

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/282863245>

# Seeing Past The Edge: A Cosmology

Research · October 2015

DOI: 10.13140/RG.2.1.3466.0567

---

CITATION

1

---

READS

692

1 author:



David Yurth

10 PUBLICATIONS 4 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Corona Discharge Plasma Gas Dissociation System [View project](#)

# **Seeing Past The Edge<sup>©</sup>**

***Sixth Edition***

**An Original Work of Non-fiction  
By: David G. Yurth  
Copyright 1997  
All Rights Reserved**

# Table of Contents

## Foreword

## Prologue 8

## Introduction 20

- Basic Principles
- The Model
- Complementarity
- Information
- Consciousness
- Language
- The Standard Model of Science
- Section One
- Section Two
- Fundamental Questions
- Sources
- Valid Sources
- The Myth of Peer Review
- A Parting Comment

## SECTION ONE

### Looking For Simple, Elegant Solutions

## Chapter One      A World of Mystery and Wonder 34

- The Problem With Language
- Finding the Edge
- Language, Mathematics and Semantics
- The Art of Seeing
- The Place of Creation
- Things We know But Do Not Understand
- Metaphysics
- Complexity
- Creating a New Context
- The Principles of Complementarity
- A Journey of Discovery

## Chapter Two      Everything Is Information 46

- Historical Overview
- The Discovery of Quarks
- The Discovery of Sub-quarks
- The Sub-quark Scandal
- The Importance of the Sub-quark
- Matter Created From Light:  $E \neq MC^2$
- Information - The Common Denominator

**Chapter Three      Experience is Only Half Experience      58**

- A Journey of Discovery
- Experience is Only Half Experience
- The Myth of Detachment
- Bell's Theorem
- The Role of Complementarity in Information Processing
- Rene` Descartes
- Newtonian Physics
- Reductionist Science
- The Role of Ambiguity in Communication

**Chapter Four      How    Nature    Works:    Self-Organizing  
Criticality in Complex Systems      69**

- Catastrophic Events
- The Sand Pile Experiment
- Complex, Self-Organizing Systems
- Self-Organizing Criticality
- Entropy
- Punctuated Equilibrium
- Power Laws
- The Role of Criticality
- The World Wide Web

**Chapter Five      The Myth of Upper Limits      83**

- Criticality At All Scales
- Bell's Inequality
- The Aspect Experiments
- The Wheeler Experiments
- C.E.R.N. Non-Locality Experiments
- Hodowanec's Gravimetric Sensor Effect

**Chapter Six      The Fractal Universe      93**

- Information Without Context
- Nature is Fractal
- The Fractal Equation  $Z \hookrightarrow Z^2 + C$
- Ian Stewart's Insight
- Fractals Are Not Just Ideas
- Holograms and Fractals

**Chapter Seven      A Holographic Universe – Implicate Non-  
Locality** **105**

- The History of Holograms
- Erroneous Notions
- Lasers
- Holograms
- Holographic Universe
- Holographic Quantum Teleportation

**Chapter Eight      Phenomena      Which      Cannot      be  
Accommodated** **116**

- Simple, Elegant Rules
- How Information is Transported
- A New Approach
- Background
- Phenomenological Anomalies
- Simultaneity - Non-local Effects at a Distance
- Creating Matter From Light
- Mass at Rest = Energy
- Unexplained Anomalies
- A Severely Crippled Physics
- Time Domain Effects
- A New Paradigm

**Chapter Nine      The Torsion Field – Information Link to  
Infinity** **130**

- Metaphysical Considerations
- The Conscious Universe
- Mind-Matter Connection
- The Problem
- Torsion Field Phenomena
- A New Approach
- Torsion Field Attributes
- Practical Applications
- Conclusions
- Institutional Resistance
- Consciousness Research

## **SECTION TWO**

### **The Stuff Descartes Left Out**

<b>Chapter One</b>	<b>Consciousness: The Fountainhead of Creation</b>	<b>147</b>
--------------------	--	------------

- All In Your Mind
- The Problem With Language
- Complementarity and Mathematical Expressions
- Superstring (M) Theory
- Goedel's Theorem
- Ambiguity
- Consciousness – A Definition
- Sir Jagadis Chandra Bose
- The Gaia Concept – The Cosmos as System
- Bohm's Implicate Order
- Mind-Matter Dynamics

<b>Chapter Two</b>	<b>Consciousness: A Matter of Complexity</b>	<b>164</b>
--------------------	--	------------

- A Strategic Approach
- Is Consciousness the Product of Complexity?
- Conceptual Limitations
- Sheldrake's Morphic Fields
- Does Matter Arise from Consciousness?
- Conclusions and Summary
- The Next Step

<b>Chapter Three</b>	<b>Architecture of the Human Condition</b>	<b>176</b>
----------------------	--	------------

- The Immune System
- Neuropeptides, Emotions and Information Processing
- Information Transport Mechanisms
- Dr. Candace Pert
- Neuropeptides and Non-locality
- Neuropeptides and the Immune System
- What is the Mind?
- Information Processing Structures of the Brain
- Experimental Evidence
- Memory

<b>Chapter Four</b>	<b>The Mind-Matter Connection</b>	<b>196</b>
---------------------	-----------------------------------	------------

