
LIOLOGY: TOWARDS AN INTEGRATION OF SCIENCE AND MEANING

Introduction.

Imagine a satellite being launched into orbit, but its controls aren't working too well. If the trajectory gets too steep, the satellite will break through earth's gravity field and soar into outer space, leaving earth behind forever. On the other hand, if the calculations were wrong, the resistance of the atmosphere might become too great, and the satellite would come crashing down to earth in a fiery ball. Only if everything is managed with great care will the satellite achieve its stable orbit, locking into synchrony with the earth.

I see our human trajectory like that satellite. Our ever accelerating rate of technological innovation has allowed the human race to accomplish things that couldn't have been dreamed of even a hundred years ago. And the daily advances in areas like microchip technology and genetic engineering offer promises of ever more fantastic achievements. At the exponentially increasing pace of this technological change, it won't be too long before artificial intelligence transcends human intelligence and human DNA can be safely enhanced to produce an improved species. That's the analogy of the satellite breaking through earth's gravity field to leave its home planet behind forever.

But there's no guarantee that this is what the future holds for our species. Our technological progress has been based on exploiting our world's natural resources at an ever-increasing pace, to the point that the current rate of material progress appears unsustainable on many fronts. In addition to the threat of climate change, there is a rapidly accumulating list of equally daunting issues such as capacity limits in crucial resources like oil and water, deforestation, desertification, oceans emptying of fish and a massive extinction of species. If the convergence of these multiple threats becomes too much to handle, our global civilization might face a total collapse. This is the analogy of the satellite hitting too much resistance and crashing down in a fiery ball.

To me, and most likely to you too, neither of those scenarios is attractive. But is it possible for the human race to manage the trajectory it's on closely enough to reach a stable orbit? What would it take for us to achieve that? That's a question this book attempts to answer. But the approach taken in this book has very little to do directly with global economics or environmental politics. There are plenty of other books currently being published offering plans for social and political transformations that could help to put us on a more sustainable course. The fundamental problem, however, is that as long as each of us continues to live according to the values infused in us through our culture, it's not realistic to expect any real change in the human trajectory.

This book is based on the premise that there are some fundamental, structural elements to our modes of thought that drive our global culture on its accelerating and unsustainable path. Understanding those foundational structures requires looking deeply into the historical and psychological sources of how we currently think. It may not be a simple journey, but it's only when these foundations are clearly understood that we can explore possibilities to rebuild our patterns of thought in ways that might permit us to enjoy a sustainable future on our planet.

This book takes us on a journey into the depths of our modern consciousness and identifies some faults in the foundations. At the same time, it offers an alternative foundation of thought, based on a fusion of scientific insight and traditional wisdom, that could provide us with a sturdier basis for the next phase in our human project.

In order to accomplish this exploration, the book is divided into three parts. The first part attempts to understand what happened historically to our collective consciousness that put us on our current trajectory. It offers what I call a "cognitive history," an investigation into the major historical factors that structure our modern consciousness, from the earliest days of the human race to the present day. The second part examines the biological source of our consciousness and explores the new view of life as a dynamic, self-organized system proposed by leading thinkers in biology and complexity science. The final part of the book integrates learnings from the first two parts, offering a way of thinking about ourselves and our relationship with the natural world that synthesizes major themes from both Chinese and Western thought traditions, proposing a worldview that could bridge the chasm that currently exists between science and spirituality and could potentially offer a path for sustainable living on our earth.

What follows is a more detailed description of each of these three parts.

Part I: An archaeology of the mind

The first part of this book conducts what may be thought of as an "archaeology of the mind." It attempts to uncover the layers of cognitive structures that comprise our modern consciousness and investigate how they were originally formed. In order to do that, we have to go back to the very origins of our species and determine what it was that made *homo sapiens* unique in the history of our planet. From that foundation, we take a look at the worldview of our hunter-gatherer ancestors who have accounted for the vast bulk of human history. Then, layer by layer, we'll trace how the phenomenon of agriculture transformed the world, and how this in turn paved the way for the great early civilizations that spanned the continents.

At that point, though, our archaeology dig stumbles on a strange bifurcation in its cognitive search. We'll take a close look at how, roughly twenty five hundred years ago, a unique confluence of cultures in the Eastern Mediterranean led to the emergence of an unprecedented dualistic cosmology, a complete separation of the eternal and sacred from the material and profane, which has formed the basis of our modern worldview. At the same time, we'll see how in China, separated by the Himalayas from their contemporaries in the West, a sophisticated and fundamentally different cosmology emerged from earlier shamanistic and agricultural traditions. We'll begin to explore the significance of these contrasting worldviews, and see how they led to a divergence in the way people understood themselves and their relation to the natural world.

