

Healing Our Planet, Healing Our Selves

The Power of Change Within to Change the World

THE DALAI LAMA

JOAN BOIRYSENKO

LARRY DOSSEY

MARY CATHERINE
BATESON

RAM DASS

HUSTON SMITH

DARYL HANNAH

ANDREW HARVEY

JEAN SHINODA BOLEN

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KAI JAKOMA

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MARSHALL VIAN
SUMMERS

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SYLVIA HASKVITZ

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BRUCE LIPTON

TRATHEN HECKMAN

EDWARD VILJOEN

JOHN EASTERLING

Edited by Dawson Church & Geralyn Gendreau

The Ching and I

The Bio-political Musings of a Transformed Scientist

Bruce H. Lipton, Ph.D. ©2004-2005

The global crisis precipitated by the events of 9/11 was a turning point for Western civilization. The tragedy served as a wake-up call, alerting us to the fact that our way of life is wreaking havoc in the global community and our survival is now in question. Another much less heard, but no less important wake-up call about our survival was sounded at the same time by a community of concerned biologists. The scientists warned that the rapid disappearance of a wide variety of species has catapulted us deep into the sixth mass extinction to hit the planet since the origin of life. Unlike the first five such massive die-offs, attributed to extraterrestrial sources such as comets, the current wave of extinctions is due to a source much closer to home: man. The 9/11 tragedy and the disturbing rate at which species are disappearing on this planet are crises that should force us to pause and reconsider the path our culture has embarked on.

By their very nature, crises are harbingers of change, so when I started pondering these wake-up calls, I turned to the *I Ching*, the “Book of Changes.” This ancient Chinese divination manual offers insight into the fundamental questions that have perplexed human beings since their arrival on this planet. I was particularly drawn to the I Ching hexagram for the *Returning* (#24), first introduced to me by Fritjof Capra in his influential book, *The Turning Point*. The *Returning* symbol offers three pronouncements: 1. After a time of decay comes the turning point. 2. The powerful light that has been banished returns. 3. There is movement, but it is not brought about by force.

These three ancient pronouncements offer valuable insights into our current social and political crises. But before we launch into that discussion, I’d like to tell you how my life as a “transformed” scientist began in order to set a context for why I turned to an “unscientific” oracle like the *I Ching* for understanding and direction about the fix we find ourselves in today.

As a cellular biologist, my work has always been driven by the desire to understand the nature of life. I will never forget the first time I used an electron microscope in graduate school. The large control console of the microscope resembled the instrument panels of a Boeing 747. It was filled with switches, illuminated gauges and multicolored indicator lamps. Large tentacle-like arrays of thick power cords, water hoses and vacuum lines radiated from the base of the microscope like tap roots at the trunk of a tree. The sound of clanking vacuum pumps and the whir of refrigerated water re-circulators filled the air. For all I knew, I had just walked on to the command deck of the *U.S.S. Enterprise*. Apparently, it was Captain Kirk’s day off, for sitting at the console was my cell biology professor. I watched attentively as my mentor began the elaborate procedure of introducing a tissue specimen into the high-vacuum chamber of the electron microscope. Finally, he began increasing the magnification of the tissue specimen, one step at a time: first 100X, then 1,000X, then 10,000X. When we hit warp drive, the cells were magnified to over 100,000 times their original size.

It was indeed *Star Trek*, but rather than entering outer space we were going into deep inner space where “no man has gone before.” One moment I was observing a miniature cell and seconds later I was flying deep into its molecular architecture. I knew that buried within the *cytoarchitecture* of the cell were clues that would provide insight into the mysteries of life. Throughout graduate school, postdoctoral research and into my career as a medical school professor, my waking hours were consumed by explorations into the molecular anatomy of the cell.

Though my exploration of the “secrets of life” led to a successful research career studying cloned stem cells grown in tissue culture, I eventually ran afoul of the scientific establishment because the results of my research forced me to question the dogmas on which cell biologists and other life scientists base their work. I refer to these dogmas as the “Three Assumptions of the Apocalypse” because I do not believe human civilization will survive unless we turn away from these false beliefs. Specifically, I rejected these three assumptions: 1) genes control biology, 2) evolution is a random process driven by a struggle for the survival-of-the-fittest, and 3) life can be understood by only studying the physical parts of the body.

