

The Foreword

First, I will tell you how I got into quantum, or rather, how quantum got into me. Then, the thesis of The Magic of Quantum (the what and why). Next, you get a very simplified explanation of quantum. After that is my apology to grammarians of the world. And finally, I get to thank the really important people in my life by name.

How Quantum Entered My Life

I remember lying awake at night as a child wondering what was on the other side of the edge of the universe. If the universe was expanding, what was it expanding into? What is nothingness like?

My first real teacher was my Uncle Fred. He was married to my mother's youngest sister Henrietta and they farmed in Western Kansas. They were both pilots. Uncle Fred was a HAM radio operator and played a mean clarinet. Despite the fact that he'd never been to college, my Uncle Fred was the smartest person I knew. And he treated me like an adult. We had wonderful conversations about things that were never talked about in school. Like the edge of the universe. I remember Uncle Fred answering my questions one time by saying that there are things we as humans don't have the capacity to comprehend. "It's like putting a dog at a podium and expecting him to deliver a speech. It's beyond the dog's capacity to do that. We're like the dog. We just don't have the capacity to understand what's on the other side of the edge of the universe." I liked the analogy, but didn't like the answer.

This book is an attempt to find my own authentic answers. Not someone else's based on second-hand research. At this point in life, I want my answers based on my own experience. My questions have changed. I'm no longer plagued by what's beyond the edge. Now what I want to know is "How does it all work?" I have experienced a flow, a rhythm that is there - available - even in chaos. I have begun consciously experimenting with my own life, paying acute attention to what happens when the input varies, goes 'beyond my control'. I suppose my real question is "How do I get it all to work for me?" It's a self-centered control thing, I'm sure. Based on my objective observation of my own life (if that's possible), I can say that my life has continued to get better over the years. My life now is sprinkled with moments of happiness and extended periods of deep satisfaction. Perhaps this is simply the wisdom of age. On the other hand, perhaps I really am getting some things figured out about the Big Picture. And in *The Magic of Quantum* I'm sharing it to see if it works beyond my own little Petri dish . . . and maybe to find like-minded explorers who are discovering another piece to the puzzle. It jazzes me when something I write has meaning for someone else - confirming the big poster made by Frank (you'll meet him soon) that, "It's all relationships!"

I had an image in a dream once. In the dream, I was floating in from outer space through the galaxy, towards home. In the vastness, on my right there was a large clear flat circular field with a few simple geometric figures: lines, long thin U-shaped figures, a few dots. They were moving. Then I saw that it was made up of two planes, like two clear glass lenses on top of each other. The same geometric pattern was on both. The bottom lens was at rest. The top lens was rotating clockwise. As I watched, the two sets

of figures moved into alignment with each other. I felt it click into place like a soft sonic boom.

Interestingly enough, this dream came to me in my mid-forties, around the time I met Frank and quantum. It is quantum physics that has given me the context to align the realities of my life in a way that make sense to me - put the pieces in place, so to speak.

Quantum emerged for me at Sundance, Utah. The flood of information that triggered The Magic of Quantum began there. Or maybe eons before that, but in my limited reality, it was at the Sundance conference that the lightning struck.

My mentor, friend, and partner Frank Clement was with me. Frank had spent thirty years as a scientist at Bell Labs, and had invented both the Speakerphone and Touch-Screen Computer. When Frank retired from Bell Labs, he had started the Boulder Center of Accelerative Learning, Inc. ('BCAL') That way, he could play around with thinking and creativity, and call it corporate training!

Frank Clement at a BCAL workshop

The scientist in Frank was excited about sitting at the feet of Fritjof Capra, the famous physicist. I was eager to meet Meg Wheatley, the pioneer in applying quantum thought to corporations. It was Dr. Margaret Wheatley's Self-Organizing Systems Conference held at Robert Redford's ski resort / independent film festival center outside of Salt Lake City, Utah. It was the winter of 1996.

My soul caught fire at this conference. I was in the company of Fritjof and Meg, and learning about the work of Dr. Ilya Prigogine (Pre'- go - jean). A passion ignited in me for the quantum world and its possibilities. It was a peak experience where my mind kept exploding with Aha!'s.