Back in the West, we'll trace how the Christian view of the universe permitted the astonishing transformation of thought that led to the Scientific Revolution, the gateway to our modern world. We'll see how fundamental concepts that we take for granted nowadays, such as Reason, Truth, Measurement, Time and Progress, evolved over the past two millennia into their modern forms.

The tyranny of the prefrontal cortex

As we conduct our archaeology of the mind, we'll be viewing our findings through a lens that's been provided by recent developments in neuroscience. A major thesis of this book is that a crucial part of the human brain – the prefrontal cortex – has played a central role in the human story. The prefrontal cortex (hereinafter referred to as the "pfc") is that part of the brain responsible for mediating those cognitive abilities we view as uniquely human, such as symbolic thought, abstraction, planning, rule-making and imposing meaning on things. It's a part of the brain that's far more developed in humans than in other mammals.

Neuroscientists have already established for some time now that the pfc is a central component of human uniqueness. But this book's thesis goes beyond that. It argues that the unique evolutionary

expansion of the pfc in the human brain, combined with the dynamics of culture (itself a product of pfc activity) has created a positive feedback loop leading to an imbalance within the human psyche, both collectively and individually. Within each culture, a cognitive network of symbols constructed over countless generations imposes itself on the mind of each child growing up, structuring the pathways of that child's cognitive perception. This structuring gives each individual's pfc a greater role in shaping a person's consciousness than it would otherwise have.

This has been true for all the different cultures that have evolved throughout the world over the millennia. But this book proposes that, along with the rise of a dualistic worldview, something unique happened to the relative power of the pfc within human consciousness in the Western world. For the first time in human thought, the pfc's function for abstraction became a core value in itself. Reason was separated from emotion. Abstraction became conjoined with the notion of an eternal and omniscient monotheistic God. The human soul became defined on the basis of the abstracting function of the pfc, and viewed as eternal and holy, the link between human and God. Conversely, that part of the human experience that we share with other animals and is less dependent on the pfc – our instincts and our physical sensations – became viewed as inferior. Paralleling this dualistic, split view of the human being, mankind's relationship with nature experienced a similar divergence: for the first time in human history, nature was seen as something separate from mankind, something that lacked an eternal soul.

While the pfc's capability for abstraction was forming an eternal God in its own image in the Western world, a very different cosmology was developing in East Asia. Over the course of a millennium, two indigenous Chinese thought traditions – Taoism and Confucianism – became infused with Buddhist ideas imported from India, leading to the flowering of a philosophy known as Neo-Confucianism. Around the time that William the Conqueror was invading England, the Song dynasty of China was conceiving an integrated view of the relationship between the spiritual and material worlds that placed the pfc-mediated functions in harmony with the other aspects of human experience, in direct contrast to the dualism developing in the West. Specifically, the Neo-Confucianists thought of the universe in terms of dynamic patterns, or *li*, which organized how matter and energy, or *ch'i*, were manifested. They saw the living world as one gigantic, interconnected organism, and in fact their cosmology has been referred to as an "organismic" worldview.

In recent centuries, however, traditional Chinese thought – along with other indigenous cosmologies around the world – has been overwhelmed by the modern, scientific worldview which hitched a ride along with the global military and industrial conquests of the Western powers. And the first section of this book goes on to examine the cognitive roots of the scientific revolution that has so transformed our world.

In the traditional narrative of European history, the rise of the scientific worldview is generally seen as being in opposition to Christian theology. The current ongoing raucous debate between the two sides may be presented as evidence enough for this. But viewed from the lens of the pfc's influence over human consciousness, the scientific revolution appears as yet another stage in the pfc's rise to power. In fact, "power over nature" (including our own human nature) may be identified as the hallmark of the scientific revolution, a theme introduced by Francis Bacon in the 17th century that has since become a foundation of modern thought. And the systematic application of reason has now become generally viewed as the only way to arrive at an objective truth.

I've called this cognitive imbalance the "tyranny of the pfc" over the rest of our consciousness. The choice of this term is designed to communicate the notion that it's both an unnatural and unstable dynamic. In fact, this tyranny of the pfc has been responsible for creating the current unsustainable trajectory for the human race. Whether it continues to successfully harness technology to take us into a future of genetically engineered super-humans and artificial super-intelligence, or whether it ransacks the desacralized natural world into ruin, either way life as we know it will be headed for extinction. Either our humanity or our civilization is at risk.

