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DEEP TRUTH

Igniting
the Memory of
Our Origin, History,
Destiny, and Fate

GREGG BRADEN

The *New York Times* best-selling author of *Fractal Time* and *The Divine Matrix*

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DEEP TRUTH

The Crisis:

Best-selling author and visionary scientist **Gregg Braden** suggests that the hottest topics that divide us as families, cultures, and nations—seemingly disparate issues such as war, terrorism, abortion, genocide, poverty, economic collapse, climate change, and nuclear threats—are actually related. They all stem from a worldview based upon the false assumptions of an incomplete science.

The History:

The obsolete beliefs of our modern worldview have brought us to the brink of disaster and the loss of all that we cherish as a civilization. Our reluctance to accept new discoveries about our relationship to the earth, one another, and our ancient past keeps us locked into the thinking that has led to the crises threatening our lives today.

The Facts:

The scientific method allows for, *and expects,* new information to be revealed and assimilated into our existing beliefs. It's the updating of scientific knowledge with the new facts from new discoveries that is the key to keeping science honest, current, and meaningful.

To continue teaching science that is *not* supported by the new discoveries—ones based upon accepted scientific methods—is not, in fact, scientific. But this is precisely what we see happening in traditional textbooks, classrooms, and mainstream media today.

The Opportunity:

Explore for yourself the discoveries that change 150 years of scientific beliefs, yet are still not reflected in mainstream thinking, including:

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GREGG BRADEN

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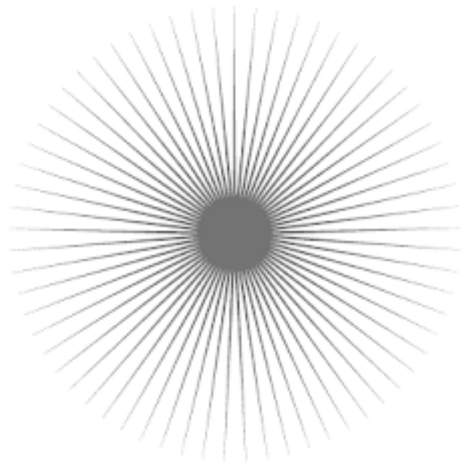

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"It is the hallmark of any deep truth
that its negation is also a deep truth."

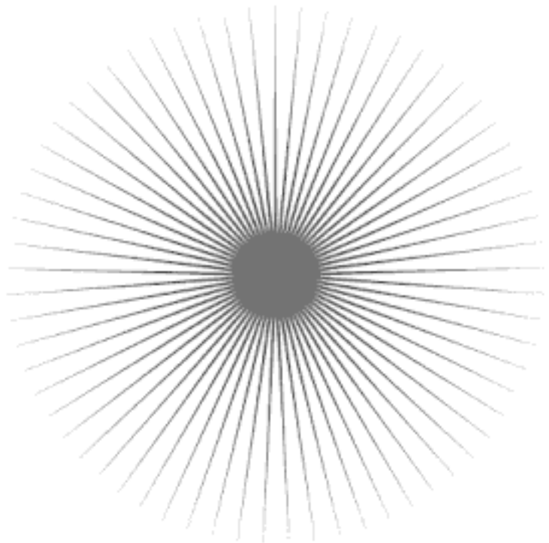
— **Niels Bohr** (1885–1962),
Nobel Prize–winning physicist

A new world is emerging before our eyes. At the same time, the unsustainable world of the past struggles to continue. Both worlds reflect the beliefs that made them possible. Both worlds still exist—but only for now.

From the global crises of terrorism, collapsing economies, and war; to the deeply personal beliefs surrounding abortion, relationships, and family, the issues that divide us are clear reflections of the way we think about ourselves and our world. The fierce nature of our divsions is also a clear indication that we need new ways to think of our most cherished relationships.

New discoveries regarding our origin, our past, and the most deeply held ideas about our existence give us reasons to rethink the traditional beliefs that define our world and our lives—beliefs that stem from the false assumptions of an incomplete and outdated science. When we do, the solutions to life's challenges become obvious, and the choices become clear.

This book is dedicated to revealing the deepest truths of human life by sharing scientific discoveries that have yet to show up in our textbooks and classrooms; and nevertheless hold the key to the way we think of our world, one another, and ourselves.



INTRODUCTION

There is a single question that lurks at the very core of our existence.

It's the unspoken question lying beneath every choice we'll ever make. It lives within every challenge that will ever test us, and it's the foundation for every decision we'll ever face. If God had a cosmic question "counter" to track the things we humans wonder about most, then I have no doubt that this device would have maxed out and returned to zero so often in registering this one question alone that even *God* would have lost count of how many times it's been asked!

The question at the root of all questions—one that has been asked countless times by countless individuals during the estimated 200,000 years or so that we've been on Earth—is simply this: *Who are we?*

While the question itself appears simple and brief, the way in which we answer it has implications that we simply cannot escape. It tears directly into the heart of each moment of our lives, and forms the lens that defines the way we see ourselves in the world and the choices we make. The meaning we give to these three words permeates the fabric of our society. It shows up in everything we do, from the way we choose the food that nourishes

our bodies . . . to how we care for ourselves, our young children, and our aging parents.

Our answer to who we are underlies the core principles of civilization itself: it influences how we share resources such as food, water, medicine, and other necessities of life; when and why we go to war; and what our economy is based upon. What we believe about our past, our origins, our destiny, and our fate even justifies our thinking regarding when we choose to save a human life, and when we choose to end it.

In what may be the greatest irony of our existence, at the dawn of the 21st century, following more than 5,000 years of recorded history, we have still not clearly answered this most basic question about ourselves. And while at *any* time discovering the truth of our existence would be worth the time, energy, and resources needed to do so, as we currently face the greatest crises affecting life and survival in the memory of our species, it's especially critical for *our* time, here, now.

The Clear and Present Danger

One good reason for us to know who we are stands above all others. Maybe it's no coincidence that today, after three centuries of using the scientific method to answer the most basic question about ourselves, we also find ourselves in deep trouble here on planet Earth. It's not just any old run-of-the-mill trouble we're in. It's the kind of trouble of which dramatic novels and science-fiction blockbusters are made.

Just to be absolutely clear: It's not Earth that's in trouble. It's us, the people who *live* here on Earth. I can say with a high degree of confidence that our planet will still be here 50 years from now, and 500 years from now. No matter what choices we make during that time period—no matter how many wars we wage, and how many political revolutions we begin or how badly we pollute our air and oceans—the world that our ancestors called the "garden"

will still be here making the same 365.256-day journey around the sun each year, just as it has for the past 4.55 billion years or so.

The question is not about Earth; it's about whether or not we will be *on* Earth to enjoy it. Will *we* still be here to enjoy the sunsets and sensual mysteries of nature? Will *we* witness the beauty of the seasons with our families and other loved ones? As I'll explore in a subsequent chapter, unless something changes soon, the experts are betting against us.

The reason? Because, when it comes to having what it takes for our children and us to live on Earth, we're dangerously close to making the choices that lead us beyond the "point of no return." This is the conclusion of an independent study on climate change co-chaired by Britain's former Secretary of State for Transport Stephen Byers and U.S. Senator Olympia Snowe (R-Maine), which was released in 2005. It stated that when it comes to the environment alone, we could reach that tipping point in as little as ten years and lose the fragile web of life that sustains us.[1] But the environment is only one of a host of crises facing us today, each leading us toward the same potentially deadly outcome for the human race.

The best minds of our time acknowledge that we're on multiple collision courses with disastrous outcomes—from the renewed threat of global war, the overuse of our resources, and the growing shortages of food and drinkable water; to the unprecedented stress we're placing on the world's oceans, forests, rivers, and lakes. The problem is that the experts can't seem to agree on what to do about these problems.

Act . . . but How?

Sometimes it's a good idea to study a problem thoroughly before we act. The more we know about a difficult situation, the more certain we can be that we've found the best solutions to the dilemma. But sometimes prolonged study is not so good. There are times when the best thing to do is act quickly to survive the

immediate crisis, and only then to study the problem in detail from the safety of the time bought by taking decisive action.

Maybe the best way to illustrate what I mean here is with a make-believe scenario:

Let's say that on a beautiful, clear, and sunny day you're crossing a stretch of highway with a friend in order to get from your house on one side of the road to your friend's home on the other. Suddenly you both look up after being engrossed in deep conversation and see a huge 18-wheel tractor-trailer rig coming directly toward you.

Instantly your body's "fight or flight" response kicks in so that you can act. The question is: *How?* You have to decide quickly what to do. You and your friend both must choose, and choose fast.

So there you are, in the middle of the highway, with three lanes in front of you and three lanes behind you. Your dilemma is this: Do you have time to move forward to your destination—the other side—or is it best to move backward to the place you began? To answer the question with absolute certainty, you would need information that you simply don't have at your fingertips in this moment. You do not know, for instance, whether the truck is empty or loaded. You may not be able to tell precisely how fast it is moving or whether the driver can even see you on the road. You might not be able to recognize if it's a diesel- or gasoline-fueled truck that's coming your way, or what make the vehicle is.

And this is precisely the point. You don't need to know all of those details before you act. In the moment that you're crossing the highway, you already have all of the information necessary to tell you you're in a bad place. You already know that your life is in danger. You don't need such details to recognize the obvious: there's a big truck heading your way . . . and if you don't move quickly, in a matter of seconds nothing else is going to matter!

While this scenario may sound like a silly example, it's also precisely where we find ourselves on the world stage today. Our paths as individuals, families, and nations are like that of you and your friend walking across the highway. The "big truck" that's

bearing down upon us is the perfect storm of multiple crises: situations such as climate change, terrorism, war, disease, the disappearance of food and water, and a host of unsustainable ways of dealing with everyday living here on Earth. Each crisis has the potential to end civilization and human life as we know it.

We may not be in agreement as to precisely why each of these events is occurring, but that doesn't change the fact that they are actually happening now. And, like two friends deciding to move forward across the highway or go back to the safety of where they've come from, we could study each crisis for another 100 years . . . yet the fact is that there are people, communities, and ways of life that will not survive the time it takes for all of the data to be compiled, the reports to be published, and the results to be debated.

The reason is that while we're evaluating the problem, people's homes will be destroyed by earthquakes, "superstorms," floods, and war; the land that sustained them will stop producing food; their wells will dry up; oceans will rise; coastlines will disappear—and those individuals will lose everything, including their lives. While these scenarios may sound extreme, the events I'm describing are already occurring in places such as Haiti, Japan, the Gulf Coast of the United States, and drought-ridden Africa . . . and it's getting worse.

Just as it makes tremendous sense to move out of the path of the big truck coming your way on the highway before you study the problem further, it makes tremendous sense to move out of the way of the multiple disasters looming on the horizon before they take an even greater toll.

And just as the direction you choose to move on the highway determines whether or not you get to your friend's house on the other side, the way we decide to take action in the face of the greatest threats to our existence will determine whether we succeed or fail, live or die. Our choices for survival all point back to the way we think about ourselves in the world, and how our thinking leads us to act.

The message of this book is that we must act wisely and quickly to head off the collision that awaits us on the highway of life we've chosen to cross. Maybe Albert Einstein said it best: "A new type of thinking is essential if mankind is to survive and move toward higher levels."[2] Developing a new level of thinking is precisely what we need to do today. We know the problems exist. We've already applied the best minds of our time, and the best science based upon the best theories available, to study those problems. If we were on the right track with our thinking, doesn't it make sense that we would have more answers and better solutions by now? The fact that we don't tells us we need to think differently.

The Dilemma

In recent years, an explosion of new discoveries throughout the sciences has left little doubt that many long-standing views about life, our world, and our bodies have to change. The reason is simple: *The ideas are wrong.* New evidence has given us new ways to think about the perennial questions of life, including where we've come from, how long we've been here, how we can best survive the crises that face our world, and what we can do now to make things better. While the new discoveries give us hope, despite the breakthroughs we still have a problem: the time required for us to integrate these discoveries into the accepted way of thinking may be longer than the time that's available to us to solve the crises. The state of biology is a perfect example of how this works.

The recently developed science of *epigenetics* is based upon scientific fact. It proves that the genetic code that we call the "blueprint of life," our DNA, changes with our environment. The piece that traditional scientists are reluctant to talk about is that the environment changing our DNA includes more than the toxins in our air and water, and more than the electromagnetic "noise" inundating those who live among the power lines, transformer stations, and cell-phone towers of the biggest cities in the world. The

environment includes our very personal, subjective experiences of beliefs, emotions, and thoughts as well.

So while the scientific evidence tells us that we *can* change the DNA at the root of the life-threatening diseases that ravage our friends and loved ones, the textbooks that Western medical doctors rely upon still teach us that we can't, saying that we're victims of heredity and other factors beyond our control. Fortunately, this is beginning to change.