My first day back in Boulder, I sat at my desk. I was eager to translate what I was beginning to understand about quantum as a result of Dr. Prigogine's Theory of Dissipative Structures. It had won him the Nobel Prize in chemistry in 1977. A central theme in his work was chaos. The theory proved that earth wasn't headed for a heat death (as the Second Law of Thermodynamics implies). Instead, his theory showed that the result of chaos can be just the opposite of death and disintegration. He proved that chaos can create a higher energy level that is better equipped to handle more activity, more chaos. The little word that caught my attention was 'can'.

Frank, my teacher in so many areas, had taught me the value of putting complex concepts into simple models. As I stared at the blank piece of paper in front of me, a model began forming in my mind. I drafted my first Model of Dissipative Structures: simple lines, arrows, and waves. With excitement (and the fear of rejection I used to feel when showing the model to scientists), I went down to Frank's office to show him my model. He liked it! Frank's enthusiasm for the model was all the affirmation I needed.

I daringly called it the Kirk Model of Dissipative Structures. Frank's use of his own name in the Clement Bubble Theory of the Mind gave me courage. Right up front here, I want to give credit to the co-creators of the model: the Whatever that did a fly-by that morning and dropped it into my awareness, and of course, Dr. Prigogine. The model evolved into the Kirk Model of Chaos (KMC).

Frank and I introduced the KMC in a new workshop on self-organizing systems, called Quantum Leadership. We were pleased to see how people responded to the model, and how profound their resulting insights often were.

But the real test was the scrutiny of the author of the theory, Dr. Prigogine. The idea of showing the model to Dr. Prigogine himself germinated gradually. Frank had died of cancer on May 5, 1997, only 6 months after discovering the disease. The following spring, an ad for a conference called The Paradox of Certainty caught my eye. It was to be held in Austin, Texas with Dr. Prigogine as the keynote speaker. The registration was expensive, but the lure of actually sitting in the same room with Dr. Prigogine had me hooked.

"I'll be able to tell people what he's like, how it feels to 'be in his energy,'" as one says in Boulder. I felt the expense was justified. Then one day I thought, "Why not arrange to meet him?" It would definitely justify the cost (and inflate my ego) if I could casually drop his name in the workshops like, "When I met Dr. Prigogine. . .!" So I began planning how to meet him personally. I began envisioning being able to shake his hand and thank him for his contributions in the Theory of Dissipative Structures, maybe even tell him how effective it was in our workshops. Then one day my biorhythms must have all been on high. I thought, "What the h---! You might as well show him your model."

On April 15, 1998, I found myself in Texas, walking across the lawn at Austin's Lakeway Inn, doing focused breathing to quell my terror. Within an hour, after his talk, I'd have my private audience with Dr. Prigogine. Every fear demon I had was raging. "Who in the world do you think you are? Fritjof Capra just introduced Dr. Prigogine as being on par with Einstein, and you haven't had physics since high school!" "You're being way too arrogant here." "You're wasting the time of a very important man." "You'll embarrass yourself. You'll be humiliated." "What if he destroys my model? What if he laughs at it?" I felt like the mother watching her baby suspended under Solomon's sword.

I stopped on the grass to calm myself. There was a beautiful gray-green fuzzy clump of Spanish moss that had fallen at my feet from the tree above.

Spanish Moss

I bent over and picked it up with a little smile, feeling as if the Whatever had dropped it there to get me to lighten up. I reminded myself that I had seen the effect of the KMC on others for 2 years. As scared as I was of having it discredited, this was the ultimate test, and I wanted to know. Silently, I went through the 4 touchstones I use when I'm really unsure of myself:

- ~ Am I showing up with my unique voice?
Yes, definitely.
- ~ Am I speaking my truth without judgment?
Yes.
- ~ Am I paying attention to what has heart and meaning for me?
Yes.
- ~ Am I letting go of the outcome?
No. I was very invested in Dr. Prigogine liking my model.

What would letting go feel like? It would mean staying totally open to his response, being willing to change the model, even throw it away.

