

Afterthoughts

"I only went out for a walk and finally concluded to stay out till sundown; for going out, I found, was really going in."—John Muir

Do you believe in serendipity or destiny?

The pursuit of this book has been oddly serendipitous ... influenced by what quantum physicist David Bohm would call "implicate order", what Jung would call "synchronicity", the Vedas would call "akasha", Goethe would call "the ground of all being", Rudolf Steiner would call "cosmic intelligence", and biochemist Mae-Wan Ho would call "quantum entanglement."

Early on, during the research and writing of this book, I discovered that this project on water had become a gestalt watershed for all the important moments in my life. Places I've been. Things I've learned. People I've met and with whom I'd had surprising discussions and realizations. All spanning many years. And many of them totally unrelated. And yet, now, with a sudden flood of context, their significance has transcended into a new fabric of meaning through surprising connection. Like puzzle pieces cooperatively arranging themselves into a symbiotic pattern of synchronicity: from a strange discussion with a fellow student in college to a learning moment in motherhood to meeting a mysterious stranger on the Internet or serendipitously reading an article that resonated.

It's truly humbling.

I've had watershed moments like this before, but none as all-encompassing. Over a decade ago, when Karen, my publishing friend, suggested I write a book on how to write fiction—a brash idea, given it was still early in my own writing career—I embraced the task and wrote and researched the textbook in three short months. The research came fast and easily. The Universe provided everything I needed. The format and content came to me in bursts of "genius". It came out of me like someone else was directing me and I was simply transcribing. *The Fiction Writer: Get Published, Write Now!* has been praised for its content and style. It was translated into Romanian by *Editura Paralela* and is currently used in universities, colleges and high schools all over the planet and considered a useful tool by a full range of writers from new and young to old and established. It remains my bestselling book. To this day, I know that my fiction-writing textbook arose from a Universal collaboration. I had help. And the book, in turn, has helped many budding writers of all ages and all over the world write better.

And from that regard, it has fulfilled my prime directive to help make the world a better place and to give voice to those who would otherwise remain silent or be silenced.

It starts with the word. And that word is water.

I taught limnology and served as an environmental consultant for over twenty-five years. During that time, I waded—and stumbled—through northern muskeg, avoiding bears and moose. I scrambled up—and down—the talus slopes of acid mine tailings ponds. I sampled the tannic water of a rural dystrophic lake. I took sediment core samples from a northern reservoir. I hiked through logged old growth forest in search of fish-bearing streams. I sampled water over a 24-hour period along a working river impacted by industrial effluent. I collected and studied surface algal blooms—as part of a limnological study—of an urban eutrophic lake to create a community restoration plan. I replanted hectares of marsh with indigenous plants to restore its functionality. As a limnologist, environmental consultant, mother and naturalist, I was blessed with the opportunity to see water in so many identities, circumstances and places around the world.

My mission is simple with *Water Is...*

I hope that somewhere among these pages, you have emotionally connected with water, as I have. It's that simple.

Water Is... has incorporated a synchronicity that defies space-time. I have no doubt that it's the result of quantum entanglement.

Water is the singularity.

When Science Tangos with Art—Synchronicity

Imagination is more important than knowledge—Albert Einstein

I tell stories. I'm also a scientist. I use the scientific method in my research to seek truth; I also find truth presented to me through the symbols of intuition.

A few years ago, I was introduced to Krista Fogel, a University of British Columbia masters student, who was investigating the use of creative art in high-ability scientists. She named her thesis: "The Self-Perceived Experience of Investigating Science with an Artistic Spirit: A Hermeneutic Phenomenological Study of High Ability Scientists Who Also Engage in the Arts."¹ Hermeneutic, by the way, is the development and study of theories of the interpretation and understanding of texts (I had to look it up) and phenomenology is an approach to philosophy through the study of phenomena.

Krista wanted to interview me as part of her project. I was flattered, of course. Me, a *High Ability Scientist*? Who'd told her that? Once I got past my own humble angst, I found Krista's questions bracing; they reopened a world of compelling ideas I had carried with me for some time. The concept of using art to do good science has dwelled inside me since registration day at Concordia University when I quit my fine arts program to pursue a science degree only to come full circle and write fiction. I got my Masters Degree in Ecology and Limnology and was then working as a scientist for an environmental consulting firm (I now write and teach writing full time). I did research, drove boats, collected samples and analyzed data then wrote up my findings and made recommendations. I wrote science fiction novels on the side.