Through the work of visionary scientists such as stem-cell biologist Bruce Lipton, author of *The Biology of Belief* (Hay House, 2008), the surprising results of the latest studies are slowly percolating into the textbooks we rely upon for medical understanding. However, the conduit that carries these new discoveries about our cells—as well as those updating what we know of the origin of our species, our civilization, and the details of our past—is a system that is notoriously slow. The general rule for the lag time between a scientific discovery and its review, publication, and acceptance—before it shows up in the textbooks—is eight to ten years, and sometimes longer. And this is where the problem becomes obvious.

The best minds of today tell us in no uncertain terms that we're facing multiple crises posing threats of unprecedented magnitude, and that each of these crises must be dealt with immediately. We simply don't have eight to ten years to figure out how to adapt to the situation and head off the emerging threats of terrorism, war, and a nuclear arms race in the Middle East. These are issues that must be addressed *now.*

Our old ways of thinking—which include believing in survival of the fittest, the need for competition, and our separation from nature—have brought us to the brink of disaster. We're living at a time in history when we must confront the potential loss of all that we cherish as a civilization. It's precisely because we need new ways of thinking that the ancient question of who we are takes on a significance that is greater than ever. At the same time, a new mode of seeing the world, based upon a growing body of scientific evidence, is filling in the missing pieces of our knowledge and changing the way we think about ourselves.

In light of the new evidence regarding near–ice age civilizations, the false assumptions of human evolution, the origin and role of war in our past, and the undue emphasis on competition in our lives today, we must rethink the most basic beliefs that lie at the core of the decisions we make and the way we live. This is where *Deep Truth* comes in.

Why This Book?

While there is certainly no shortage of books that identify the extraordinary conditions threatening us today, they fall short of addressing the single element lying at the heart of how we deal with them. How can we possibly know what to choose—what policies to enact, what laws to pass—or how to build sustainable economies, share lifesaving technologies, and bridge the issues that are tearing at the fabric of our relationships and society . . . until we've answered the single question that lies at the very core of our existence: *Who are we?* As individuals, as families, as nations, and as a combined human civilization, we must first know who we are before we can make the right choices. It's especially important to do so now, at a time when every choice counts.

> How can we know what choices to make until we answer the single question that lies at the heart of each and every choice: Precisely *who* are we?

Without answering this fundamental question, making life-altering decisions is like trying to enter a house without knowing where the door is. While it's possible to break in through a window or knock down a wall, we'd damage the home in the process. And maybe this is a perfect metaphor for the quandary we find ourselves in. For our human family, which has more than quadrupled in size in a little over a century—from 1.6 billion in 1900 to

about 7 billion in 2011—we can either use the key of understanding who we are to move through the door of successful solutions . . . or we can damage our home (Earth and ourselves) by responding to crises through the knee-jerk reactions of false assumptions based in incomplete science.

When we embrace the truths of our history on Earth, our planet's cycles of change, and the role these play in our lives, then we'll understand what we're really up against, what our options are, and what choices are available.

This book identifies six areas of discovery (and the facts they reveal) that will radically change the way we've been led to think about our world and ourselves in the past. As we address the great crises of our time, these are the most important truths we must consider:

— **Deep Truth 1:** Our ability to defuse the crises threatening our lives and our world hinges upon our willingness to accept what science is revealing about our origins and history.

As we face the never-before-seen threats that must be resolved within the next eight to ten years, how can we possibly know what choices to make, what laws to pass, and what policies to enact until we know who we are? The false assumptions of long-standing beliefs regarding evolution and human origins make little sense in the face of recent discoveries throughout the sciences.

— **Deep Truth 2:** The reluctance of mainstream educational systems to reflect new discoveries and explore new theories keeps us stuck in obsolete beliefs that fail to address the greatest crises of human history.

We base our choices of life, government, and civilization on the way we think about ourselves, our relationship to each other, and our relationship to planet Earth. For the last 300 years, these beliefs have come from the false assumptions of an outdated science. The sound principles of the scientific method have a built-in feature for self-correction of false assumptions that is effective when we allow the method to work as it was intended.

— **Deep Truth 3:** The key to addressing the crises threatening our survival lies in building partnerships based upon mutual aid and cooperation to adapt to the changes, rather than in pointing fingers and assigning blame, which makes such vital alliances difficult.

Our multiple crises (some induced by humans and some that have arisen naturally) have arrived at the tipping point of threatening the ultimate survival of our species. The industrial age has definitely contributed to the greenhouse gases in the atmosphere; and we certainly need to find clean, green, and alternative ways to provide electricity and fuel for the seven billion people who are presently living on our planet . . . however:

- *Fact:* Climate change is not human induced. The scientific evidence of 420,000 years of Earth's climate history shows a pattern of warming and cooling cycles at approximately 100,000-year intervals when no human industry was present.
- *Fact:* During the warming and cooling cycles of the past, the rise in greenhouse gases generally *lags behind* the temperature increase by an average of 400 to 800 years.
- *Fact:* It will take *never-before-seen* levels of synergy and teamwork to create sustainable lifestyles that help us adapt to natural cycles of change, as well as to address human-induced crises.

— **Deep Truth 4:** New discoveries of advanced civilizations dating to near the end of the last ice age provide insights into solving the crises in *our* time that our ancestors also faced in theirs.

While the scientific revelations involving near–ice age civilizations are upsetting the way historians traditionally think of humankind's journey through Earth's different ages, they support the oldest records of our past and the indigenous view of a cyclic world . . . with the rise and fall of civilizations, catastrophic events, and the consequences of poor choices repeating themselves.

— **Deep Truth 5:** A growing body of scientific data from multiple disciplines, gathered using new technology, provides evidence beyond any reasonable doubt that humankind reflects a design put into place at once, rather than a life-form emerging randomly through an evolutionary process over a long period of time.

While science may never identify precisely what, or who, is responsible for the design underlying our existence, the discoveries strongly challenge the conventional wisdom of evolutionary theory, and demonstrate that the chance that we resulted from random processes of biology is virtually nonexistent.

— **Deep Truth 6:** More than 400 peer-reviewed studies have concluded that violent competition and war directly contradict our deepest instincts of cooperation and nurturing. In other words, at the core of our truest nature we simply are not "wired" for war!

Why, then, has war played such a dominant role in shaping our history, our lives, and our world? Clues to the answer are found in the records of our early experiences on Earth, and the ancient accounts that hold instructions for ending the "war of the ages" and living at the heights of our destiny, rather than succumbing to the depths of our fate.

The sheer magnitude and number of crises converging in the first years of the 21st century pose a critical threat—a clear and present danger to our survival—and follow the cyclical trends that led to the loss and collapse of civilizations past. Knowing who we are, where we are in the cycles of civilization and nature, and the mistakes of past civilizations that we can learn from is the key to surviving the crises facing us today.

The best science of our time, when it is married to the wisdom of our past, confirms that we still have the ways and means to shift our time of crisis into a time of emergence. We can create a new world based upon actionable and sustainable principles rooted in the core understanding of our deepest truths.

In This Book

Through the seven chapters in this book, I invite you into an empowering, and possibly novel, way of thinking about your relationship to the world. For some people, this way of thinking may be nothing new. Maybe you were fortunate enough to be raised in a family that allowed current discoveries about civilization and life to fill in the missing pieces of your spiritual, religious, and historical views on the world.

For those who did not have such an upbringing, however, the chapters that follow open the door to a powerful, and practical, new path of self-discovery. Regardless of your beliefs, the evidence forcing humanity to rethink the traditional story of who we are, how long we've been here, and why the world seems to be "falling apart at the seams" is fascinating reading.

In the pages that follow, you will discover:

- Archaeological evidence leaving little doubt that advanced civilizations, with advanced technology, grew and flourished on Earth long before the traditionally accepted date of 5,000 to 5,500 years ago
- Why the wars we fight today stem from a way of thinking that began long ago, and why they're the modern continuation of an ancient battle that's not even ours
- Science-based evidence that human life is the result of an intelligent design
- A timeline illustrating when the human code of life is activated in the womb, when the first heartbeat of human life begins, and when consciousness awakens in human development
- A revised timeline of past civilizations (and how they fit into the world-age cycles) giving new meaning to the crises of today, as well as helping us define the choices that lie before us

It's important that you know up front what you can expect from your journey through these discoveries. For that reason, the following statements clearly explain what this book is, and what it is not:

- *Deep Truth is not a science book.* Although I will share the leading-edge science that invites us to rethink our relationship to the past, the cycles of time, our origins, and our habit of war, this work has not been written to conform to the format or standards of a classroom science textbook or a technical journal.
- *This is not a peer-reviewed research paper.* Each chapter and every report of research *has not* gone through the lengthy review process of a certified board or a selected panel of experts with a history of seeing our world through the eyes of a single field of study, such as physics, math, or psychology.
- *This book is well researched and well documented.* It has been written in a reader-friendly style that describes the experiments, case studies, historical records, and personal experiences supporting an empowering way of seeing ourselves in the world.
- *This book is an example of what can be accomplished when we cross the traditional boundaries between science and spirituality.* By marrying the 20th-century discoveries of genetics, archaeology, microbiology, and fractal time, we gain a powerful framework within which to place the dramatic changes of our age, and a context that helps us deal with those changes.

By its nature, the exploration of what and how we think of ourselves is different for everyone—it's a journey that is unique, intimate, and personal. So much of that difference stems from the experiences we share with our families, peer groups, and cultures. We've all been taught stories that explain our past and the origins of the earth and humanity, and that help us make sense of our

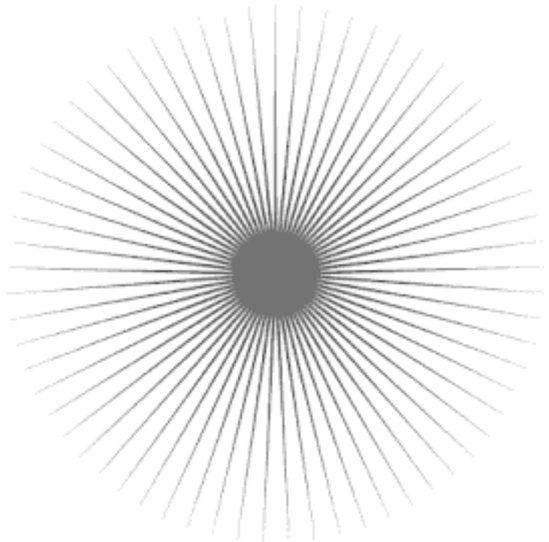
world—stories based on what our community accepts as "truth" at a given point in time.

I invite you to consider the discoveries recounted in these pages and explore what they mean to you. Talk them over with the important people in your life; and discover if, and how, they may change the story that is shared in your family.

Deep Truth is written with one purpose in mind: to empower us (as we solve the crises of our lives and our world) to understand our relationship with the past. The key to empowerment is simply this: the better we know ourselves, the clearer the choices in our lives become.

No one knows for certain what the future holds. Quantum understanding tells us that we are always selecting our future through the choices we make in this very moment. But no matter which challenges await us or which choices we'll be faced with, one thing is absolutely certain: knowing who we are and understanding our relationship to one another, as well as to the world beyond, gives us the evolutionary edge that our ancient ancestors may not have had when they faced similar challenges in the past. With that edge, we tip the scales of life and balance in our favor. And it all begins with our awareness of the deepest truths of our existence, and how we rely on those truths each day for every choice in our lives.

— Gregg Braden
Santa Fe, New Mexico



CHAPTER ONE

Who Are We?
In Search of Ourselves

"Without an understanding of who we are, and from where we came, I do not think we can truly advance."

— **Louis Leakey** (1903–1972),
ARCHAEOLOGIST AND NATURALIST

"You imagine wonderful things and you imagine terrible things, and you take no responsibility for the choice. You say you have inside you both the power of good and the power of evil, the angel and the devil, but in truth you have just one thing inside you—the ability to imagine."[1] With these words from his novel *Sphere,* the late author Michael Crichton described the irony of our human experience as seen through the eyes of someone, or something, from beyond our world—in this case an alien sphere that has been on the bottom of the ocean for 300 years. And although

the book itself is fictional, the insights revealed may hit closer to home than many of us would like to believe.

We are, in fact, mysterious beings of extremes and contradictions, which show up every day in the way we live and the choices we make. We say, for example, that we long for freedom in our lives, yet we allow ourselves to be bound by the fear of what we would do if we *had* all the freedom in the world. The fact that each cell in our bodies regenerates itself reminds us that we have the power to heal ourselves (we wouldn't be alive if we didn't), yet we refuse to acknowledge this power when it comes to healing our own diseases. We also claim to be beings of compassion, yet we are the only species that inflicts pain upon others to coerce information, or purely for entertainment. We say we desire peace in our world, while we continue to build the most destructive weapons of war ever known.