I told myself that no matter what happened my family would still love me. Life would go on even in the worst-case scenario if he destroyed my model. I took a few more slow breaths and then I continued walking to the conference room. I felt willing to accept whatever was on its way. I could trust that whatever happened, in the long run, would be beneficial.

I sat through Dr. Prigogine's lecture, hanging on every word, understanding little. Because my years in Russia gave me a familiarity with his accent, I got his words, but only vaguely got his concepts. His work on Probability and the Arrow of Time was, and still is, beyond me. But I felt delicious things rolling around in my brain. They were not making contact enough to give meaning. The ideas were more like pinballs bouncing off of bells and buzzers, throwing out sparks of light and sound.

These are the jewels from my notes of that day:

- ~ probability as a central element of quantum and classical mechanics
- ~ chaos's sensitivity to initial conditions
- ~ vibration to rotation
- ~ the evolution of humanity is the evolution of communication
- ~ chaos / dynamics of correlation
- ~ trajectory or location, not both
- ~ nature uses irreversibility to produce life
- ~ Einstein to Van Gogh, "Ask the moon why the moon moves."
- ~ determinism vs. thermodynamics
- ~ Laplace's demon = Fate
- ~ the end of certainty: time, chaos and new laws of nature
- ~ Classical periodicity; Now, time fluidity
- ~ Poincaré . . . Niels Bohr . . . Karl Popper . . . Jules Henri

- ~ *Empire of Chance* by Gerd Gigerenzer
- ~ Equilibrium is reached at maximum of entropy.
- ~ Most phenomenon on earth are irreversible, so Newtonian Classical Mechanics applies to a very small part.
- ~ Near equilibrium is positive feedback.
- ~ Fusion is decisions at the top . . . fission is decisions at the bottom.
- ~ Uncertainty needs more choices
- ~ the sun's flow creates non-equilibrium state on our earth
- ~ A town is a structure. It is involved in a flow of energy in and out.
- ~ Adam Smith's 'invisible hand' in economics is the self-regulating aspect of living systems
- ~ Humanity is a relationship history, not a study of Robinson Crusoes.
- ~ In early studies, I analyzed traffic:
 - › the individual regime;
 - › the collective regime;
 - › where you drive others and others drive you
- ~ Principle of quantum mechanics: wave function in a world of possibilities . . . when we measure, we collapse the wave.
- ~ We are participating: The mechanics of bifurcation is different in humans than bifurcation in molecules because we humans compare what is to what can be. This suggests we choose.
- ~ Do we choose based on behavior before bifurcation or at bifurcation?
- ~ The Nobels voted that science is not a danger. The optimists won.

By the end of Prigogine's talk, my brain was hyperventilating. I had worked hard to follow his line of thought. At the same time, I wanted to capture the explosions going on in my brain. I wanted to follow all the trails shooting out from the chain reactions.

Dr. Prigogine's quiet closing comment won my heart. He said, "Understanding this gives us the energy to try to participate in creation."

Dr. Ilya Prigogine
Nobel Prize Laureate in Chemistry 1977

I felt excited and ready to meet him. The twenty minutes he granted me felt like a timeless moment. As I walked him through the chaos model on two large easels, his comments were direct and instructive. At the end, he asked me if I'd published, which caught me by surprise. He asked me to write to him. I assured him I would.

As I walked out with Dr. Prigogine, I felt blessed by the presence of this brilliant, humble, focused man. I felt at peace, elated and excited about the door that had opened for me to participate in creation. This book is the result of walking through that door.

Thesis of *The Magic of Quantum*

The Magic of Quantum begins with an explanation of quantum chaos. Chapters 1 - 3 give you an understanding of energy, systems and chaos theory from a quantum perspective. Chaos Theory tells us that chaos is a constantly recurring function of a healthy system. (That's the bad news.) The rest of the book is how to stay happy during chaos. (That's the good news.) This is the quantum reality that offers a way to 'be' in chaos without 'being in chaos'.

(Really) Basic Comparison of Newtonian Physics and Quantum Physics

Newtonian Physics (also called Classical Physics) is named after Isaac Newton. He was the brilliant scientist who lived in the late 1600's. His thinking shaped the next 300 years of history.