My feeling that these three assumptions were wrong was so strong that I left university life to study independently. Five years after leaving academia I experienced a moment of profound insight while pondering astonishing new insights of leading edge cell science and new lessons acquired in my own research. At that moment, in 1985 at 1:59 in the morning, I wrote this one sentence, and my life changed: The cell membrane is a liquid crystal semi-conductor with gates and channels.

With a start, I realized that the control mechanism for each individual cell—and by extension our bodies, which are made up of trillions of cells—is the cell’s membrane: the boundary between the cell/body and the environment. Every cell is a programmable chip, and the nucleus is the hard disk with programs. But like a computer, it is the programmer that controls the disk not the disk that controls the programmer. The cell is programmed by the environment. While the membrane is the “mechanism,” the environment controls its activities. Signals, i.e., information from the environment, engage membrane “switches” that activate the very movements that characterize life. The individuality of each human is distinguishable by a unique set of membrane “antennas,” or self-receptors, displayed on their cells’ membranes. By their nature, membrane receptors resonate with and “download” complementary environmental signals.

Then it struck me: my physical “self” is resonating with an environmental “self.” The environmental “self” (i.e., information) is separate from and outlasts our mortal “self.” In other words, we are immortal, just as spiritual sages have told us for thousands of years. In that instant, I was “transformed” from an agnostic scientist mired in the physical world into a spiritual scientist who considers the non-visible, spiritual side of life with as much passion as I consider the physical, visible world. In that same instant, the door opened for me to become as comfortable consulting the *I Ching* as I am consulting the latest issue of *The Journal of Cell Biology*!

Indeed, the three pronouncements of the *Returning* hexagram offer us profound and valuable insight for these troubled times.

1. *After a time of decay comes the turning point.*

Among all of the world's cultures, there is a "history," or—to be more accurate—a mythology, about the existence of a former utopian era, similar to the Garden of Eden described in Judeo-Christian scriptures. Each culture describes a "decay," a falling-out with Nature, wherein mankind is essentially banished from that perfect world.

In the west, our falling out with Nature occurred when people began to perceive themselves as separate from the world in which they lived. In the earliest stages after the "fall," people held that their fates were in the hands of immaterial spirits, forces that they tried to appease in order to secure a good life. The ancient Greek, Roman and Egyptian polytheists believed in a panoply of gods who "controlled" their universe. By honoring and following the wishes of these gods, citizens could expect to have rewards in life. Those who shunned the ways of the deities were destined to pay for their transgressions through lives punctuated with personal tragedies.

The more recent evolution of Judeo-Christianity simplified the worship process by coalescing all of the gods into one almighty God and codifying His "laws" into scripture, so that all could understand what is required to receive the reward of a good life. In the new religion, spirituality was no longer associated with the planet, for God and His servants reigned over Earth from a distant, celestial throne. The Church of Rome claimed to be the chosen intercessor between God and humankind—its "truths" infallible because they were directly acquired from and mandated by God. The Church stressed Genesis's version of a "six day" course of evolution in which Adam and Eve were created separately from the rest of Nature. Human beings came to believe that our "special" moment of creation allows us to exploit our environment in any way we deem serves us.

Not only did religious philosophy disconnect us from Nature, that same philosophy also destroyed any notion that Nature is an ally of humanity. The Church emphasized a mistrust and fear of Nature, warning its followers that the material world is fraught with danger and is an impediment to spiritual fulfillment. The Church did, however, honor the Earth's majestic beauty as the grand design of God. In fact, the spiritually-based science of that time, Natural Theology, was premised on the principle that "the living word of God was to be found in Nature." Cleric scientists studied the relationships among the elements that comprised His Garden so that we would be better able to live in harmony with God.

However, the Church didn't want these cleric scientists to dig too deep into the mysteries of Nature. Puzzling phenomena were not studied. Instead, they were dismissed as "mysteries of faith." God, and

only God could understand the great mysteries. In fact, these mysteries were so out of bounds for human consideration, that the Church made it a sin to study them. For example, the Church declared the internal workings of the human body off-limits—banning Christians from even looking inside a body. Consequently, only Muslims and Jews were physicians, because their religious philosophies did not conflict with studying human anatomy and physiology.