In our encounters with other worlds that may occur in the future, we will, no doubt, appear to any advanced forms of intelligent life as a conflicted species engaged in a constant struggle, wavering between the possibilities of a beautiful destiny and the death blows of our feared fate.

Now, having recently entered the second decade of the 21st century, we're faced with a humbling reality that brings the crises, extremes, and contradictions of our time into sobering focus. In the presence of the most advanced science in the history of our world, we still haven't answered the most basic question of our lives: *Who are we?*

The Jury Is Still Out

The U.S. Census Bureau tells us that we share our world with about seven billion fellow members of the human family. Although we may divide ourselves into separate groups, as defined by skin color, bloodlines, geography, and beliefs, we all share the same heritage when it comes to the origin of our species. And if each of us could be asked where we come from in a global door-to-door

survey, there's a good chance that the responses would fall into one of three lines of thinking:

1. We are the product of a long line of miraculous synchronicities of biology (evolution) that have occurred over the last two million years.
2. We've been created, imbued with life, and placed on Earth directly by the hand of a greater power.
3. There is a grand cosmic pattern—an intelligent design—that makes us what we are; and this design was set into motion a long time ago by someone, or something, that we don't understand today.

While this quick summary may not entirely do these viewpoints justice, these three explanations, or some combination of them, form the core of all possibilities generally being considered today.

For thousands of years, the first and third explanations didn't even exist. Until 1859, essentially only one explanation was available to make sense of how we got here: the one invoked by the religious community. Based upon a literal interpretation of the biblical book of Genesis, the oldest document common to the world's three great monotheistic religions (Judaism, Christianity, and Islam), the belief essentially holds that we are here on purpose and were placed here personally by God.

This view remains popular in some communities today and is best recognized as *creationism,* a theory rooted in the religious doctrine proposed by Anglican bishop James Ussher more than 350 years ago. Combining the different biblical interpretations with the historical births and deaths recorded in the Bible of his time, Bishop Ussher created what he believed to be an accurate timeline for biblical events, commencing on the first day of creation.

Based upon his calculations, Ussher predicted that Sunday, October 23, 4004 B.C.E., was the first day of the world—the biblical "beginning" described in Genesis.[2] Using this date as the starting point, he followed the events and genealogies over time to arrive

at the age that modern creationists, and specifically young Earth creationists, generally accept for the earth: 6,000 years.[3]

With this age as his benchmark, Ussher then calculated dates for key biblical events that relate to the origin and history of humankind. He determined, for example, that Adam was created in 4004 B.C.E., that Eve was created shortly thereafter, and that both were expelled from the Garden of Eden later the same year. Ussher's correlations were printed in authorized versions of the Bible in his day, and in 1701 the Church of England officially accepted Ussher's biblical chronology.

One of the creationist assumptions that stems directly from Ussher's work is that all life was created at once during Genesis. Additionally, the theory states that there are essentially no new species to be found in the world today. All life existing at present or in the past—including the human race—is supposedly the result of the original creation, and has remained fixed and unchanging.

These views are in direct conflict with two key points of modern science:

1. Geologists now place Earth's age at a staggering *4.5 billion* years old.
2. Mainstream biology largely accepts Darwin's theory of evolution as the mechanism responsible for the diversity of life on Earth today.

While the four-and-a-half-billion-year-old earth can sometimes be accepted by old Earth creationists, due to varying interpretations of how long a biblical day and year actually were, there is no such leeway when it comes to evolution. Charles Darwin's theory is in direct conflict with the theory of human origin through divine intervention, and there appears to be no middle ground for the two beliefs.

Darwin returned from his historic journey on the H.M.S. *Beagle* in 1836 and published his findings 23 years later, in 1859. His paradigm-shattering book, entitled *On the Origin of Species,* rocked the foundation of long-standing beliefs regarding our beginnings. While we will explore the ideas and implications of Darwin's work

in greater depth later on, I mention them here because, for the first time, the theory of evolution challenged religious views in general, and specifically those of the Christian church.

I will state clearly at this point, however, that although Darwin's work was well thought out, meticulously documented, and performed within the guidelines of the scientific method, *a growing body of evidence now proves that it does not account for the facts of human origin as they're known today. Nor does it prove that we are the result of an evolutionary process*. This is not to say that evolution doesn't exist or hasn't occurred. It has. And the fossil record proves that it has for a number of specific species. The problem is that when we attempt to apply the processes observed in plants and some animals to humans—to us—the facts plainly don't support the theory.

So where does that leave us? What are we to believe? Which of the three viewpoints is the right one when it comes to our origin and our history? The jury is still out on this one, and the very topic is a trigger for heated debate. If we're relying upon the language of science, however, evolution is becoming less and less of a viable option to explain the complexities of human life.

In other words, the evolution that we see in nature may not apply to us. As you'll read about in the next section, there are things about our human family that simply cannot be explained by evolution, at least as we understand the theory today.

A Theory in Trouble

The scientific community since 1859, as well as much of the "modern" world since that time, has embraced evolution as the only plausible theory to explain human origins and how we've come to be what we are today. This widespread acceptance has led to the search for physical evidence to prove the theory: the fossilized "missing links" that should exist to document the stages of our journey. For reasons that are as controversial as the fossils

themselves, for more than 150 years these missing links in our human ancestry have proven to be elusive at best.

More recently, the search for evidence of our ancestors has captured our collective imagination, as prestigious and credible journals such as *Science* and *Nature* have reported studies and featured full-page color plates documenting these discoveries. Seemingly overnight, recovered skulls with hollow eye sockets staring out at us from glossy images on magazine covers became members of our human family tree. They even took on names such as "Lucy" and "George" that made them seem more like family.

Growing up in the 1960s watching documentaries on my family's black-and-white television and reading about the search for our human origins in beautiful magazines like *National Geographic* and *Smithsonian,* it seemed as though there were updates almost on a daily basis regarding the search for our origins. While the search continues today, the latest discoveries appear to be less public, but are nonetheless ongoing. Some of the most productive areas for fossil evidence of our past have been located in remote portions of eastern Africa's Great Rift Valley. In northern Tanzania, for example, the Leakey family's multigenerational search for hominid remains—by Louis S. B. Leakey; his wife, Mary; their son Richard; and some of their other children—has pushed the accepted date of human origins back to about two million years ago.

During explorations since the 1950s, Leakey teams have painstakingly sifted through loose soil, pulverized rock, and grains of dust to recover bone fragments, teeth, stone tools, and sometimes entire skeletal sections of ancient beings that appear to have human characteristics. With complex-sounding names such as *Australopithecus afarensis* and *Homo neanderthalensis,* these are believed to be examples of human development along the ladder of evolution.

As impressive as these and similar findings are, and as much as they have added to our knowledge of the past, the search for human origins has been dogged by the lack of a single discovery that directly links such ancient forms of life to us.[4] And it may be that such a link will never be found. My sense is that, as interesting as the work in Africa is, and as much as it tells us about long-ago life-forms, it's probably not *our life history* that's being recovered.

Missing-Link Update: Still Missing

From 1859, when evolutionary theory was introduced, to the date of this writing, no clear evidence of a transitional species leading to us—the fossil evidence documenting our ancestors evolving into increasingly more humanlike beings—has surfaced. This fact remains despite the sophisticated technology and great manpower dedicated to resolving the question of our origins. A close look at the human family tree reveals that many of what are assumed to be undisputed links between fossil findings are, in fact, noted as suspected or *inferred* links.

In other words, the physical evidence that links *us* with the discovered remains of these creatures from the past has not been firmly established (see Figure 1.1).

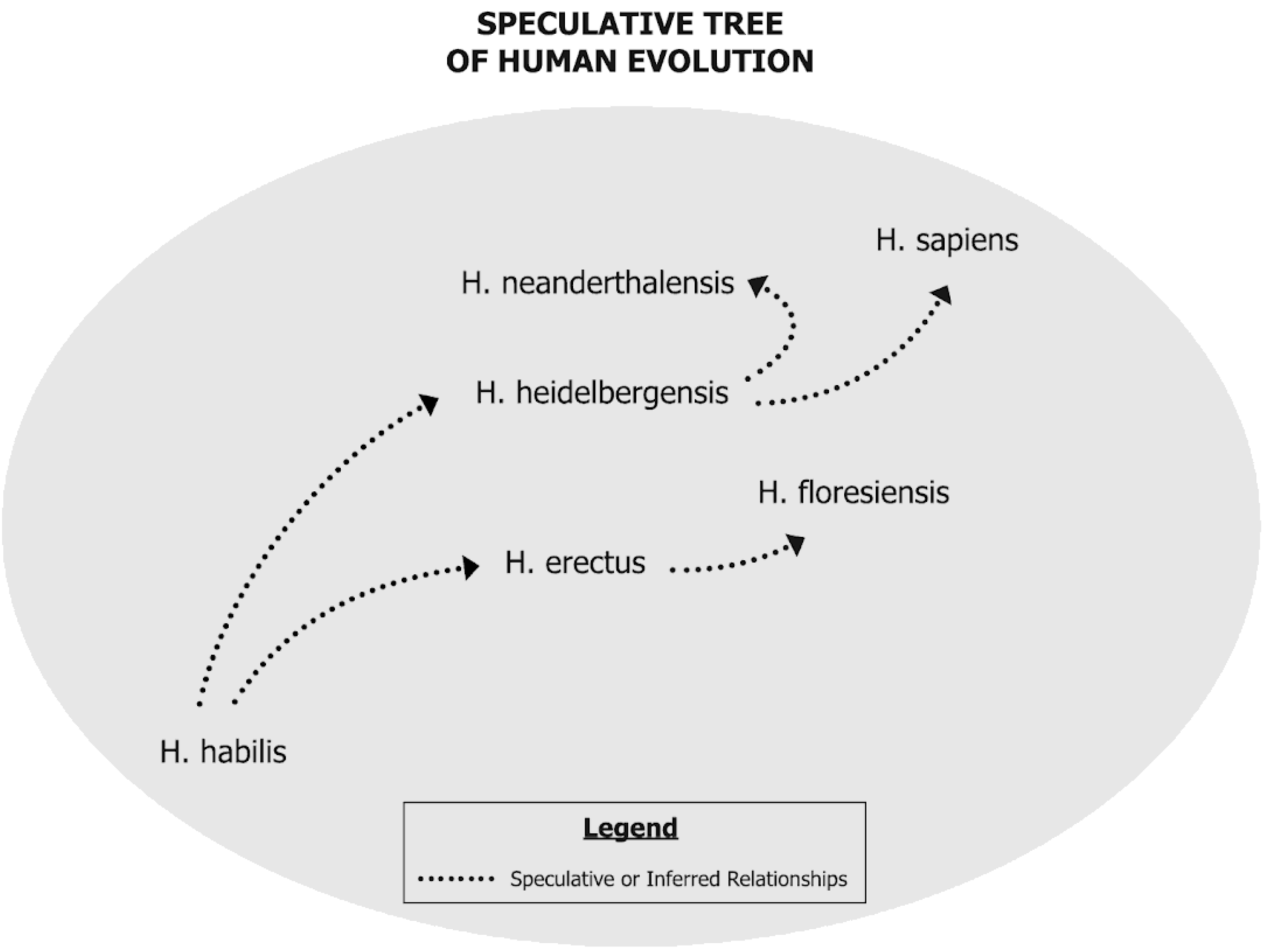


Figure 1.1. An example of the widely accepted chronology of ancient ancestors thought to lead to modern humans. Sequences such as this are largely interpreted from fossil evidence.

In *On the Origin of Species,* Darwin acknowledged this lack of evidence. He also acknowledged that it could be due to a flaw in one of two places: the way geologists think of the earth, or his theory of evolution. In his own words:

> As on the theory of natural selection an interminable number of intermediate forms must have existed . . . [w]hy do we not see these linking forms all around us? Why is not every geological formation charged with such links? We meet with no such evidence, and this is the most obvious and forcible of the many objections which may be urged against my theory.[5]

Reflecting upon this apparent quandary, Thomas H. Morgan, recipient of the 1933 Nobel Prize in physiology or medicine, stated that applying the "most rigid . . . tests used to distinguish wild species," we do not "know of a single instance of the transformation of one species into another."[6]

Two late-20th-century discoveries may begin to shed light on why the problem of a bridge between ancient and modern humans exists, and what the fact of a missing link may be saying to us about our history. For sound scientific reasons that will be explored in depth in a later chapter, while *Australopithecus afarensis* and Neanderthals may tell the story of *someone's* history, it's probably not *ours*.