Sir Isaac Newton at age 47

By watching an apple fall from a tree, Newton came up with 3 laws of motion. His laws tell us how we can predict (prediction). If you take an apple that weighs 'X' and you throw it with force 'Y' at an angle of 'Z', then it will land right over there at point 'A'. We can predict outcomes because we know the elements of force, angle, and weight. Things can be determined (determinism). Everything can be reduced to parts and pieces (reductionism). Once you know the piece and the force, it follows a set line of travel (linear). Cause and effect (causality) are all there is. And the god of this world is the Scientific Method. It says that whatever is true can be objectively observed (objectivism), and can be repeated and measured. It says there are two separate sources (duality): me as the observer, and the thing I am looking at. (observer/observed) In Newtonian Physics, the earth is like a windup clock and the universe is a huge machine (mechanistic). We can use force to manipulate desired outcomes. We humans are in control, and all's right with the world.

Enter quantum. Quantum Physics says, "Yes, Newtonian Physics is true in limited circumstances. Newton's laws still apply, but not everywhere. We have discovered the next level of reality, and it looks really strange." Some of the world's greatest minds came together in 1927 to struggle with this new reality.

The Birth of Quantum Physics ~

The 1927 Solvay physics conference in Brussels Belgium

Some of the really big names in quantum (most of whom were at this conference) that you'll want to at least recognize are: Einstein (you'll see his bushy head in the front row center), Heisenberg (of the Uncertainty Principle), Niels Bohr, Pauli, Max Born, Schrödinger (of Schrödinger's Cat), David Bohm, Feynman, Mandelbrot, and Max Plank.

These scientists were looking at a new reality that was vastly different from Newton's physics. Imagine a tiny cup (the kind they serve that really strong coffee in). Inside that cup is the world of Newtonian Physics. Now take a huge soup bowl and set the cup inside it. The rest of the space outside the little Newtonian cup is Quantum Physics. A different set of laws applies here.

In the quantum soup bowl things get really weird. You cannot predict where something will be just by knowing its size, path and force (indeterminism). Things don't travel in a direct line (non-linearity). They disappear from here and instantly appear somewhere else without going through the space in between . . . sort of like time travel. And speaking of time, it doesn't really exist - except inside its own local region of reality, the little cup. One thing can have two forms. It is both a wave and a particle (wave/particle duality). And forget cause and effect. Things happen seemingly without cause (acausality) and by chance (random).

In Quantum Physics, the proton, neutron and electron are no longer the smallest pieces. We now have cool-sounding things like quarks (and anti-quarks!), pi-mesons, hadrons, leptons. And the smallest pieces we are finding are not solid pieces; they are bundles of invisible energy. There's the String Theory that says that within our 3-dimensional world there are other hidden dimensions. What would a world of 10 or 30 dimensions look like? How do you collapse 30 dimensions into a 3-D reality so they exist in the same space?

The word 'quantum' comes from the word for 'quantity'. Remember that particle act: "It's here. No, it's there!"" Quantum (or quanta) just means the smallest movement that a piece of matter can make when it jumps from here to there without traveling through the space in between here and there. If you want a very easy to read, in-depth explanation about anything quantum, get *Who's Afraid of Schrodinger's Cat? An A-to-Z Guide to All the New Science Ideas You Need to Keep Up with the New Thinking*, by Ian Marshall and Danah Zohar. It's my basic quantum textbook.

Here's a fun comparison of Newtonian and Quantum adapted and enhanced from the work of Meg Wheatley and Myron Kellner-Rogers. See if you can fill in the blanks. (Complete chart at end of Foreword.)

Newtonian	Quantum
Matter is made up of 'things'	Matter is bundles of energy in relationship to each other
The world is a clockwork machine	The world is a great thought
We understand things by taking them apart	We understand things by _____? _____+
Knowledge comes in pieces: science, math, art	Knowledge is seamless
People have narrow, specific skills	People _____? _____
Motivation is based on manipulation of external lures	Motivation is based on _____? _____
Things fall apart	Things _____? _____
The basic unit is 'things'	Relationships are all there is
Structures are man-made	Structure _____? _____
Order comes from having structure	Order comes from freedom of information
Information should be closely managed	Information should be open, abundant
Either/or	_____? _____
Certainty	Inconsistency
Predictable	Random
Determined	_____? _____
Linear	Non-linear
Observer/observed	Participant
Duality: good/bad, right/wrong	_____? _____
Judgment and exclusion	Perception and choice
Change is the troubling exception	Change is _____? _____
We want equilibrium ---	We want to be at the edge of chaos ~~~

At this point, you may take comfort in the words of Niels Bohr, one of the big names in quantum. He says, "If you're not in awe, you don't understand quantum." Awe is what I felt at Sundance. (This is not to imply that therefore, I understand quantum!)

