainian Easter egg. The system is responding to disturbance by creating a new level of intricate organization…*
>
> *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…

I find the openness of self-organizing systems especially intriguing. Their relationship with their environment feels new to me. In organizations, we typically struggle against the environment, seeing it as the source of disruption and change. We tend to insulate ourselves from it as long as possible in an effort to preserve the precious stability we have acquired. Even though we know we need to be responsive to forces and demands beyond the boundaries of our organization, we still focus our efforts on maintaining the strongest defensive structure possible. We experience 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?

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…

We are beginning to see organizations that are learning how to use the power of self-organization to be more agile and effective. There are increasing reports of organizations that have given up any reliance on permanent structures. They have eliminated rigidity—both physical and psychological—in order to support more fluid processes whereby temporary teams are created to deal with specific and ever-changing needs. They have simplified roles into minimal categories; they have knocked down walls and created workplaces where people, ideas, and information circulate freely. (See Petzinger, 1999)

At Oticon, a Scandinavian manufacturer of hearing aids, employees were given the freedom to redesign their physical space as part of a major destructuring of the entire corporate operation. They created maximum flexibility for themselves by foregoing offices or normal furniture. Employees created a nomadic office; each person received a cell phone, a laptop computer, and a file cart on wheels. As teams form, they wheel their file caddies up to neighboring tables and begin to work. Their CEO tells the story of being gone from the office for a day, only to find his own rolling cart wheeled into marketing. His staff had heard him mention that he needed to spend more time in that area (see Pinchot and Pinchot 1996).

If an organization seeks to develop these life-saving qualities of adaptability, it needs to open itself in many ways. Especially important is the organization's relationship to information, particularly to that which is new and even disturbing. 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... 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 [*The Creative Energy of the Universe—Information*]) (81-83)

Here I've shared a few examples of *Leadership and the New Science*'s beauty and coherence. But plenty of chaos and disorder mark its pages too—as again and again, in different ways and from different perspectives, Wheatley explores connections and relationships between chaos and order, or disorder and order. It's in the embracing of that interconnectedness and duality as a transformative potential that the book generates its greatest power, and offers the reader—this reader at least—its most valuable inspiration and guidance:

> *Is chaos an irregularity, or is order just a lucky moment grabbed from natural disorder? We've been taught to see things as separate states: One needs to be normal, the other exceptional. Yet as we move into this new territory where paradox is a distinguishing feature, we can see that what is happening is a dance—of chaos and order, of change and stability. Just as in the timeless image of yin and yang, we are dealing with complementarities that only look like polarities. Neither one is primary; both are absolutely necessary. When we observe growth, we observe the results of the dance…*
>
> *While we have lusted for order in organizations, we have failed to understand where to find it. We have seen order reflected in the structures we build, whether they be bright mirror-glass buildings, dazzling charts, or plans begun on paper napkins. These structures take so much time, creativity, and attention that it is not hard to want them to be permanent. It is hard to welcome disorder as a full partner in the search for order when we have expended so much effort to bar it from the gates. I find myself challenged by this new land of evolving form, of structures that come and go, of bearings gained not from the rigid artifacts of organization charts and job descriptions, but from directions arising out of deep, natural processes of growth and self-renewal. This is not an easy land to inhabit, not an easy world in which to place faith, except that we're already living with the evidence that supports it—this wonderfully diverse and creative planet. And all of us, even in rigid organizations, have experienced self-organization, times when we recreate ourselves, not according to some idealized plan, but because the environment demands it. We let go of our old form and figure out how best to organize ourselves in new ways.* (Ch. 1, 23-24)

Unlike the authors of so many leadership and management best sellers, Wheatley doesn't prescribe antidotes and vaccines for the many behavioral and organizational maladies she describes. Instead she challenges us to recognize and embrace the uncertainty and volatility of the "real world … a world of interconnected networks, where slight disturbances in one part of the system may create major impacts far from where they originate [and where] the most minute actions can blow up into massive disruptions and chaos." (Ch. 10, 170).

She shares the sanguine worldview that keeps her strong and positive in the darkest hour of the night, reminding us that ours 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…* (Ch. 10, 170)

But lest we mistake her sanguinity for utopian fantasy, Wheatley is blunt as she lays out the quantum implications of the possibility that humanity may be unable or unwilling to adapt to this "real world," which

> *… stands in stark and absolute contrast to the world invented by Western thought. We believe that people, organizations, and the world are machines, and we organize massive systems to run like clockwork in a steady-state world. The leader's job is to create stability and control, because without human intervention, there is no hope for order. Without strong leadership, everything falls apart. It is assumed that most people are dull, not creative, that people need to be bossed around, that new skills develop only through training. People are motivated using fear and rewards; internal motivators such as compassion and generosity are discounted. These beliefs have created a world filled with disengaged workers who behave like robots, struggling in organizations that become more chaotic and ungovernable over time. And most importantly, as we cling ever more desperately to these false beliefs, we destroy our ability to respond to the major challenges of these times.* (Ch. 10, 170-171)

So, will we use the power of dissolution inherent in our chaotic time to create new meaning, or will we be dissolved into the new order that will follow the dissolution of ours? Who knows how the future will unfold, but let's take advantage of our chances to tilt the odds where and when we find them. Let's accept and respect the differences in our neighbours' views from our own. Let's embrace our opportunities to discover, celebrate and build on the values we share. Let's recognize that so often fear and hope are self-fulfilling. Let's choose hope over fear, and action over angst.

And as inspiration for hopeful action, just read the final paragraph of *Leadership and the New Science*:

> *This is a strange world, and it promises only to get stranger… So we must live with the strange and the bizarre, directed to unseen lands by faint glimmers of hope. Every moment of this journey requires that we be comfortable with uncertainty and appreciative of chaos' role. Every moment requires that we stay together. After all is said and done, we have the gift of each other. We have each other's curiosity, wisdom, and courage. And we have Life, whose great ordering powers, if we choose to work with them, will make us even more curious, wise, and courageous.* (Epilogue, 193)