What follows are two of the reasons why.

Interesting Fossils, but They're Not Us!

The first "map" describing the building blocks of life was established by James Watson and Francis Crick in 1953. Through their model of the DNA molecule, the door was opened for an entire science devoted to identifying people based on the genetic traits that make them who they are, and that also make them different from anyone else.

From eye and hair color, to gender, and the tendency toward developing certain diseases, the code for how our bodies look and work is stored in the blueprint of our genes, our DNA. Once

Watson and Crick unlocked the code holding the evidence of our past, the science of matching segments of DNA to determine paternity, identify missing persons, and link perpetrators to crime scenes has become a keystone in the fields of law enforcement and forensic medicine. It has also become the foundation for one of the most successful crime-solving series in the history of television: *CSI: Crime Scene Investigation*.

In 1987, the same techniques used in *CSI*-type investigations—the results of which are accepted as evidence in the highest courts of law today—were applied to the study of human origins for only the second time in history. In 2000, researchers at the University of Glasgow Human Identification Centre published the results of their investigation comparing DNA from a species believed to be our ancestor to that of modern humans.[7] Along with co-workers in Russia and Sweden, the Scottish scientists tested ancient DNA from an unusually well-preserved Neanderthal infant discovered in a limestone cave in northern Caucasus, at the border of Europe and Asia.

The exceptional condition of the child's remains is a story, and a mystery, unto itself. Normally this is the case only in frozen specimens, like those found in the icy polar regions. It was this state of preservation that allowed 30,000-year-old DNA from the infant to be compared to the DNA of humans today. It was also the first time that such tests could be performed on a body that had already been carbon-dated. The study concluded that the possibility of a genetic link between Neanderthals and modern humans is remote. The report suggests that modern humans are not, in fact, descended from Neanderthals.[8]

While in theory the science of genetic comparison should solve the mystery of our ancestry, the results are actually raising more questions regarding our evolutionary lineage and origins, and opening the door to "forbidden" territory.

The term *early modern human* (EMH), or *anatomically modern human* (AMH), has replaced *Cro-Magnon* as the descriptor for our closest ancestor. Scientists now believe that the physical differences between the bodies of contemporary humans and those of

EMHs are so slight that they don't justify a separate grouping. In other words, although ancient humans didn't necessarily behave like us, they *looked* like us. Or, conversely, we still look like them: our appearance hasn't changed much since our first ancestors appeared on Earth about 200,000 years ago. This fact has proven to be a problem for those who look to slow evolutionary changes over long periods of time to explain how we've come to be as we are.

In 2003, advances in DNA technology allowed for even more ambitious comparisons of ancient DNA. This time the tests compared Neanderthals and our earliest confirmed ancestors, the EMHs. The team of European scientists studied the DNA from two EMHs, one that was 23,000 years old and another that was 25,000 years old, with DNA from four Neanderthals between 29,000 and 42,000 years old. The findings, published in *Proceedings of the National Academy of Sciences,* stated: "Our results add to the evidence collected previously in different fields, making the hypothesis of a 'Neanderthal heritage' very unlikely."[9] In other words, the Neanderthals portrayed as the cavemen in motion pictures and cartoons are not the ancestors of EMHs. This means that we didn't evolve from them, and they cannot be *our* ancestors.

The Mystery of "Fused" DNA

Since the discovery of the genetic code, an additional mystery has emerged regarding the chromosomes that distinguish one species from another. Biological instructions are contained within the chromosomes for members of a species, determining things like the structure of their bones, the size of their brains, how they metabolize, and so on. Apes have 24 pairs of chromosomes, or a total of 48. Humans have 23 pairs, or a total of only 46. Although it looks like we're "missing" an entire set of chromosomes compared to our nearest relatives, our genetic maps reveal an interesting curiosity.

A closer look at where chromosomes appear to be absent from our genome shows that *human chromosome 2* is remarkably

similar—and actually "corresponds"—to chromosomes 12 and 13 of the chimpanzee, *as if they somehow were combined* (fused) into a single larger piece of DNA.[10] Interestingly, this fusion occurred only in the case of humans.

I'm including the technical terminology from the *Proceedings of the National Academy of Sciences* (October 1991) that describes this fusion: "We conclude that the locus cloned in cosmids c8.1 and c29B is the relic of an *ancient telomere-telomere fusion* and marks the point at which two ancestral ape chromosomes fused to give rise to human chromosome 2."[11] (My italics.)

In other words, the two chromosomes that seem to be missing from our DNA appear to have been found, merged into a single new chromosome that is unique to us. Additionally, there are other characteristics of human and chimp genes that look almost identical.[12]

How did this merging of DNA happen? Scientists simply don't know. But the conclusion drawn from the studies opens a mysterious door that may allow us to ultimately find the answer to this question. It's the fact that these chromosomes are fused together, and the way they're fused, that has led scientists to conclude that only a rare process could have given rise to such a genetic phenomenon.[13] These studies are telling us that the arrangement of the DNA that makes human chromosome 2 (and us) unique is not something that we would normally expect from Darwin's evolution through natural selection.

What could have happened in the distant past to produce such changes in the fundamental code of life? The short answer is that we simply don't know. Based upon a comparison of human and primate physiology, however, there is a growing body of evidence suggesting that as *Homo sapiens,* we may not fit neatly into a traditional tree of evolutionary steps.

* * *

New data from DNA, and the lack of fossil evidence supporting the notion of human evolution from lower primates, suggests that we may, in fact, be a species unique unto ourselves. This theory takes the approach that rather than being *descendants* of earlier forms of primates, we're separate and distinct from them. A comparison of primate and human characteristics such as bone density—and our ability to shed tears, perspire, and grow hair rather than fur—supports this theory, while fueling controversy for *both* proponents of creationism and evolutionary theory.

Although such findings may ultimately raise more questions than they answer, each stage of investigation adds to what we know about ourselves and further defines our place in the universe and our role in creation. Additional evidence in the fossil record lends credibility to these studies, indicating that, while we may share genetic characteristics with less evolved forms of life, *we've developed independently from them* along our own genetic timeline. Ours may be a much older species than previously thought, and we may have changed very little with respect to evolution during our time here.

Clearly, for both creationism and evolution, the sources of information are incomplete, leaving interpretations open to revision as new evidence comes to light.

What We're Not

Sometimes we find the truth of what "is" in our lives by first discovering what "is not." Through the process of elimination, we eventually zero in on the understanding we're searching for. From our personal relationships with lovers, family, friends, and co-workers, to the war and peace between our nations, we seem to learn the great lessons of life in precisely this way. We *experience* what we don't want before we *learn* that we don't want it.

It was only after experiencing war on a global scale, for example, not once but twice, that we said no to more world wars. It was only after we experienced the unimaginable genocide of the

mid-20th century that we said we would never allow events to unfold in that way again.

Many mainstream scientists, teachers, and researchers of our time are actively engaged in sifting through the discoveries of the last 100 years or so to discover what's true, and what's not, when it comes to human origins. Their discoveries are so numerous that they're being published on what sometimes feels like a daily basis. In fact, there is so much new information being reported so frequently now that scientific journals—such as *Science,* for example—have resorted to adding a weekly newsletter to their monthly publications to keep their subscribers up-to-date on the latest discoveries.

While all of this research is designed to help us understand what the 20th century revealed, many of the key discoveries that tip the scales one way or another on the issues scientists are investigating have yet to be presented in our textbooks and classrooms. This means that we're placing the hopes, trust, and promise of our future in the hands of young people who are learning science based upon obsolete beliefs.

Just as learning to operate a car without first understanding the rules of the road can't make for a healthy driving experience, reducing nature to atoms and molecules without learning about our relationship to them can't possibly lead to meaningful solutions for the crises facing us today. If we could bring the essence of the 20th-century discoveries regarding ourselves and our past together, what would they tell us? What does the best science of our time indicate about who we are and who we aren't?

The partial list that follows gives an idea where the new science may be headed. It is a fact that . . .

1. . . . the theory of living cells mutating randomly (evolving) over long periods of time does not explain the origin or complexities of human life.
2. . . . the biological link between humans and earlier humanlike life-forms in our ancestral tree is inferred and not proven.

3. . . . DNA studies prove that we did not descend from Neanderthal families, as previously believed.
4. . . . we have changed little since the early modern humans (EMHs) appeared about 200,000 years ago.
5. . . . it's unlikely that the DNA that makes us human and gives us our uniqueness could have formed in the way it has from natural processes of evolution.

So now that we know some of the things we're "not," what does the best science of our time tell us about who we *are?* The answer to this question is the key to the next six chapters of this book.

Three hundred years ago, the scientific thinking around Isaac Newton's laws of physics led us to view the universe, our world, and our bodies as if they were parts of a grand cosmic machine—that is, as huge and small systems that were separate from one another, independent from one another, and replaceable.

One hundred and fifty years ago, Charles Darwin proposed that we're the end product of a 200,000-year journey: survivors of an evolutionary competition who have had to fight for our place on Earth in the past, and must continue to do so today.

Also, the science of the last 100 years or so has led us to believe that technology is the answer to our problems, and that through science we will conquer nature and the threats to our survival.

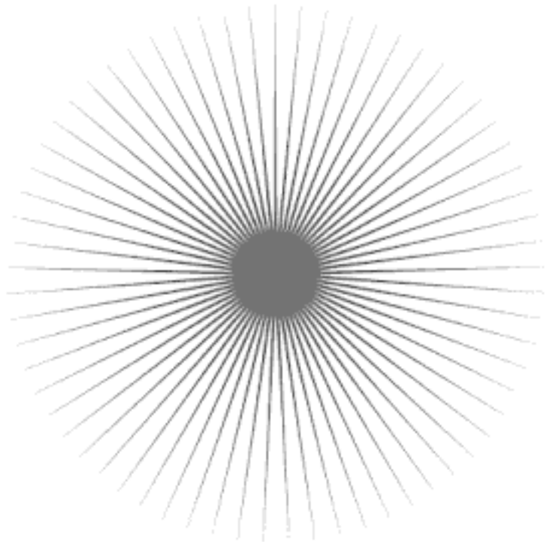
Each of these ideas is based upon a false belief derived from scientific information that, at the very least, is incomplete. In some cases, it's just wrong.

Before we can answer the question of who are we, we must honestly consider the truths that we've asked science to reveal. In doing so, we quickly discover how the false assumptions of the past have led us into a proverbial rut on the road of discovery, where we are spinning our wheels in our search for the answers to life's mysteries.

The discoveries in the following chapters are real. They represent the kinds of news stories that should make for bold headlines in magazines and mainstream papers around the world. Instead,

they are often relegated to obscure technical journals and newsletters with a limited number of technically minded subscribers. This may help us understand why our textbooks lag so far behind the discovery curve. It may also help us see where the thrust of exploration can lead with respect to the next great forays into the mysteries of our existence.

Deep Truth 1: Our ability to defuse the crises threatening our lives and our world hinges upon our willingness to accept what science is revealing about our origins and history.



CHAPTER TWO

The Deep Truth of False Assumptions: Discoveries That Change Everything

"Sometimes a concept is baffling not
because it is profound but because it is wrong."

— E. O. Wilson, BIOLOGIST AND NATURALIST

In 2008, two brothers released a film documenting their quest to answer some of the oldest and possibly most elusive questions out there, including "Who am I?" and "What is the meaning of life?" With critical recognition in the form of more than 30 major awards so far, Clifford and Jeffrey Azize created a stunning and powerfully moving film. It is simply titled *The Human Experience*.[1]

The poignant story line is highlighted through the brothers' sharing of images of rare personal encounters that range from meeting the lost children of Peru to visiting the abandoned lepers of Ghana. These life-altering encounters led them, and similarly lead viewers, on a journey to a deeper understanding of the universal experiences that bind us as a human family.

The questions posed in this film are among the same ancient and as-yet-unanswered ones that we humans have asked since our earliest ancestors tried to make sense of the cosmos, and our role in it, 200,000 years ago. Through the ages we have done our best to answer what have become known as the "perennial questions" of our existence: *Who are we? Where do we come from? How did we get here? Where are we going?* In every age, the best tools of the day have been used in this endeavor.

Our current era of science is no different. Science gives us a way of exploring the mysteries of the world and our bodies that makes sense out of the sometimes seemingly senseless things of life.

While I was trained as a scientist and taught to use the scientific method, no one ever really explained to me precisely what science *is* and *why* it has been such a successful way of exploring the world.

In the poetic language of a brilliant physicist, Einstein described science as the "attempt to make the chaotic diversity of our sense-experience correspond to a logically uniform system of thought."[2] In other words, it gives us a common language with which to explore the mysteries of life.