This book is my explanation of how quantum can show up in life day-to-day. . . how I can choose quantum to enrich my life. For example, if there really are multiple realities, how can I access those other realities and what can they do for me? What's the "So what?" of all this for me -- here and now at this moment in my life?

You will not find lots of science. Perhaps the book should be titled *The Magic of Quantum Lite...* or *The 'SoWhat?' of Quantum*. This book is the experiential side of the scientific. It is my search for how to make use of what science tells us is reality. If it's reality, then it is available to me . . . even if it's an alternate reality that appears magical. How do I access it? What can it do for me?

The Magic of Quantum is my explanation of how I have chosen to live in a world of uncertainty, of probabilities, of multiple realities, of radical, non-linear explosions. Seen through Newtonian glasses, that world can be terrifying, life-sucking, and depressing because I'm not in control. Seen through quantum eyes, that same world is delightful, entertaining, and life-giving because I am abundantly supported by my participation and my belonging.

Apologia

An explanation to the grammar teachers of the world: The English teacher in me wants you to know that I do know (because I have taught it!) the following:

- ~ One should never use a preposition to end a sentence with. :)
- ~ Numbers under ten should be spelled, not given a numeric symbol;
- ~ It is proper to say 'to whom', 'from whom', 'with whom', etc.;
- ~ Fragments are unacceptable;
- ~ Contractions should not be used in formal writing;
- ~ . . . and all the other rules that standardize the English language.

And I want you to know that I know that I'm using 'their' instead of 'his/her', and 'they' instead of 'she/he', etc. I want you to know that I've played fast and loose with quotations, freely replacing 'he', 'him', and 'Man', with 'they', 'them', and 'One'.

You won't find God referred to as He (or She), and rarely as God. I agree with Bucky Fuller (inventor of the geodesic dome) that the word 'God' has become anthropomorphic - it makes God into our own image. Bucky used Greater Intellect, Greater Integrity, and Universe. Since the jury is still out for me on what God is, I want words that support that exploration. Einstein's Whatever is definitely vast enough. I like what the Australian Aborigines have been using for 50,000 years: Divine Oneness, Source, Consciousness and Energy also offer the right feeling for what I'll be exploring in this book.

Before I began writing, I pondered my writing style. One academician with whom (See? I know.) I had had a stimulating conversation, said, "And your book will be well annotated, of course?" To which I answered, "Yes, of course." But I knew that my heart

wasn't in it. I didn't want to grind away at a scholarly tome that sought to appeal only to the intellectual elite.

My goal is to create a book that is available and accessible. I want my book to be conversational, understandable and enjoyable. I believe that thought-provoking material can also be humorous. As a matter of fact, the brain learns better when it's entertained. Children laugh a lot when they are learning naturally. I have made the book as interactive as possible because the brain remembers better when we're involved. You'll find that the calm music helps slow the heart and make the brain more receptive.

My first guideline is to make the book simple, direct and clear. You may recall Mark Twain's comment to a friend: "I'd have written you a shorter letter, but I didn't have the time." I am finding how true that is. All eleven chapters of this book were drafted three years ago on St. Vincent's Island. As I now finalize each chapter to get it 'web-ready', I am amazed at how long it takes to write simply and clearly, especially for a recovering lawyer.

So, grammarians of the world please know that I respect our craft. Know that when I take short-cuts, they are (mostly) conscious ones. They are made in the interest of inclusion (the positive word for 'non-sexist') and a conversational, easy style. I trust that the trade-off is worth it.

Answer Key, aka 'the cheat sheet'

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