The Church suppressed the advancement of scientific research for a very specific, self-serving motive. The Church ruled on the basis of the power afforded by “infallible” knowledge. If science ventured into the “unknown” and came back with answers that the Church did not possess, it would obviously compromise their claim of power. To avoid that pesky problem, people who offered truths other than those endorsed by the Church were declared heretics and subsequently punished according to the decrees of the Inquisition.

But over time, the Scientific Revolution toppled the Church’s claim to infallibility. That revolution was launched in 1543 when Nicolas Copernicus published his discovery that the Earth was not the center of the Universe as was thought by the scientist-theologians of the day. The fact that the Earth actually revolved around the sun, and that the sun itself was not the center of the universe, undermined the teachings of the “infallible” Church. The “infallible” Church was revealed to, indeed, be fallible.

As Modern Science evolved, it offered a radically new philosophy about the nature of life and our relationship to the Universe. The new philosophy was built on scientific truths that were verified through accurate observation and measurements of physical world phenomena. Science officially ignored the putative influences of a spiritual realm, because they were not amenable to scientific analysis. Consequently, civilization’s search for Great Truths resulted in an adversarial relationship between Science, which preoccupied itself with the physical realm, and Religion, which focused on the spiritual plane.

While man’s relationship with the Earth and the environment did not prosper under the leadership of the Church, it has degenerated still further under the leadership of Modern Science to such an extreme point that we now find ourselves in a life-threatening global crisis. Modern Science did not deny the existence of a God. It simply believed that God created the physical universe, and once that was done, He stepped back and let the mechanism run its own course. With the Hand of God out of the way, mankind’s domination and control over nature became a central theme of the 17th century worldview.

The influential Sir Francis Bacon, a renowned scientist, philosopher and barrister, defined a reality wherein “nature takes orders from man and works under his authority.” *She* (Nature) was to be “put in constraints”; the aim of science was to “torture nature’s secrets from her” so she can be “forced out of her natural state and squeezed and molded.” It is not coincidence that in a patriarchal culture nature

is a “female” to be controlled and even tortured by a “masculine” science. The metaphors employed by Bacon in his scientific writings are directly linked to his position as attorney general for King James I. In that capacity, Bacon employed the same terminology in his prosecution of witches that resulted in the torture and murder of millions of women.

Bacon’s philosophy devalued Nature by considering her an unruly handmaiden of *mankind* who needed taming. But how would she be “controlled?” Historically, humans tried to intervene and shape Nature through dreams and prayer, practices that implied the human mind could influence the behavior of Nature. However, the power of mind and consciousness was completely discounted by Rene Descartes’ claim that the mind and body were separate entities. According to the beliefs of that time, an immaterial essence, such as the mind, could not interact with, nor move, matter.

With God and the mind eliminated as potential sources that control life, Descartes resolved the question of control by suggesting the Universe was one giant machine. The planet, including its living organisms, represented mechanical automata: robots. Through the process of reductionism, i.e. taking the Universe apart and studying it piece by piece, it was assumed that Modern Science would acquire knowledge that would allow us to not only understand the “machine,” but also to *control* and *clone* it.

In the competition between the Church and Science for control of western civilization, Charles Darwin delivered the decisive blow in 1859 when he published the *Origin of Species*. Darwin’s theory of evolution suggested that the traits that characterize an individual were passed from the parents to the offspring. Life then was controlled by material hereditary factors, which a child acquires via the chemistry of the egg and sperm, not from God. Darwin extended his ideas to further suggest that random variations of these hereditary factors created the diversity of Nature’s species. The idea that humans came into existence through the happenstance of genetic variations removed the last link between God and the human experience. Human beings evolved by pure “chance,” which by extension means: *without an underlying purpose for our existence*. The rules of the Church about how to comport one’s life became superfluous in a world devoid of God’s influence.