In its purest form, science is independent of the emotion or expectations that can sometimes change the way a scientist looks at the world. When scientists use the step-by-step procedures developed by other scientists in the past—what is known as the *scientific method*—it allows them to be certain that they're on solid ground when those accepted methods lead to new discoveries and these are shared with the world.

The dating of one of the world's most ancient archaeological sites is a perfect example of what I mean here. When researchers used ^{14}C (carbon-14) dating to find out how old the Göbekli Tepe (pronounced "Go-beckly Tep-ah") site in Turkey is, they followed

an established method that has been widely accepted in the past. So when it showed that the site is between 11,517 and 11,623 years old—at least twice the age of ancient Sumer, long thought to be among the world's oldest civilizations—the data was based upon a proven approach, and the findings were taken seriously.

In general, the scientific method describes a sequence of steps that must be followed if an idea is to be accepted in the scientific community. Figure 2.1 illustrates this sequence.

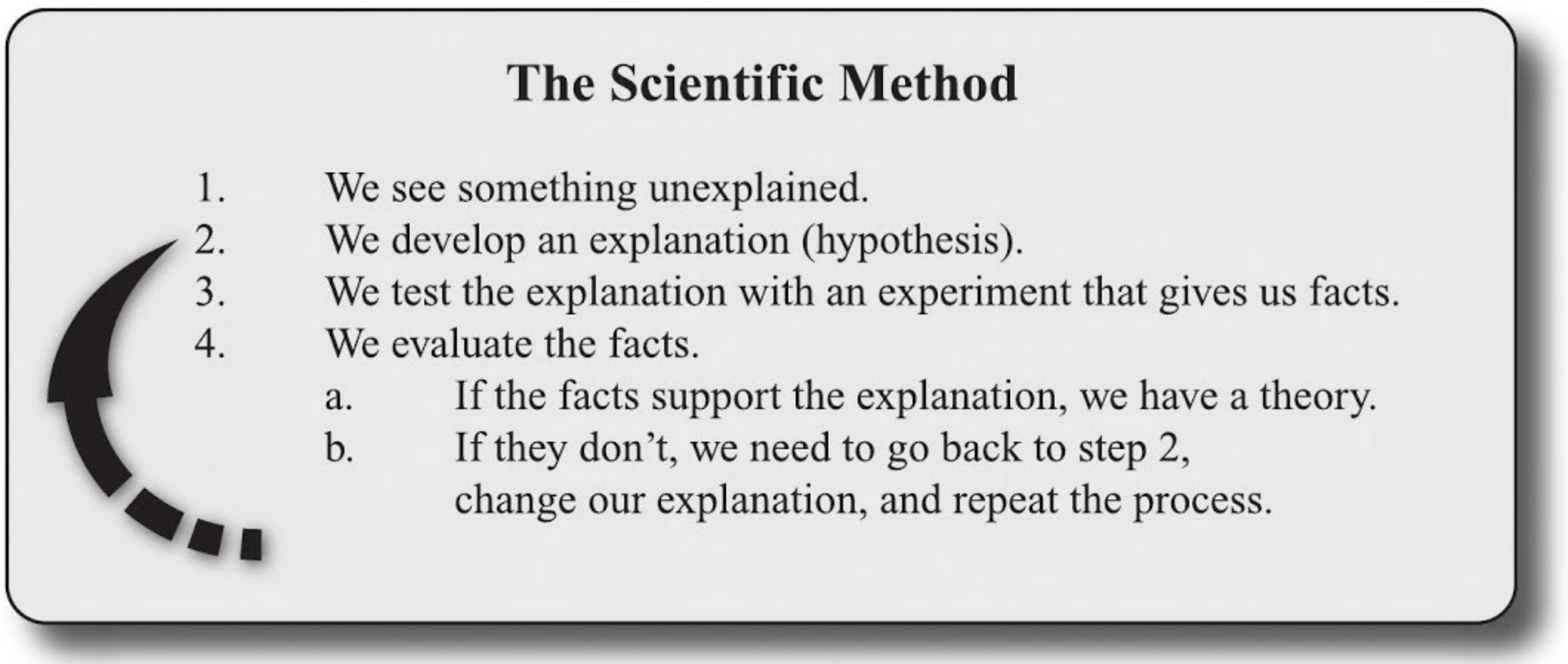


Figure 2.1. The four steps of the scientific method. This sequence gives us a consistent way to establish facts and discover where our thinking about something may not be supported by them. The scientific method is only as good, however, as the discipline and honesty of the individual who applies it.

There is a reason why I'm sharing the scientific method at this point in the book. From the sequence in Figure 2.1, we can see that if a new fact is uncovered that changes what we know about an existing idea, then the old belief must be updated to make room for the new information. The method allows for, *and expects,* new information to be discovered over time and assimilated into our existing canon of ideas and beliefs. When scientists discovered that the atom is not the smallest particle of matter, for example, and is actually made of even smaller particles, the old models of the atom became obsolete. They gave way to the new ones incorporating quarks, leptons, gluons, and so on. This updating of

scientific knowledge with the confirmed facts of new discoveries is the key to keeping science honest, current, and meaningful.

To discount new and proven facts when they clearly do not support an existing scientific belief is, in fact, not scientific. But this is precisely what we see happening in the preparation of our textbooks and in our classrooms today. In the chapters that follow, we will explore new discoveries that have yet to be reflected in the educational curricula for a number of reasons, including reluctance to give up old models and ways of thinking. However, these are the very discoveries that help us make sense of the past, while holding the key to wise choices for our future.

In addition to giving us a good way to be consistent when we explore the natural world, science offers us a language with which to share what's been found in a meaningful way. So when a biologist says that something mysterious happens to a human embryo after the first three mitotic cell divisions, we can be certain of precisely the stage of development he or she is talking about.

I'd like to emphasize that there are other languages that describe our natural world. Some of them, such as alchemy and spirituality, have been around much longer than the brief lifetime of science. And while they're definitely not "scientific" (meaning they don't necessarily build upon the confirmed discoveries of the past to explain nature), they have been successful in helping us understand our relationship to the world, and to one another, for a very long time.

Apples, Magnets, and the Age of Science

It's generally accepted that modern science, and the scientific era, began in July 1687. It was then that Isaac Newton published his influential work *Philosophiae Naturalis Principia Mathematica* (in English, "The Mathematical Principles of Natural Philosophy") showing the mathematics that describes our everyday world.[3] For more than 200 years, Newton's observations of nature were the foundation of the scientific field now called *classical physics*.

Along with the theories of electricity and magnetism from the late 1800s and Albert Einstein's theories of relativity from the early 1900s, classical physics has been tremendously successful in explaining what we see as the "big things" in the world: the movement of planets and galaxies, apples falling from trees (according to a popular story, Newton discovered the law of gravitation after an apple fell on his head), and so forth. It has served us so well that using classical physics, we have been able to calculate the orbits for our satellites and even put men on the moon.

During the early 1900s, however, new discoveries showed us that there are places in nature where Newton's laws just don't seem to work. From the tiny world of particles within an atom, to the way atoms behave during the birth of stars in distant galaxies, some phenomena encountered by scientists simply could not be explained by this traditional brand of physics. The scientific way of answering questions says that if the existing thinking cannot explain what we see, then the way we think of the world must be updated to take into account the new observations and discoveries. The result of doing so in the world of physics produced what today is known as *quantum physics:* the study of the things that happen on a very small scale, dictated by forces underlying our physical world.

From the time that quantum physics appeared on the scientific stage, the great challenge has been to marry the two very different kinds of thinking represented by classical and quantum physics into a single view of the universe and life: a unified theory. So far, it hasn't happened. While some theorists have managed to solve individual pieces of the puzzle, none has yet solved the whole mystery. Just in the way new cracks seem to show up in a weak dam once existing ones are filled, the emerging theories have answered some questions while opening the doors to new ones—at times in places where no "doors" were even known to exist.

The evolution of *string theory* is a perfect example of such doors and cracks. In the 1980s, the idea that the universe is made of invisible vibrating strings of energy was believed to herald the next

great revolution in physics. The deeper that physicists explored the theory, however, the more problems there appeared to be with the idea. "String theory was a bubble waiting to be pricked," says mathematician Peter Woit of Columbia University. "The fundamentals just weren't there anymore."[4]

Similarly, the initial promise of the Wheeler-DeWitt (WD) equation to unify classical and quantum physics faded quickly when the "fine print" became clear. To accomplish its seemingly impossible task, the WD equation left out the big factor that caused the problems: time itself. Although doing so helped with the mathematics, the fact remains that time is part of our world and our lives. Without it, any equations don't realistically represent the mystery they are trying to solve.

For now, however, the stark reality is this: It's been over a century since Max Planck formulated the core principles of quantum theory. After 100 years of the world's best scientific minds working with the best theories of mathematics and physics, testing these theories at the most advanced research facilities in the history of the world, it makes perfect sense to expect that by now we would have solved the big problems that plague our scientific worldview. That is, if we are on the right track.

It's because we haven't that we must now face the possibility that we may be on the *wrong* track.

Is Science on the Wrong Track?

If the basic ideas of how reality works are incomplete, then applying all of the brainpower and technology in the universe to those wrong ideas is not going to yield true answers. Regardless of a century's worth of teaching, millions of textbooks printed, and entire lifetimes and careers devoted to the theories—and the serious economic investment made to build and operate some of the most sophisticated machines ever devised to test them—if the ideas are wrong to begin with, they're never going to "get" right if we follow the same mistaken path that has led to them.

This is the big elephant of a concern that stands in the center of the room at each scientific symposium and conference being held anywhere in the world at present: Are we on the right track? When it comes to our relationship to our world, are we thinking the right way and asking the right questions?

In a 2010 article in *Prospect* entitled "Science's Dead End," physician James Le Fanu gives two examples of why many critics are questioning the value of new science and asking a question that looms even larger than "Is science on the right track?"[5] Le Fanu states his question boldly, asking out loud and publicly what others have only alluded to, or whispered behind closed doors. The question is this: *Is science stuck?*

Le Fanu explains why it's easy for us to think so:

> At a time when cosmologists can reliably infer what happened in the first few minutes of the birth of the universe and geologists can measure the movements of the continents to the nearest centimeter, it seems extraordinary that geneticists can't tell us why humans are so different from fruit flies, and neuroscientists are unable to clarify why we recall a telephone number.[6]

Le Fanu is right. And his example of humans and fruit flies is a perfect illustration of the problem.

Following the completion of the Human Genome Project (HGP) in 2001, scientists were astonished to learn that the genetic blueprint for a human is about 75 percent smaller than what had been expected. This is a huge discrepancy—about 75,000 genes were "missing"—and scientists had to acknowledge a difficult fact regarding what they had believed in the past. Before the results of this project, the thinking had been that there is a one-to-one correspondence between our genes and proteins. In other words, each of the proteins in our bodies comes from a single gene that holds instructions to make that protein.

After the HGP was completed, it was evident that this idea wasn't off just a little bit; it was *wrong!* The error was due to the belief that the one-to-one relationship between proteins and genes exists—a false assumption that scientists had made in the

mid-20th century, and then built an entire belief system upon. In the end, the scientists also had to acknowledge that if so very few genes actually differentiate us from simpler forms of life, like Le Fanu's fruit flies or the common field mouse, then they were also wrong about what makes us unique.

Craig Venter, the president of a firm leading one of the gene-mapping teams, recognized this problem immediately when he stated, "We have only 300 unique genes in the human that are not in the mouse."[7] Taking the findings of his team one step further, Venter said, "This tells me genes can't possibly explain all of what makes us what we are."[8]

So this is one beautiful example of the quandary that a false assumption can create, and where it can lead. With only 300 genes separating us from a common mouse, where do we look to find out what makes us so different? If, as the evidence suggests, the difference is not in the DNA itself, then where is it? These questions have opened up what some have called a "Pandora's box" of possibilities leading us down a road from which there is no turning back. Scientists must now look *beyond* the DNA of the body to answer them. This puts us into the realm of unmeasured fields and unseen forces, a place where science has been reluctant to go in the past.

Ultimately, we may find that the key to discovering what makes us so different from other forms of life lies at the heart of our most ancient traditions and deeply held beliefs. Almost universally, these sources tell us that we are infused with what has been described as a special "spark" of a mysterious essence eternally joining us with one another and with something beyond our physical world that we can't see. It is this spark that sets us apart from all other forms of life on Earth.

The point of Le Fanu's comments and the discussion of mice and fruit flies is simply this: If we're really on the right track and we're really asking the right questions, then why haven't we bridged some of the great gaps in our understanding? Why can't we explain human consciousness or unite classical physics with quantum physics? Why is the question of when life begins in the

womb still a mystery? And why don't we know who built the ancient civilizations that have now been dated back to the last ice age? Could it be that when it comes to the way we think of ourselves in the world, we have not only been *on* the wrong track, but we're *stuck* on that wrong track, which is leading us in the wrong direction?