"History shows that eminent scientists, such as Leonardo da Vinci, also engaged in the arts,"¹ said Fogel. She went on to cite 400 other famous scientists who also practiced art at a high level. "If not entirely engaged in the arts, scientists throughout history have at least engaged in science with an artistic spirit. Scientists and artists use common tools for thinking such as intuition and imaginative processes."¹

Krista and I met several times at the local Starbucks, where I "toked" on coffee as she fumbled with her notes. A young gal with a direct but unassuming gaze and a gentle smile, Krista asked me to share my personal experience of mixing art with science. Every good scientist is an artist at heart: science is the tool and art is the process.

Fogel concludes that when conducting scientific investigations with an artistic spirit, the scientist holds her heart central, from which the artist springs. This "allows us to connect with serendipitous occurrences, which breed discovery,"¹ Fogel adds.

You can train your mind as both artist and scientist to become more aware of serendipitous occurrences around you. I call it being in sync and wrote about it in several articles for various magazines and mentioned about it here.

When I'm working on a story, for instance, I find that events, opportunities, actions and resources directly germane to my project present themselves: watching an applicable movie that a friend chose for us to see; picking up a newspaper (which I seldom do) and reading a relevant article; looking for something on the internet and finding something totally different (ok; that happens to me all the time); a friend out of the blue introduces a pertinent topic, or someone you haven't seen in a long time bumps into you with significant news. As though the universe was providing me with what I needed. Of course, my mind was focused on anything to do with my current piece. It was as though I had donned a concentrating filter, one that would amplify relevant details. I'll go further: I was unconsciously acting in a way that was bringing me more information relevant to my project. Ask and you shall receive.

Often, when I'm researching a novel, I pick up things serendipitously. Something will come up that just fits with what I was searching for. An article pops up in the news. Or I'm talking to someone and they bring up just the topic I am researching. These things

always happen to me. This occurs not only in my fiction writing but in my scientific pursuits. Some years ago, I was doing a pollution study using glass slides for colonizing algae to compare communities of an urban stream to those of an agricultural stream. I was really looking to see the difference between communities of these different stream environments when I discovered that the algae were colonizing the glass surfaces according to the current. Compelled with more questions of why, how and what if, I pursued this new line of research (which turned out to be far more interesting than my original research premise) and wrote several ground-breaking papers on it.

Indeed, questions like “why” and “what if” are germane to both art and science; the ‘what if’ question is the science fiction writer’s mantra and the premise, which comes from the artist part of you: imagination and an inquisitive and open mind. The idea of seemingly unrelated events intersecting to produce meaningful patterns has spawned new notions of thought from the scientific study of spontaneous order in the universe (synchronicity), to Synchronism — the discovery of convergent archetypal symbols in pop culture (e.g., books, music and film).

Writer and philosopher Jake Kotze suggests that, “Synchronicity happens when we notice the bleed-through from one seemingly separate thing into another — or when we for a brief moment move beyond the mind’s divisions of the world.”² Synchronicity and serendipitous discovery, like metaphor, appears when we change the way we look at things.

Serendipitous discovery comes to us through peripheral vision. Like our muse, it doesn’t happen by chasing after it; it sneaks up on us when we’re not looking. It comes to us when we focus outward and embrace our wonder for this world. When we quiet our minds and nurture our souls with beauty. It is then that what we had been seeking naturally comes to us. Like a gift.

Author Sibyl Hunter tells us that, “Sync operates as an undercurrent of divine awareness personified through the myriad processes and symbols that make up the building blocks of our reality. Within that current, we spin our modern-day myths into books, fairy tales and movies, subconsciously retelling ourselves the same story over and over.”³ This also holds true in the models and metaphors of scientific genius, which often spring from the creativity of an intuitive heart and imaginative mind.