But Darwinism and neo-Darwinism, a refinement of his theory embraced by modern evolutionists, left humans without a moral compass. Evolutionary success is based on “the survival of the fittest in the struggle for existence.” It’s a dog-eat-dog world out there, and as long as you are the top dog, you need not be concerned about the others. The end of the struggle is survival. As for the means to that end, apparently anything goes. The goal is survival by *any means*. Rather than framing the character of our lives by the “laws of morality,” Science suggests that we live our lives by the “laws of the jungle!”

These laws of the jungle have led the modern world to shift from spiritual aspirations to a war for material accumulation. The one with the most toys wins. Evolution theory essentially concludes that

those that have more...deserve it. In the West, we have become inured to the fact that our cultural imperative, by its definition, creates a civilization that is distinguished by those “who have” and those “who have not.” Everything in this world has a price; unfortunately, this includes people as well. The homeless, who represent losers of this Darwinian struggle, are an accepted and apparently not too disturbing consequence of our adherence to this way of thinking.

Darwinian philosophy assures us that in our struggle for life we are not responsible to anyone or anything, other than ourselves and our genes. We become miffed when the price of bananas goes up five cents, but ignore the fact that in some other country, the laborer who picked those bananas toiled in the field for ten hours only to earn a dollar or two. Though we may balk at the price of designer jeans, we will readily spend seventy dollars on a pair and not think twice about the child labor that was literally enslaved to manufacture them.

While we want to believe that we are a good people and we desire to help the less fortunate, *we have not even owned the reality that our preoccupation with material success is the primary factor in creating those less fortunate we are trying to help.* The truth is, we are so concerned about what we want that we never enquire as to how we got it. Our greed is so sanitized and our image so polished, that we are totally unaware of the people we hurt and the earth that we destroy in securing the life we have been programmed to seek. Being disconnected from the world community and having had our heads in the sand for so long, we are actually surprised when we hear that enraged citizens in other countries are demonstrating against our global policies.

The chasm between the haves and the have-nots in our world has created a disastrous biological situation. The imminent danger relates to an interesting characteristic built into all of Nature’s living creatures called: the *will to survive*. By some unknown mechanism, all organisms, from bacteria to humans, are “programmed” to make every effort to survive when they perceive their life is being challenged. If you chase a rat, it will do its best to survive by simply escaping your grasp. However, if you corner that rat and it has no way out, in spite of the odds against success, that rat will lunge in your face with every intention of taking you down. The “haves” have built fortresses to protect themselves from the ever-expanding population of “have-nots.” Soon, the “fittest” will be surrounded by a sea of the downtrodden and their protective refuges in the end will become their prisons.

In addition to terrorizing the world’s human population, our scientific “progress” has been terrorizing Mother Nature herself. The “Better Living Through Chemistry” motto we have ascribed to has led to our attempt to control Nature with innumerable drugs, fertilizers and pesticides. We have now come to realize that our indiscriminate use of “magic bullets” has polluted the environment and altered the balance of Nature.

Similarly, genetic engineering, which offered promises of redder tomatoes, clones of your favorite

pet or child and the opportunity for perfect health, has fallen far short of its goals. Genetic engineers, though familiar with the molecular mechanics of the cell, have no familiarity with the fact that each organism is a unit of life delicately balanced in a dynamic network. Science has already established that designer genes in GMO's escape and readily transfer their engineered genes to native organisms, changing the face of the environment. Without a full awareness of the *communal complexity* of species interactions, the creation and introduction of genetically modified organisms into the environment becomes a threat to the vitality of the biosphere and by consequence, to human survival.

Man's efforts to control and dominate Nature with technology have consistently disrupted the complex web of Nature that fostered our evolution as a species. Western philosophy and technology have now brought human civilization to the brink of spontaneous combustion. As you sit on your porch and watch the sunset, note its spectacular color. The beauty in the sky reflects the pollution in the air.

But that grim picture of spontaneous combustion is not inevitable. Instead, we are at the *turning point* that comes after the decay. We can—says the *I Ching*—find our way back to the Garden.