New Discoveries, or Old Ones Improved?

These gaps of knowledge, coupled with what many see as diminishing returns on the investments we're pouring into scientific research, have led some critics to view the current lull in major scientific breakthroughs as a sort of holding pattern. In other words, while we continue to take leaps and bounds forward in the application of sciences such as genetics and computer technology, the advances are largely refinements of things we already know. They're based upon scientific breakthroughs that have already happened.

Advances in technologies related to information storage, telecommunications, and microprocessor speed—and the shrinking size of our computers as the computing power within them grows—are less about breakthroughs that shed new light on our world, and more about advances within the principles that are already understood. Microchips are a perfect example.

The microchip that makes computers possible was developed in 1958. It was based upon the scientific thinking of the time, which viewed information as energy that needs to be stored in a physical place and moved through physical wires that connect physical devices. With these ideas in mind, the first commercial chip needed only one transistor to accomplish its task. And while today's advanced microchip technology is hugely more sophisticated than the technology of the first chips made in 1958 (some now have more than 125 million transistors), the new ones are a refinement—a powerfully awesome and beautiful refinement using

new materials—to streamline the original idea that information is "stuff" that needs to be stored in a place.

At the same time that microchip technology was being refined based on old ideas of energy, however, quantum discoveries showed scientists that the world we live in is *all* energy. And the energy of the world *is information itself.* In other words, information is everywhere, contained in the energy that is everything. This profound understanding tells us that the digital data of our books and communication devices doesn't have to be captured and stored as "stuff" in physical locations.

Instead, it can be stored beyond the bounds of a chip, in the place quantum theory describes as the foundation of reality: the quantum field. Here, the properties that make the field what it is (holography and entanglement) suggest that the distance and space limitations that plague today's manufacturers would disappear with fully realized quantum computing.

The knowledge already exists. The technology is already here. And while forward-thinking and visionary scientists such as Seth Lloyd, a professor of mechanical engineering at MIT, have proven that quantum computing is possible in the laboratory, we may discover that the biggest shift needed to embrace such possibilities on a large scale is less about the technology itself, and more about the way we think of it. The barrier to more scientists answering the big questions of life and the universe is the constraint of accepting theories based in false assumptions.

There Are Elephants in the Room

While some critics are asking if science is stuck, others are asking if it has failed us. As we find with any belief system that we look to for help in making sense of our world, there is a maturity curve that comes with it. When the early Christian church emerged in the 3rd century, for example, there was a belief that the new religion held the answers to the deepest questions about humankind's existence. As the religion matured and those who

followed it evolved in their understanding, the beliefs changed. While the church still provides a powerful social core for families and communities, its ability to answer the questions of everyday life in a way that is useful has come into question.

Our world is arguably a better one, and we live better lives, because of the benefits of science. Science has certainly gotten it right in some places, and we all continue to reap rewards from scientific breakthroughs such as the advances in medicine adding years and even decades to our lives. But there are other places where the gaps and inconsistencies in the scientific view have become stubborn roadblocks in our quest to unlock the mysteries of life and nature. These are the proverbial elephants in the room: incomplete theories that form the foundation of scientific beliefs . . . unresolved issues that, despite not having been fully explained, inform the way we think of ourselves.

In addition to the assumed one-to-one correspondence between genes and proteins previously mentioned, and the fact that we now know it doesn't exist, other elephants in the room of science include the failure to account for the field of energy that makes quantum entanglement possible, the failure of evolutionary theory to explain the origins of life and the origins of humankind, and the failure to acknowledge evidence of advanced civilizations in the past as part of a cyclical model of civilization.

The fact that traditional thinking has been unable to solve the deepest mysteries of our existence is casting a long shadow of doubt on what we use as the foundation of our reality. The scientific method states that when new evidence no longer supports an existing way of thinking, it's time to "rethink" the thinking.[9] And with the growing number of discoveries shifting us away from our past beliefs, the scientific evidence that has been considered anomalous in the past can no longer be discounted; it must be incorporated into mainstream science. As we'll see in the following sections, certain assumptions fall into the categories of beliefs that prevent us from advancing into a truly sustainable view of the world and our role in it.

To reconcile the crises in the way science defines us and our world means that we must do in the early 21st century what physicists had to do a hundred years ago. Just as they had to shift their thinking to accommodate the evidence of quantum theory, we must make room for more recent discoveries that have upset some of the most cherished beliefs of science. Our failure to do so will keep us locked into the beliefs, and the ways of living, that are leading us down the destructive path where we find ourselves today.

The False Assumptions of Science

A revolution in the way we think of ourselves is sweeping the world. It's forcing us to rewrite the story of our origins, our past, how long we've been here, and where we're going. Even though the revolution began in the early 20th century, it has gone unnoticed by average people going about their daily routines—that is, unless they're among the group of scientists who have dedicated their lives to understanding how life and the universe work.

For the archaeologists struggling to fit the discovery of advanced ice age civilizations into the traditional timeline of history, for example, and the biologists publishing more than 400 peer-reviewed studies showing that nature is based upon cooperation rather than "survival of the fittest," the revolution in thinking feels like a major-magnitude earthquake. It registers "off the scale" of new ideas as it levels some of the most cherished beliefs of conventional science. In its wake is left a wide swath of outdated teachings, demanding the reevaluation of long-held traditions and destroying the legacy of entire careers. The reason? Discoveries have shown that many of the scientific "facts" we've trusted for centuries to explain the universe and our role in it are flawed.

An obsolete paradigm of the universe and our relationship to it was based upon a series of scientific assumptions—*false assumptions*—that can no longer be taught as fact in light of new evidence. Examples of these include the following:

- *False Assumption 1:* Civilization is approximately 5,000 to 5,500 years old.
- *False Assumption 2:* Nature is based upon "survival of the fittest."
- *False Assumption 3:* Random events of evolution explain human origins.
- *False Assumption 4:* Consciousness is separate from our physical world.
- *False Assumption 5:* The space between things is empty.

When we think about everyday life—the way we care for ourselves and our families, how we solve our problems, the choices we make—we find that much of what we accept as common knowledge is rooted in the core beliefs of these false assumptions, which are holdovers of an outdated science that began 300 years ago. *It may be no coincidence that during this same period of time, the world has found itself facing the greatest crises of war, suffering, and disease in recorded history.* These ideas of our sterile-sounding chemical origins, of our relatively recent arrival on Earth, and of our separateness from nature have led us to believe that we're little more than specks of dust in the universe and a biological sidebar in the overall scheme of life.

Is it any wonder that we often feel powerless to help our loved ones and ourselves when we face life's great crises? Is it any wonder that we often feel just as helpless when we see our world changing so fast that it has been described as "falling apart at the seams"? At first blush there seems to be no reason for us to think any differently, to believe we have any control over ourselves or events. After all, there's nothing in our traditional textbooks or traditional way of seeing the world that allows for anything else. . . .

That is, however, until we take another look at the new discoveries of the last years of the 20th century. Although the results of paradigm-shattering research have been published in leading technical journals, they're often shared in the complex language of

science, masking the power of their meaning from a nonscientific person. Average nonscientific, nontechnical people don't feel the impact of the new discoveries because they're being left out of the conversation. And that's where our revolution comes in.

Rather than following the first three centuries of scientific imagery portraying us as insignificant beings that originated through a miraculous series of biological "flukes" and then survived 5,000 years of civilization as powerless victims separate from the harsh world we've found ourselves in, the new science suggests something radically different. In the late 1990s and early 2000s, peer-reviewed scientific studies revealed the following facts:

- *Fact 1:* Civilization is at least twice as old as the approximately 5,000 to 5,500 years estimated by conventional timelines.[10]
- *Fact 2:* Nature relies upon cooperation and mutual aid, not competition, for survival.[11]
- *Fact 3:* Human life shows unmistakable signs of an intelligent design.[12]
- *Fact 4:* Our emotions directly influence what happens in the sea of energy we are bathed in.[13]
- *Fact 5:* The universe, our world, and our bodies are made of a shared field of energy—a matrix—that makes the unity known as "entanglement" possible.[14]

It's been said that "insanity" is doing the same thing over and over again in the same way and expecting different results. To attempt to resolve the unprecedented crises of our time, looking at them through the eyes of the same beliefs that paved the way *to* the crises makes little sense. Doing so *now,* knowing that those beliefs are no longer true, makes even less sense.

To meet the challenges of our time, we must be willing to think differently about ourselves than we have for at least the last three centuries. And to do so means that we must cross some of the traditional boundaries that have isolated the discoveries in

one area of scientific study from those in another. When we do, something wonderful begins to happen.

Science Was Wrong . . . Then It Was Right!

There is a chain of knowledge that links our modern world with the past, and each time that chain is broken, we lose valuable knowledge about ourselves. We know that the chain has been broken at least twice in recorded history: once with the burning of the Great Library of Alexandria in Egypt during the Roman conquest, and again with the biblical edits of the 4th century C.E. My thinking has been that the closer we can get to the original teachings that existed before the knowledge was lost, the more clearly we can understand what our ancestors knew that we've forgotten.

For the bulk of my adult life, I've searched the places least disturbed by the modern world to find sources of ancient and indigenous wisdom. My journey has taken me to some of the most amazing sites remaining on Earth. From the magnificent monasteries of the Tibetan plateau and the humble monasteries in the mountains of Egypt and southern Peru, to the recovered texts of the Dead Sea and the oral histories of native peoples throughout the world, I've listened to stories and studied records. As different as each of the traditions I've encountered appears to be from the others, there are common themes weaving them into the collective fabric of our past.

One of the overriding themes is our relationship with nature and our world, a relationship whose depths have been confirmed only recently in the language of modern science. The question that comes to me again and again is this: if our ancestors had such a deep understanding of the earth and our relationship to it, and science is just now able to validate that relationship, then what else did advanced civilizations of the past know that we've forgotten?

The Deep Truths

During a conversation with Albert Einstein, Nobel Prize–winning physicist Niels Bohr once shared what seems to be a contradiction regarding what we think of as "truth." He described how there are two very different kinds of truth: "To the one kind belong statements so simple and clear that the opposite assertion obviously could not be defended. The other kind—the so-called *deep truths*—are statements in which the opposite also contains deep truth."[15]

The scientific belief that everything is separate from everything else is an example of a deep truth, one established by the Michelson-Morley experiment in 1887.[16] This was the much-anticipated culmination of efforts in the scientific community to settle once and for all the question of whether or not a universal field of energy connects all things. The thinking at the time was that, if present, it should be a moving field, and it should be possible to detect its movement.

The results of the experiment were interpreted by scientists of the time to show that no field exists. The implication of the results—the scientific assumption—was that everything is separate from everything else. This meant that what happens in one place has little, if any, effect on what happens somewhere else.

The results of the Michelson-Morley experiment were the foundation of scientific theory and classroom teachings. Multiple generations grew up believing that we live in a world where everything is separate from everything else. This belief is reflected in many facets of our lives and civilization, ranging from the way we think of ourselves and our relationship to the earth, to the economic systems that benefit some people at the expense of others. For nearly a century, the assumptions of Michelson and Morley (the two scientists for whom the experiment was named) were accepted as fact . . . that is, until the experiment was repeated 99 years later.

In 1986, a scientist named E. W. Silvertooth duplicated the Michelson-Morley experiment in a study sponsored by the U.S.

Air Force. Under the unassuming title "Special Relativity," *Nature* published the results. Using equipment that was much more sensitive than what Michelson and Morley had in their day, Silvertooth *did detect movement* in the field. And the movement was precisely linked to the motion of Earth through space, just as Michelson and Morley had predicted a century before.[17] I'm sharing this experiment here to illustrate how a deep truth accepted at one time can later change.

> *Deep truths* are statements of which
> the opposite also contains a deep truth.

It's the profound and mysterious relationship between the deep truths of our past (false assumptions that we've long accepted as truths) and those emerging from new discoveries (which now reveal those earlier "truths" to be false) that is dividing us at all levels of society today. These divisions show up in everything from terrorism and wars between nations to the conflicting beliefs that tear us apart as families. Left unchecked, they pose a clear and present danger to our world.

At a later time, Bohr restated the paradox of deep truths in simpler terms, saying, "It is the hallmark of any deep truth that its negation is also a deep truth."[18] In the example above, it's what Bohr called the "negation" of the old scientific assumption (meaning the discovery that it no longer makes sense in the presence of new evidence) that makes the *opposite* a deep truth. And this is where the news of a recent discovery becomes a proverbial double-edged sword.