Part II: An exploration of the pfc, consciousness and life

The term "tyranny of the pfc" is used in the first section to describe how our modern set of values overemphasizes certain characteristics of our thought processes that are mediated by the pfc, to the profound detriment of both our own experience of ourselves as well as our relationship to the natural world. The second section explores the fundamental question: since the pfc is a central part of our human uniqueness, is the "tyranny of the pfc" an inevitable outcome of humanity's cultural evolution? Or is there in fact another basis for us to understand ourselves and to experience our relationship with the world around us?

The section begins by using recent insights from neuroscience research to examine the ways in which the pfc makes us uniquely human, and then starts digging down into the very roots of consciousness and life. It distinguishes between the kind of pfc-mediated consciousness experienced only by humans, *conceptual consciousness*, and the kind that we share with other animals: *animate consciousness*. But where does animate consciousness come from? As we uncover the remarkable complexities of other life forms and the astonishing workings of individual cells, we begin to see how even individual bacteria make choices. This exploration leads us to a form of intelligence existing at a cellular level, which has been described as "the intelligence that lurks in nonhuman nature," and which I refer to as *animate intentionality*. Understanding animate intentionality takes us on a path that opens up a different perspective on human consciousness and indeed, on life itself.

The li: dynamic principles of self-organization

How do creatures without a brain – plants, fungi, bacteria – figure out what to do? How do creatures with tiny brains – ants, bees, termites – act so smart as a group? Biologists have achieved major insights into these puzzles in recent years by analyzing what is known as self-organization: the principles by which highly complex living systems can achieve sustained levels of intelligence, order and flexibility. This has led some biologists and philosophers to the fundamental notion of life itself as a self-organized system, which becomes a cornerstone for the new way of looking at ourselves and our world proposed in this book. In this view, the dynamic organization of a system, the ways in which each of its parts interrelate, are more significant than the physical matter of which the system is comprised.

Think of a photograph taken of yourself when you were a child. Most of the cells that were in that child no longer exist in your body. Even the cells that do remain, such as brain and muscle cells, have reconfigured their own internal contents, so that probably none of the molecules forming that child in the photograph are part of you now. So what is it that still connects you to that child? It's the principles of self-organization in your body, the ever-dynamic but remarkably stable interrelationships existing within and between the cellular components of your body and your brain.

But these interrelationships don't just stop at the boundary of your body. In fact, these principles of dynamic self-organization apply to all living systems, from the tiniest cell to the largest ecosystem. From this perspective, all living organisms can be seen as both comprising smaller self-organized systems, and at the same time being a part of one or more larger self-organized systems. In this view, no living system is self-sufficient, but is interdependent within what is known as *the holarchy*, a conceptual model of systems acting within systems. The largest system of all in the holarchy would be the biosystem of the Earth, which is sometimes referred to as Gaia, named after the Greek goddess of the Earth.

If this description of life reminds you a little of the Neo-Confucian view of the world as one giant, interconnected organism, this is no coincidence. Remarkably, the principles of self-organization that modern biologists and complexity theorists have uncovered may be understood as the very same

dynamic that traditional Neo-Confucian philosophers in China described as the "li." In both cases, the emphasis is on understanding the interrelated, dynamic qualities of a living system as its most important feature, rather than merely analyzing the system's physical components. However, whereas modern scientific investigations use advanced mathematics and computer modeling to understand these principles, the Neo-Confucianists used their perspective on the li to achieve profound spiritual insights. This astonishing and informative congruence of modern scientific thinking with a sophisticated, traditional worldview that flourished a thousand years ago becomes a major theme in the final section of the book.

Part III: Towards a democracy of consciousness

In Part I, our archaeology of the mind identified some flaws in the foundations of our modern worldview. In Part II, our journey into the heart of consciousness revealed an alternative biological view of life that's commensurate with the Neo-Confucian "li" from a thousand years ago. The third section pulls together learnings from the past and the present into one integrated worldview, proposing an approach that bridges science and spirituality to lead us away from the tyranny of the pfc and towards a democracy of consciousness.

In our modern world, the tyranny of the pfc described in Part I has led us to a chasm that separates science and spirituality. But other, non-Western traditional worldviews never experienced that split. How did they deal with those attributes of the pfc that make us uniquely human?