According to Mark A. Runco at California State University, “creativity depends on originality, while accomplishment and achievement reflect other problem-solving skills. Creative thinking involves at least three things: 1) the cognitive capacity to transform experience into original interpretations, 2) an interest in producing original interpretations, and 3) discretion.” The title of Piaget’s monograph, *To Understand Is to Invent*, reflects the fact that we do not have an authentic understanding of our experience until we construct that understanding for ourselves. In other words, “it is one thing to memorize some datum; it is quite another to discover it for one’s self; only then do we understand,”⁴ says Runco. Fogel concurs: “what Piaget called *invention* is a kind of creation, a creation of personal meaning. Piaget tied assimilation to imaginative

play into creative interpretation.”¹

According to Dean Keith Simonton at the University of California and author of *Scientific Genius: A Psychology of Science*, even the most illustrious creative geniuses of history have careers riddled by both hits and misses, both successes and failures. He uses Albert Einstein as an example. A man who has achieved almost mythical status as a genius, Einstein’s career “was plagued by terrible ideas, false starts and surprising disasters.”⁵ Simonton tells the story of Einstein’s debate with Niels Bohr over the implications of quantum theory, in which Einstein offered a series of arguments that Bohr countered. Bohr once even pointed out that Einstein failed to take into consideration the theory of relativity! According to some, Einstein wasted the final years of his career working on a unified field theory that was almost universally rejected by his colleagues. Einstein defended his missteps by noting that errors can advance science so long as they are not trivial; the greater the error, the greater the opportunity for new perspective and discovery.

It is left for us to simply recognize the dance.

Singularities, Gravity and Love

“The creation of something new is not accomplished by the intellect but by the play instinct acting from inner necessity. The creative mind plays the objects it loves”—Carl Jung

Speaking of singularities and black holes ... I recently watched Christopher Nolan’s science fiction epic *Interstellar*.⁶ Critical reception was widely mixed. Reviews ranged from being dazzled and awestruck to thinking it utterly ridiculous and silly. Much of the range in opinion had in fact to do with the hard science: hard science that Nolan insisted he get right by hiring theoretical physicist Kip Thorne to best approximate what a black hole and a wormhole would look like and behave. Science so good that it generated a discovery worthy of reporting in a scientific journal.

To accurately portray a black hole in the film, Thorne produced a new set of equations to guide the special effects team’s rendering software. A black hole apparently spins at nearly the speed of light, dragging bits of the universe along with it. Based on the notion that it was once a star that collapsed into a singularity, the hole forms a glowing ring that orbits around a spheroidal maelstrom of light, which curves over the top and under the bottom simultaneously. The team then discovered that “warping space around the black hole also warps the accretion disk,” explained Paul Franklin, senior supervisor of Double Negative (the visual experts). “So, rather than looking like Saturn’s rings around a black sphere, the light creates this extraordinary halo.”⁷ Thorne confirmed that they had correctly modeled a phenomenon inherent in the math he’d supplied and intends to publish several articles in scientific journals,

based on these findings. In Chapter 11, I talk about some of the latest theories about black holes that suggest that these “singularities” may in fact be tunnels for spiralling matter (or energy) falling into them between universes in a multiverse.

Interstellar begins in the near-future on a post-climate change Earth, plagued by dust storms and failing crops in a society reverted to parochial superstition. Cooper (Mathew McConaughey), once a NASA pilot and now a farmer, laments: “We used to look up at the sky and wonder at our place in the stars, now we just look down and worry about our place in the dirt.”

In a scene reminiscent of present day schools removing cursive writing from the curriculum or the controversy of teaching evolution (e.g., in favor of creationism), Cooper’s daughter’s teacher, Ms. Kelly, informs him at a parent-teacher meeting that the history textbooks have been rewritten to make known the “truth” about the moon landing: “I believe [the moon landing] was a brilliant piece of propaganda,” attests Ms. Kelly, “that the Soviets bankrupted themselves pouring resources into rockets and other useless machines...And if we don’t want to repeat the excess and wastefulness of the 20th Century, then we need to teach our kids about this planet, not tales of leaving it.”

The danger of turning away from scientific exploration—particularly space exploration—in times of great social and economic insecurity is a theme that runs deep in the film. Not only are scientists and engineers portrayed as whole individuals, both smart and compassionate, but they are also marginalized in a future world looking more to blame than to fix. “We didn’t run out of planes and television sets,” the principal of the school tells Cooper. “We ran out of food.”

When a gravitational anomaly leads Cooper and his daughter Murph (Mackenzie Foy) to a secret NASA base in the middle of nowhere, an old colleague, Professor Brand (Michael Caine), recruits him to pilot the interstellar *Endeavor*, NASA’s “Noah’s Ark”, into the far reaches of outer space to repopulate the human race.

Equipped with a bank of human embryos, Cooper and his team follow the trail of the 12-ship exploratory *Lazarus* mission sent out earlier, led by Dr. Mann, an intellectual without connection who believes that “we can care deeply, selflessly about those we know; but that empathy rarely extends beyond our line of sight.”