The good news is that the new information gives us an updated and presumably more correct way of thinking about things. The downside is that entire paradigms have already been built upon the false assumptions. Everything from the curricula approved by school boards and taught in our classrooms; to the careers of

teachers, authors, and academics whose lives have been devoted to teaching the paradigm—along with political decisions and the policies that have been made into law in the highest courts of the land—is based upon what is accepted as "true" in our culture. We may well discover that our beliefs about global warming, for example, fall precisely into this category of deep truth.

The prospect of realigning so many legal, political, and academic systems already in place to reflect a deep truth is, for some, overwhelming. On the other hand, how can we hope to confront the great crises facing us *without* doing so? Clearly, the greatest threats to our lives and our world lie in the beliefs that we fight and die for, as these beliefs are based on assumptions about the past. For this very reason, the key to our survival lies in uncovering the deep truths of our very nature.

The Pyramid of Knowledge

We live in a world where everything has meaning, and is meaningful to everything else. What happens in the oceans has meaning for the climate of the mountains. What happens in a river has meaning for the life that depends upon the river. The choices that you and I make as we express our beliefs in our living rooms and around family dinner tables have meaning for the people in our immediate lives, as well as for those living halfway around the world. In the world of nature, there are no boundaries separating one part of life from another. It's for precisely this reason that it's always been a mystery to me why we *create* boundaries when we study the universe and nature.

We tend to think of geology, for example, as somehow distinct from physics, and imagine that biology is somehow detached from everyday life. While this separation may make it easier to study rocks and living things for a few years in a university, at some point we must begin to think of them as part of our everyday reality in order for them to become useful in our lives. And this is where scientific study of our world is emerging into an

entirely new paradigm based upon the way in which one kind of knowledge is related to other kinds of knowledge.

There's a hierarchy in terms of the scientific disciplines. Sometimes it helps to illustrate this relationship visually as an upside-down pyramid. The smallest part of the pyramid, the capstone on the bottom, represents the key to everything that is stacked above it. In the world of science, that capstone is mathematics. It's for this reason that the words of one of the first scientists, Galileo Galilei, continue to ring as true today as they did when he wrote them 500 years ago. He said that the universe is like a "grand book, which stands continually open to our gaze, but cannot be understood unless one first learns to comprehend the language and interpret the characters in which it is written. It is written in the language of mathematics."[19]

Clearly, our mathematical knowledge is the tool that allows us to describe what happens in each successive field of knowledge as we move up the pyramid, shown in Figure 2.2 below.

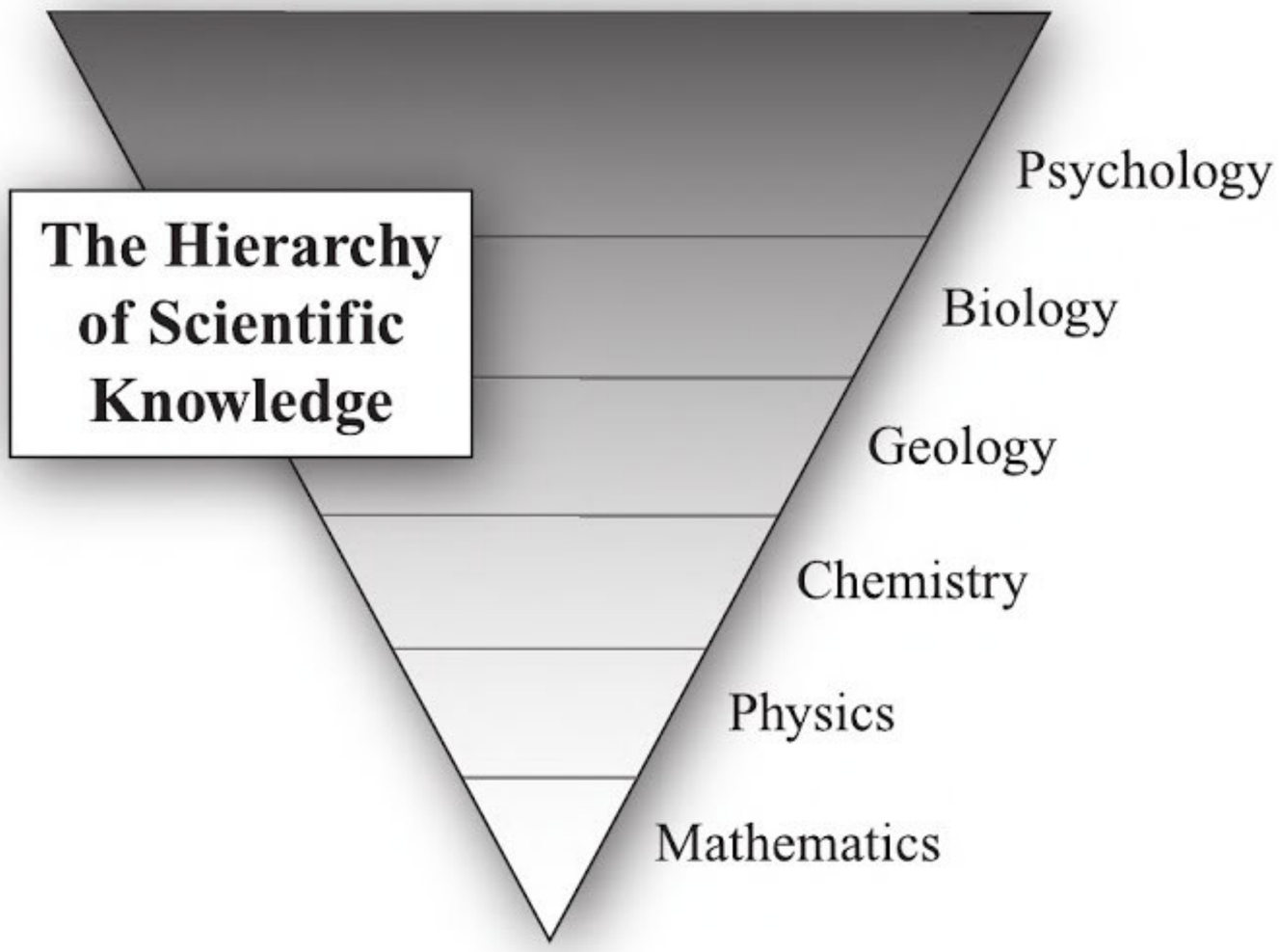


Figure 2.2. The relationship between the sciences expressed as a pyramid of knowledge to show their hierarchy. Mathematics is the foundation that each of the subsequent sciences is based upon. With this relationship in mind, it's easy to see how a change in scientific understanding at any level of the pyramid must be taken into consideration by each science above it in order to remain truly scientific.

After mathematics, physics forms the next layer of knowledge on the pyramid, as the ideas of mathematics are applied to the forces of nature, what we call the "laws" of the universe. These things—such as gravity, the speed of light, and so on—are then applied to the study of chemistry, the next layer in our model. Through chemistry, the forces of the universe act upon the elements of nature to create the foundation of our world, which we study as geology. Directly or indirectly, the expression of each underlying field of knowledge comes to bear upon the way in which life is expressed in our world. Biology is the study of that life; and directly above it is psychology, the science that helps us understand why life behaves as it does.

From this simple chart, two things become obvious: (1) each field plays a vital role in nature and is directly related to all of the fields below it; and (2) when new discoveries change the way we think of ourselves at any point in the hierarchy, everything above it must reflect the new thinking. For example, when the quantum principles of interconnection (nonlocality) emerged in physics, every scientific discipline above physics on the chart should have changed to reflect that understanding. And while chemistry has begun to adapt the ideas and offer them in the classroom, biology still teaches that biofields, such as the magnetic field of the heart, are localized and have little, if any, effect on the world beyond the body itself.

In the compartmentalized way we've chosen to study our world, science is enmeshed in a continual struggle to catch up with itself. And, if the past is any gauge, the higher the scientific discipline is on the chart, the longer it will take for the new discoveries to be reflected in that field. The key to reaping the benefits of science is all about *us* and the wisdom with which we apply what we discover.

Maybe evolutionary biologist E. O. Wilson said it best when he noted: "We are drowning in information, while starving for wisdom. The world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it, and make important choices wisely."[20] From

the invention of the wheel (which could be used for transportation or torture) to the invention of weapons (which could provide food for entire communities or kill other people in war), the tension between knowledge and wisdom appears to be a species-wide struggle that has been with us for a very long time.

Later on, we'll take a look at the reasons why we've struggled and why our struggle may be near its end. For now, I'd like to say that science's value may be calculated less by its failure and more by how we use it, what we expect from it, and our relationship to knowledge and wisdom.

Beyond Knowledge and Wisdom: Common Sense

By any measure, the 20th century was a wild ride for the people of Earth. Between 1900 and 2000, we went from a world of about 1.6 billion to over 6 billion people, survived two world wars, squeaked through 44 years of the Cold War and 70,000 ready-to-go-at-the-touch-of-a-button nuclear missiles, unlocked the DNA code of life, walked on the moon, and ultimately made the computers that took the first humans into space look like children's toys. It was 100 years of the most accelerated population growth, and the greatest threat of our extinction, in 5,000 years of recorded history. Many historians look upon the 20th century as the age of knowledge, and it's easy to see why.

Along with the scientific discoveries about nature and life, we also made great discoveries about our past. Written records addressing concepts at the foundation of three major world religions were discovered midway through the century. New interpretations were made of even older artifacts from places like Egypt, Sumer, and Mexico's Yucatán Peninsula. Clearly the last century was one of recovering the knowledge of our past. And while we will undoubtedly continue to make new discoveries that shed additional light on our history, it's also clear that in this new century, we find ourselves once again living in a very different world than our parents and grandparents did.

The 21st century will be seen as the century of wisdom, as a time when we are forced to apply what we've learned in order to survive the world we've created. To do so, we will have to approach our problems very differently than we have in the past. We will be challenged to draw upon all that we know and use it in new, creative, and innovative ways. But to do so will require another kind of information that is seldom talked about in the science books of theories, proofs, and facts.

We will have to temper the facts of scientific knowledge—the data of the data sheets and the results of computer-generated models, graphs, and predictions—with the very ability that sets us apart from other forms of life. We will have to use what generations past simply called "common sense." The term *common sense,* however, may not be as ordinary as we make it sound.

Rather, it's the kind of thinking that comes from a systematic and organized process, one where we consider knowledge from many sources of information, mix it all together, and weigh it carefully before making our choices. And when we seem to be on the fence about the final decision, it's then that we add the intangible factor of common sense, often based on what we call "gut feeling" or "instinct."

It's a good thing that we do, because there are times in the recent past when it's precisely that undefined quality of human decision making that may have saved the world from disaster! An event during the height of the Cold War is a beautiful example of the power of common sense.

On September 26, 1983, Stanislav Petrov, a high-ranking Soviet military man, was in command of an early-warning system designed to detect any signs of an American attack. Tensions were already at an all-time high following the Soviet interception and shooting down of a civilian jumbo jet and the loss of all 269 people on board, including U.S. Congressman Lawrence McDonald, earlier that month.

At 30 minutes after midnight, the moment Petrov and his command team hoped would never happen did, in fact, occur. Warning lights flashed, sirens sounded, and the computer screens

in their room at the top of the Soviet Ballistic Missile Early Warning System (BMEWS) showed five nuclear missiles coming from the U.S. headed directly for the Soviet Union. In a matter of moments, Petrov had to make the choice he dreaded—to return the fire, or not—knowing that, in that moment, the potential beginning of World War III and the fate of humanity was in his hands.

He and the men under his command were military professionals. They had trained for precisely such a moment. His instructions were clear. In the event of attack, he was to push the START button at his console to launch a counterattack against the U.S. Once he did so, he knew that he would set into motion a fail-proof system designed for all-out war. Once the button was pushed, the sequence could not be stopped. It was designed so that it operated from that point forward without the help of humans. "The main computer wouldn't ask me [what to do]," Petrov later explained. "It was specially constructed in such a way that [once the button was pushed] no one could affect the system's operations."[21]

To Petrov, his operators, and the equipment, the emergency looked real. All of the data checked out. The system seemed to be working, and as far as the radar detectors were concerned, Russia was under the nuclear attack that would begin a third world war.

But Petrov had second thoughts. Something didn't seem right to him. With only five missiles detected, it wasn't an "all-out" attack from the U.S., and that was the part that didn't make sense. It just didn't seem like any scenario considered by military intelligence.

Petrov had to act immediately, but before he did, he had to be clear about what was happening. Did he actually *feel* that the Soviet Union was under a nuclear attack from the U.S., or was it something else? In less than one minute he made his decision.