2. The powerful light that has been banished returns.

How do we turn away from the decay? This second pronouncement tells us that we must embrace the Light, which I believe is the new scientific knowledge that unites the “truths” underlying all religions and opens the door to Global Peace. Over the last twenty years, this extraordinary new research has revealed that sacred dogmas embraced by biologists and other life scientists are false. When we topple these three “Assumptions of the Apocalypse,” i.e., the notion that genes control biology, that evolution is a random, dog-eat-dog process, and that we can understand our bodies and our world by studying only physical phenomena, we can embrace the *powerful light* that will guide our way back to the Garden.

Though the unraveling of the structure of genes by James Watson and Francis Crick in 1953 was a stunning intellectual achievement, ironically, it helped to set humanity on a path away from the knowledge that can set us free. Specifically, the Double Helix discovery turned scientific attention inward, to the nucleus of the cell, rather than outward to the environment where I believe the movements that characterize life begin. Because scientists thought that Watson and Crick had unraveled the “Secret of Life,” genes were elevated to the lofty position of controlling life, control that I believe lies *outside* the cell. That left us hapless human beings as victims, with no responsibility for the unfolding of our lives because we cannot select or exchange our genes.

In our refreshed role as victims, we then looked to Science to deliver us from our shortcomings. The

pharmaceutical industry motivated the public to invest in the Human Genome Project, an effort to catalogue each of the genes present in a human body. Armed with that information, drug companies would be able to use genetic engineering to heal our ills and enhance our favorite attributes, or so it was supposed. But when the results of the Human Genome Project were revealed in 2001, researchers were shocked by the fact that human beings only have 25,500 genes, not enough to explain why we are the complex creatures we pride ourselves on being. The primitive *Caenorhabditis* worm has a precisely patterned body comprised of exactly 969 cells and a simple brain of about 302 cells. This “lowly” *Caenorhabditis*, however, boasts 24,000 genes, only 1,500 fewer genes than the infinitely complex human body. Far from solving the mysteries of life and disease, the Human Genome Project only deepened them.

Meanwhile, my desire to understand the control mechanisms of the cell led me away from the genes-containing nucleus to the cell membrane. Once thought to be a simple, extremely thin, jell-like barrier, powerful electron microscopes are revealing that the membrane is an impressive mediator between the *environment* and the cell. In fact, to repeat what was said above, it is signals in the *environment* processed by the membrane, not genes, which launch the cellular activity that defines life.

Other leading edge scientists have also uncovered cellular mechanisms that reveal that every living organism is engaged with the environment in a delicate pas de deux. It is only via this interaction that genes are turned on and off, making the notion that genes control biology not just outmoded, but clearly false. In dynamically changing environments, genes are switched on and off to enable organisms to continuously adapt and survive in their new surroundings. It is a biochemical fact that genes do *not* control their own activity nor the activity of any other system in the body.

New research is also toppling the notion that evolution is driven by a random, survival-of-the-fittest mechanism independent of the environment. Researchers have discovered that organisms as primitive as bacteria are capable of creating beneficial mutations so that they can better survive in their environments. Through a mechanism described as directed- or adaptive-mutations, organisms can *select* which genes they need to mutate. Actually, two kinds of genetic mutations exist: random and directed. Random mutations almost invariably lead to dysfunction, while “directed” mutations lead to adaptation and enhanced survival.

This is a far cry from Darwin’s notion that evolution is propelled by random natural selection. So far, that when British geneticist John Cairns first introduced proof for adaptive mutations in 1988, his research—published in the prestigious journal *Nature*—provoked the wrath of the scientific establishment. An editorial in *Science* on Cairns’ work was called “A Heresy In Evolutionary Biology.” (Heresies? Dogmas? Yes, Science has become the “new” religion!)

The new science reveals that organisms shape their genome and species evolve as a direct consequence of their interactions with their *environment*. Recognizing the importance of the environment

in evolution and in genetics leads us to a completely different understanding of the origins and purpose of life. Our existence is not a random accident, but a carefully choreographed event that takes into account the balance of the biosphere. We are ignoring our in-built stewardship of that biosphere by “going it alone,” i.e.: recklessly and radically changing our environment. Our hubris threatens our survival as surely as the heroes in Greek tragedies were undone by their arrogance. We were designed to complement our environment, not to lord over it. By radically changing our environment we risk a future where we will no longer “fit.” Instead of complementing our environment we may completely undo its complex balance, causing it to collapse.