What saves *Interstellar* from sliding into patriarchal colonialism, is its subversive theme. And because of it, the movie transcends into artistic commentary.

I speak of love.

Love embodied by two of the main characters—both women: Cooper’s daughter, Murph, and his shipmate, Amelia Brand. Love that is irrational. Love that is unscientific. Love that is inexplicable. And love that is all powerful. Inviolable. Eternal. And, I believe, our salvation.

Aspects of “imperialist expansionism” and “patriarchal rationalism” interplay through Cooper, who embodies both in his “cowboy” science. Love propels his evolution to

transcend them. In Cooper, we see the tension between rationality of science and the “irrational” faith of love. Related to this, Cooper must continually choose between the personal and the whole in defining his humanity and ultimately his hard choices. First with his daughter and her “ghost”, then with Amelia Brand in their mission to another galaxy.

After a botched mission, Amelia appears to abandon the very tenets of hard science to ask the defining question: “Maybe we’ve spent too long trying to figure all this out with theory. Love is the one thing that transcends time and space.” She describes love as a cosmic force, a kind of empathic drive that provides the very basis for humanity’s survival: a link to our wholeness as living beings within a breathing multi-dimensional universe. When Cooper challenges Amelia’s unscientific notions, she responds with, “Love isn’t something we invented. It’s observable, powerful ... Maybe it’s evidence, some artifact of higher dimensions that we can’t consciously perceive.” Amelia nails it when she, in turn, challenges Cooper: if the second choice turns out bad, they will have enough fuel to do only one of two things: go on to the third planet in hopes of distributing the seeds of humanity OR go back home to his children. Which will he choose? It’s interesting what he does end up choosing: he chooses love. Love drives him to do impossible feats, like dock his shuttle with a damaged and recklessly spinning *Endeavor*:

Love for Murph drives Cooper into the black hole ... and out of it. Love directs him to that precise quantum moment where his love for Murph transcends into love for all humanity: to save the world.

This is the secret. The secret Mann in his intellectualized definition of what it means to be human could not touch. The window for connection to the whole is through a single tiny grasp of it. The glimpse into Eternity is through the lens of love. I am reminded of a quote in David Mitchell’s *Cloud Atlas*: “What is any ocean but a multitude of drops?” In Spielberg’s *Schindler’s List*, Itzhak Stern quotes the Talmud: “Whoever saves one life, saves the world entire.”

So what is love, then? Is it gravity? Does it communicate through the God particle in the fractal fabric of the Higgs field? What other phenomenon grows from nothing? What other phenomenon is not lessened but in fact grows by giving it away? What other phenomenon provides the very weight and structure—the meaning—of our existence? What other phenomenon is like a whisper heard in a crowded room; and when combined creates the most beautiful symphony? Is it that simple?

If gravity is a plane of existence, a fifth dimension that can exist across space-time, is a black hole simply a doorway? Like death? Is love the fuel of evolution, lifting us up into a higher state?

Catholic theologian and author of *The God Who Loves You* Peter Kreeft shares a new worldview based on love: “...Gravity is love on a material level. In fact, [gravity] has two movements: one is towards union, back to the center, the big bang, the past by

gravity. And the other is to give itself out to all other beings, out into the future, the expanding universe, by energy and by entropy, which is energy giving itself out to the empty places.”⁸ This is reminiscent of Goethe’s polarized systole and diastole. Similarly, not only does God love everything, but everything loves God. The acorn, electron, tomcat, human and angel. God loved these differences into existence and each loves back in its own way, says Kreeft.

“When we think of gravity,” says Kreeft, “we do not think of it as the body of love or the material expression of love ... We do not see God’s love at work in the very structure of matter ... why does that funny little electron in a hydrogen atom keep doggedly orbiting around its positively charged nucleus rather than zooming off orbit in a straight line? The scientific answer is: because its angular momentum, which tends to move it straight away from the nucleus, is exactly counterbalanced by its electromagnetic attraction to its oppositely charged nucleus.” Kreeft asks, “Why do negative and positive charges attract?”⁸ The electron loves its proton because it’s a proton, he says. We can see the same principle at work on every level, Kreeft argues: gravity and electromagnetism on the inorganic level; a plant’s attraction to the sun and to water and nutrients in the soil; animal instinct; human intuition and love.

Water is love.

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