Petrov reported the alarm to his superiors and the other command posts, but he declared it as a "false" reading. And then he waited. If he was wrong, the incoming missiles would strike their Russian targets within 15 minutes. After what must have been a very long quarter of an hour, he—and no doubt countless others in command posts throughout the former Soviet Union—breathed

a sigh of relief. Nothing had happened: the complex network of satellites and computers *had* issued a false warning.

A later investigation confirmed that the readings were due to a "glitch" in the radar.

The reason why I'm sharing the story is because of what it illustrates. Even when all of the sophisticated technology told Petrov that Russia was under attack; even though it was the height of the Cold War tensions of 1983; and even with all of his conditioning as a military man trained to follow orders, protocols, and procedures, Stanislav Petrov tempered all he knew with the intangible experience of common sense and a gut feeling—an experience that can't be taught in a classroom or taken in pill form. In this case, one man's common sense is the reason World War III did not begin in September 1983. Twenty-one years later, in 2004, Petrov was recognized as the "man who saved the world" and honored for his courage to trust his instincts by the Association of World Citizens.[22]

While hopefully none of us will ever be asked to make the kind of choice that Petrov did in 1983, I have no doubt that common sense will play a key role in assessing the knowledge that science puts at our fingertips. It will be our skillful use of that knowledge, tempered with a generous portion of common sense, that will help us bridge the gap between science and its application . . . the age of knowledge and the age of wisdom. And it doesn't have to happen in a big global way.

I have a dear friend who has been involved in more traffic accidents in the last 10 years of his life than I have in my 40-plus years of driving. Fortunately, he's survived each one with relatively mild injuries.

When I ask him about his experiences, a common theme runs through each detailed account. In every instance, he is in "the right." He always has the green light. It's always his turn to *go* at the four-way stop. And he is always allowed to park where he is parked because there is no sign telling him not to.

So while he might not have legally been at fault in each instance, the conditions may not have been the best for him to make

the choices he made. In other words, just because the light is *green* doesn't mean that it's okay to drive through an intersection. Just because there's no sign saying that the curb next to a loading dock is a vulnerable place to park doesn't mean that the trucks unloading there don't miss the mark sometimes and run over the curb. In each instance, his common sense could have told my friend to use caution. He insists that he's right, and he is. But right doesn't mean safe.

While this may sound like a silly example, it illustrates how rules are meant as guidelines only, and not as absolute guarantees of safety.

In a similar vein, when the rules of science make no sense within the context of new discoveries, it's probably because we don't have all of the information. But just because we don't have it yet doesn't mean that we are meant to keep following the old way merely because "that's the way it's always been done."

It makes no sense to follow scientific dogma to our detriment. Yet this is precisely what we do each time we teach a room of students ideas that we now know are not true. As we'll discover in subsequent chapters, it is becoming more and more critical to wed wisdom, knowledge, and the scientific method with common sense as we struggle to answer questions about life, war, and survival.

If a line of thinking has led to a dead end, then we must decide whether we return to the drawing board and start again or continue down a dead-end path. Genetics experienced a huge dead end with the completion of the Human Genome Project at the turn of the millennium. We may very well witness an example of this in the search for the "God particle" in physics.

If we're honest with ourselves, I believe we're looking for answers to help us understand the world and meet the challenges of everyday life. And for us to do so, it's clear that knowledge is not enough. As we enter the age of wisdom, we will need to draw upon everything at our disposal to navigate the uncharted territory of the deep truths that emerge. I cannot help but believe that the undefined quality of common sense will play a crucial role in our journey.

How Do We Know What's True?

Many of the ideas addressed in this book are "hot" topics in our world today: issues that have triggered some of the most passionate and, occasionally, violent debates of modern times. In order to move beyond the emotional arguments of the past—from the court and media battles over the theory of evolution, creationism, and what's printed in our children's textbooks; to the way we help other nations in times of crisis—we need a consistent way of evaluating our new discoveries. What does each one really tell us? How do we know where speculation ends and evidence begins? What's the difference between a fact and a theory? How much evidence does it take to replace an existing theory with a new one?

To answer these questions and make sure we're talking apples and apples with each topic, not apples and oranges, I'll begin by clarifying the words that are often used in connection with such hot topics to justify various assumptions—words such as *science, fact, theory,* and *proof.*

Because so many of the ideas we'll explore are based in scientific discoveries, I'll define the words from a scientific perspective. So a *scientific theory,* for example, may have a different definition than a "theory" in everyday life. With a clear understanding of what each term means, and how we're using it, we can build a reliable way to help make sense of hot topics—a kind of mental "truth template" that gives us a consistent way to evaluate what we find. So let's begin. . . .

What Is a Scientific Fact?

Definition: A *fact* is "something having real, demonstrable existence."[23]

Example: If we're in the Los Angeles International Airport (LAX) at 4 P.M. Pacific Standard Time on a Thursday, and a business partner speaking on the phone asks us where we are in that

moment, then it's a fact that we're in a precise city, at a precise airport, at a precise time, on a precise day. If our friend calls the ticket counter at LAX and the agent confirms that we are, in fact, standing in line at the counter, then the fact has been verified; and it was done by an objective witness who does not benefit one way or the other if we're actually there or not. The fact tells us what "is," but it may not explain how things came to be as they are. In other words, the fact does not describe when or how we actually got to the airport, although we make an assumption, as scientists often do, based on the fact.

What Is a Theory?

Definition: In the everyday world, we often think of a *theory* as little more than an idea that is unproven, or a guess. In the world of science, however, a theory means something that may surprise a non-science-based person. It is something that's been verified and accepted to be true. The definition of a *theory* is an "assumption based on limited information or knowledge."[24]

Example: A theory is formed on the basis of facts that are known at the time. For the previous example, because we are at the airport—something that is an observed fact—it's reasonable for our business partner to assume that we used local transportation to get there. And that assumption is our partner's *theory* of how we got to the airport. It can remain a theory, and even be a good one, as long as there's no evidence to prove it wrong. When it comes to a theory, there's no limit as to when, and how much, new evidence can show up. This is the key to understanding a theory. It can be modified and changed again and again to take new evidence into account as it comes to light. To make things even more interesting, a theory does not have to be a fact.

What Is Proof?

Definition: Proof is the "evidence or argument that compels the mind to accept an assertion as true."[25]

Example: The fact that the agent at the ticket counter confirmed that we're at LAX is the evidence—the proof—that leads our colleague on the phone to believe that we're actually at LAX.

What Forms Scientific Proof?

Definition: Based upon the previous definitions, *scientific proof* is the proof that comes from facts as a result of scientific methods of discovery.

Example: When we talk about evolution or the history of civilization in terms of fact, theory, and proof, keeping in mind what these terms mean will help us determine credibility. The new discoveries regarding the false assumptions of modern science present us with beautiful examples of Bohr's *deep truths*.

From the belief that everything is separate from everything else, to the notion that emotion has no effect upon the world beyond the person experiencing it, for the last 100 years or so science appears to have been in a holding pattern when it comes to understanding the nature of reality and our role in it. Now that we face what the experts view as the greatest number and magnitude of crises ever to threaten human existence, it is more important than ever that we move beyond the false assumptions of science that have derailed our ability to deal effectively with everything from war and terrorism to climate change.

If science is, in fact, "stuck," then the way to get *un*stuck is to honor the process of inquiry and openly acknowledge when discoveries change the way we see the world.

Now Is the Time

Clearly we don't know all that there is to know about how the universe works and our role in it. As in the analogy of crossing the highway with a big truck fast approaching (discussed in the Introduction), while future studies will undoubtedly reveal greater insights, it's sometimes best to make choices based upon what we know in the moment—so that we can live to refine our choices.

A powerful voice in the scientific community, Sir Martin Rees, professor of astrophysics at the University of Cambridge, suggests that we have only a "50/50 chance of surviving the 21st century without a major setback."[26] While we've always had natural disasters to contend with, a new class of threats that Rees calls "human induced" now has to be taken into account as well. Emerging studies, such as those reported in a special edition of *Scientific American,* "Crossroads for Planet Earth" (September 2005), echo Rees's warning, telling us, "The next 50 years will be decisive in determining whether the human race—now entering a unique period in its history—can ensure the best possible future for itself."[27] The good news echoed by the experts almost universally, however, is that "if decision makers can get the framework right, the future of humanity will be secured by thousands of mundane decisions."[28] It's in the details of everyday life that "the most profound advances are made."[29]

Without a doubt, there are countless decisions that each of us will be asked to make in the near future. I can't help thinking, however, that one of the most profound, and perhaps the simplest, will be to embrace what the new science has shown us about who we are and our role in the world.

If we can accept, rather than deny, the powerful evidence that the individual sciences are showing us, then everything changes. With that change we can begin anew. This makes us part of, rather than separate from, all that we see and experience. And that's why the new discoveries, such as those in physics and biology, are so powerful. They write us—all of humankind—right back into the equation of life and the universe. They also write us into the role

of solving the great crises of our day, rather than leaving them to a future generation or simply to fate. What problem can we—as architects of our reality, with the power to rearrange the atoms of matter itself—fail to solve? What solution could possibly be beyond our reach?

While for some people the possibilities hinted at by new discoveries are a refreshing way to view the world, for others they shake the foundation of long-standing tradition. It's not unusual to see leading-edge scientists themselves reluctant to acknowledge the implications of their own research when it reveals that we are, in fact, powerful creators in the universe. It's sometimes easier to rest on the false assumptions of outdated science than to embrace information that changes everything we understand. When we take the easier course, however, we live in the illusion of a lie. We lie to ourselves about who we are and the possibilities that await us. We lie to those who trust and rely upon us to teach them the latest and greatest truths about our world.

When I share this irony with live audiences, often the response echoes the wisdom of science-fiction author Tad Williams, who wrote: "We tell lies when we are afraid . . . afraid of what we don't know, afraid of what others will think, afraid of what will be found out about us. But every time we tell a lie, the thing that we fear grows stronger."[30]

When the discoveries of today tell us that the teachings of the past are no longer true, we must make a choice. Do we continue teaching the false principles and suffering the consequences of wrong assumptions? If we do, then we must answer an even deeper question: *What are we afraid of?* What is it about knowing the truth of who we are, how we arrived here, and how long we've been on Earth that is so threatening to our way of life?

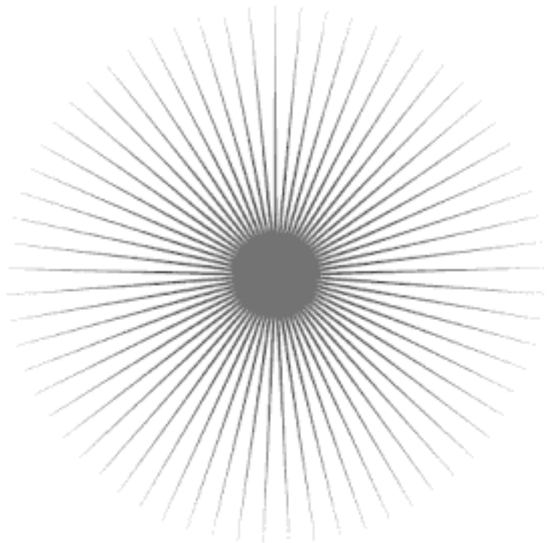
Figuring this out may become the greatest challenge of our time in history. *Can we face the truth that we have asked ourselves to discover?* Do we have the courage to accept who we are in the universe, and the role that our existence implies? If the answer to these questions is yes, then we must also accept the responsibility

that comes with knowing we can change the world by changing ourselves.

We've already seen that widely held beliefs leading to hate, separation, and fear can destroy our bodies and our world faster than we could have ever imagined. Maybe all we need is a little shift in the way we think of ourselves to recognize the great truth that we are, in fact, the architects of our experience. If the experts are right, nothing short of the survival of civilization and humankind hinges upon the choices that we make in the next few years. And to make them, we must think of ourselves and our relationship to one another, as well as to the world at large, differently than we ever have before.

Our willingness to accept the deep truths of life is the key to whether or not our children will survive our choices and have the opportunity to explore the *next* deep truths in their adulthood.

Deep Truth 2: The reluctance of mainstream educational systems to reflect new discoveries and explore new theories keeps us stuck in obsolete beliefs that fail to address the greatest crises of human history.



CHAPTER THREE

Living on the Edge: Surviving the Tipping Points of Change

"Every great and deep difficulty bears in itself its own solution.
It forces us to change our thinking in order to find it."

— **Niels Bohr** (1885–1962), Nobel Prize–winning physicist

We're dangerously close to losing all that we cherish as individuals and as a civilization. Across the board, scientists are telling us in clear and direct terms that we are perilously near the point of no return when it comes to the destruction of the natural systems that sustain our lives. At the same time, the world is reeling from the growing impact of climate change that has happened faster than anyone dreamed it would. There's been a tendency to lump all of these crises together and deal with them in the same way and from the same perspective.