The classic Taoist text, the *Tao Te Ching*, begins with the words, "The Tao that can be spoken of is not the everlasting Tao," and many of its following pages reinforce this theme. Language – that uniquely human and most powerful of all artifacts created by our pfc – is seen as anathema to an understanding of the Tao. Similarly, when we turn to Buddhist thought, we find a systematic attempt to undo the constraints of the pfc's conceptualizations. The Buddhist emphasis on living in the present moment can be seen as a way to bypass the constructions of past and future that are the hallmark of pfc-mediated activity. Interestingly, these traditions shared an emphasis on cultivating the mind through the practice of meditation, to integrate mind and body and to quiet the incessant chatter of our pfc-based inner narratives.

Of course, in the West, there have been those who fought against the tyranny of the pfc, but they didn't have a systematic foundation of thought like Taoism or Buddhism to turn to in their struggle. I call these people – such as Wordsworth, Blake or Van Gogh – "pfc rebels" and as such they have tended to surface in the arts, a social safety valve that has allowed Western mainstream thought to keep its structure secured. And there has also been a philosophical tradition, from Aristotle to Spinoza and the 20th century phenomenologists, which has attempted to see the world from something like the Neo-Confucian perspective of the li, but it's generally been hidden by the glare of mainstream Western dualist thought, and as such I call it the "moonlight tradition."

In our modern Western world, even without the practices of Taoism and Buddhism, there are still plenty of ways that each of us, on an ad hoc basis, finds moments to escape pfc tyranny. Some people have experienced moments of pfc-liberation through taking psychedelic drugs. The vast majority of us have known those special moments, in sporting activities, walking in nature, looking a loved one in the eyes, or making love, when the constructs and abstractions of the pfc melt away and we're fully in touch with our animate consciousness. Perhaps the most common form of ongoing "pfc disobedience" is music, that pervasive and primal vehicle of communication that we humans most likely used for millions of years before language evolved.

Liology

Yet all these ad hoc moments of freedom from pfc tyranny are not enough. Individually, our lives are controlled by values that are not entirely our own; and globally, we're all doing our part to drive that human trajectory on its unsustainable crash course with the Earth. We need a more systematic framework on a stable foundation to move towards a democracy of consciousness. The one that I propose is called *liology*. The very word liology is designed to demonstrate that it is a fusion of Western and Eastern worldviews: the Neo-Confucian notion of the li merging with the Western scientific tradition (the "ology" part which is Greek for "study"). Liology means a study of the organizing principles that link all living entities, a project (in Heraclitus' words) "to know the principles by which all things are steered through all things." But it's not just a "study" in the conventional Western scientific meaning of pfc-based analysis. It's also an investigation of ourselves and the natural world using both our animate and conceptual consciousness. And the "li" that is studied is both a scientific and spiritual term. In liology, there's no fundamental distinction between the two. Liology is proposed, not as a substitute for conventional Western science, but as a complement to it. Realizing the intrinsic connectedness of all things, liology would tend to lead to solutions that emphasize participation with, rather than control over, natural processes.

What liology means for us as individuals is a framework to achieve a democracy of consciousness within ourselves, to harmonize and integrate our conceptual and animate consciousness. In a democracy of consciousness, in contrast to the tyranny of the pfc, every one of the voices within us – our feelings, our fears, our hopes and our values – has its full say, and the role of the pfc is to mediate these voices, ensuring that the actions of the individual fully reflect the true self that is comprised of all these inner voices. This has major implications for the values by which we choose to live our lives. Liology will tend to emphasize an expansive set of values linking our human identity with the natural world, extending our circle of empathy beyond other humans to the interconnected li of other living entities all around us. As a result, our relationship with the natural world would shift from one of domination and exploitation towards one of guidance, nutrition and mutual support.

Finally, liology opens the possibility for broader spiritual growth. The integration of our conceptual and animate consciousness, combined with an increasing awareness of the connectivity of our li with the li all around us, offers a path to transcend the fixed sense of self that our pfc-oriented culture locks us into from early childhood. A practice of liology can help us to experience the universe that Neo-Confucian philosopher Chang Tsai described over a thousand years ago:

Heaven is my father and Earth is my mother, and such a small creature as I find an intimate place in their midst.

What fills the universe I regard as my body; what directs the universe, I regard as my nature.

All people are my brothers and sisters, and all things are my companions.

Enjoy the ride!