Finally, quantum physics provides compelling evidence that our environment is made up both of forces that cannot be seen, as well as those that can be seen. Quantum physics shows us that the Universe and all of its matter are actually made out of energy. Every physical object manifests its own unique, invisible force. While an atom appears as a physical particle, we now know that it is co

prised of evanescent units of energy called quarks, which are themselves made up of smaller quanta of energy. Rocks, air, water and humans are all fields of energy that wear the cloak of matter, which makes the old, Cartesian notion that the mind (energy) and body (matter) are separate an antiquated anachronism.

Taken together, leading edge scientific research returns us to our aboriginal roots, which stressed the belief that humans are one with Nature. Aboriginal people recognize and honor the “spirits” of the air, the water, the rocks, the plants and animals, and most importantly, the spiritual nature of themselves. Fortunately, many of the lost traditions of our forefathers are still available in the few remaining aboriginals that inhabit our planet. Native Americans, African tribes, South American Indians and Australian Aborigines still hold the secrets of how to live in harmony with the planet. We should create an international project to honor these people and we should sit at their feet to learn their life-sustaining insights about the secrets of Nature. When we return to our aboriginal roots, “*The powerful light that has been banished will return.*” I am not suggesting that we shed our technology, don loincloths and camp in the woods. I am instead suggesting that we and our technology must learn to live in harmony with our mother, our dear Earth.

3. There is movement, but it is not brought about by force.

The revolution in which the powerful light will return, i.e. the revolution that will bring this planet back from the brink of extinction, requires no violence. I know that you and I have been programmed to think that revolutions occur only with force, be it the guns at Lexington and Concord or the sharp blade of the French guillotine. But this revolution back to our aboriginal roots requires a change in

beliefs, not soldiers armed with guns and jets armed with smart bombs. Just as the *I Ching* says: *There is movement, but it is not brought about by force.*

The lessons of the new science, which I call the new Biology of Belief, teach us that we have the power to change ourselves, and our planet, using the power of our minds. Quantum physics and the well-documented placebo effect, in which people who believe (falsely) that they are getting medicine heal their physical bodies, tell us that the mind (energy) can be *more* powerful than the body's chemical reactions. The new science revives the message of Christ, who told us that we could perform all the miracles He did if we believed. "Be ye transformed by the renewing of your mind."

Of course, you can't just snap your fingers or read a book to effect change. You have to undo the self-defeating and planet-defeating programming your parents (and their parents before them) inculcated into your subconscious mind. Once we learn to reprogram our powerful subconscious minds using the insights of energy-based mind-body techniques, the possibilities for change are limitless. Just because you grew up believing that revolutions have to be bloody or that you are stuck with your genes or that there is no need to worry about the poor and the homeless, the "losers" in a vicious survival of the fittest battle, does not mean that any of it is true.

In fact the latest science tells us that all of those "truths" are false. Scientists now realize not only that innumerable species are disappearing at an alarming rate, but also that we share genes with those disappearing species. Given this sharing of genes, organisms can no longer be seen as disconnected entities—the wall between species has fallen just as surely as the Berlin Wall.

Throughout our history, Religion and Science have built a wall between humans and Nature, one false brick of belief at a time. Let us take down this false wall that we have been programmed to build. Let us realize that our fates are inextricably tied up with the fate of our global neighbors and all the species in this world. Let us change our beliefs and join with other like-minded revolutionaries to save our world from destruction. I know from the many people I meet in my travels that such change has already begun. We are already moving back to the Garden. We are, in the words of the *I Ching*, experiencing the *RETURNING*.

Bruce Lipton, Ph.D. is an internationally recognized authority in bridging science and spirit. A cell biologist by training, he taught at the University of Virginia, and later performed pioneering studies at Stanford University's School of Medicine. He has been a guest speaker on dozens of TV and radio shows, as well as keynote presenter for national conferences. His breakthrough studies on the cell membrane presaged the new science of Epigenetics, and made him a leading voice of the new biology. His new book *The Biology of Belief* appears in 2005, and you can find him on the web at www.bruce-lipton.com.

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