- Extra-Low Frequency Phenomena
- The Demented Dr. Delgado
- Extra-Low Frequency Experiments

- MagnetoEncephaloGram (MEG)
- The Amygdala – Seat of Rage

## **Chapter Five            The Corona Discharge Effect            207**

- The Schumann Resonances
- The Mind-Matter Connection
- The Getsla Effect
- Alpha Waves and Schumann Resonances

## **Chapter Six            Transpersonal            Communication: Consciousness and Non-Local Field Effects            219**

- Non-local Field Effects
- Phantom DNA Effect
- Poponin's Methodology
- Modifying the Paradigm
- The Non-local Conundrum
- Paramahansa Yogananda
- Swami Rama and the Meninger Clinic
- Consciousness Field Effects at a Distance
- Deforming Metals

## **Chapter Seven            Consciousness: Biological Effects at a Distance            234**

- The Qi Gung Effect
- Brainwaves – Non-local Effects at a Distance
- Sheldrake's Morphic Fields
- Measurable Effects of Consciousness
- Simple, Elegant Rules
- Unsupportable Notions
- A New Set of Guidelines
- Conclusions

## **Chapter Eight            Accessing Information With Consciousness            249**

- The Story of Tom Sawyer
- The Notebooks
- Near Death Experiences
- The Sylvian Fissure

## **Chapter Nine            The Discovery of Quarks By ESP            259**

- What Nature is Made Of
- The Extra Sensory Perception of Quarks
- The Nobel Prize

- Remote Viewing
- Time-Like Character of Mind
- A Severely Crippled Physics
- Sum Zero Results
- The New Frontier

## **Chapter Ten      The Seething Sea of Infinite Potential      276**

- Seething Sea of Infinite Potential
- Super String (M) Theory
- Erroneous Assumptions
- The Lorentz Transforms
- Reformulation of Maxwell's Field Equations
- The Sea of Scalar Potential
- The Myth of Primary Field Forces
- Failures of the Standard Model
- Complementarity
- Superluminal Velocities
- The Vedas – Issues of Coherence and Harmonic Resonance
- Infinitely Infolded Order
- Conclusions

## **Chapter Eleven      The Timeless Nature of Mind      290**

- The Real Question
- Past Life Regression
- Timeless, Holographic Nature of Mind
- Endless Cycles
- Engineering Our Reality
- A New Set of Notions
- Individual Soul – The Ultimate Fractal Expression
- The Final Question

## **Appendix One      Disciplined Metaphysical Practice      303**

- East Meets West
- Meditative Practices
- The Role of Conditioning
- Who Can Do It?
- Basic Aptitude Testing
- Methodology
- Reports of the Eyring Research Institute
- A Personal Experiment
- Techniques
- A Warning
- Altered States of Consciousness
- Psi-Enhancing Technologies
- Summary



**Appendix Two      The Final Engineering      320**

- Remediating Nuclear Waste
- Electron Clusters
- Soliton Ion Accelerators
- Implications
- Alternative Energy Sources
- Energy Production Technologies
- Emerging Energy Technologies
- Endlessly Renewable Resources
- Some Troubling Questions

**Appendix Three      Healing Technologies      334**

- The Story of Antoine Priore`
- Piore's Machine
- Time Reversed Phase Conjugates of "Death Photons" are "Healing Photons"
- The Effect is Universally Applicable
- In the Mid-70's It Ended
- Some Thoughts In Conclusion

**Acknowledgements      354**

**Endnotes, Comments, Hyperlinks, Suggested Readings      357**

**Definition of Terms**

**Bibliography**

**Index**

## **PROLOGUE**

Technology by itself cannot be expected to improve the quality of our lives. Indeed, until we are willing to fundamentally alter the way we treat the planet and each other, our technologies may extinguish all life as we know it within the next 50 years. This is a bitter and sobering thought. We are running out of time.

When practiced without conscience, science is the most dangerous pursuit ever devised by mankind. The consequences we face after the scientific discoveries of the 20<sup>th</sup> century are almost too staggering to contemplate. The list is long and daunting. Most serious is the irremediable contamination of the oceans with long-lived radioactive waste. Today, ocean currents are carrying high concentrations of radioactive heavy ions from the Russian dumping grounds in Riga and Novaya Zemlya to the North Sea and the Atlantic Ocean. It is estimated that within in less than 25 years, radioactive contamination will reach the islands in the Pacific Ocean in sufficient concentrations to seriously disrupt the marine ecology beyond repair.

Closely associated with this problem is the contamination of the oceans with long-term carcinogenic industrial chemicals which are not biodegradable. We are being advised to discontinue the consumption of deep sea species, shell fish and mollusks because of the increasingly high concentrations of lead, mercury and PCB's found in their tissues. The primary link in the food chain supplied by the oceans of the world is being polluted at a rate which may already be beyond intervention and remediation. If the oceans no longer support adequate life in an uncontaminated form, human kind and many other species will also cease to exist. Take the case of the ocean reefs surrounding Bali as a primary example.

Of even greater short-term concern is the issue of polluted drinking water. It is estimated by the United Nations and the World Health Organization that within the next ten years, potable water supplies will sink to a level which seriously threatens the survival of many key, densely populated areas. This is particularly true of water supplies originating in the Russian tundra and

Siberia, the Balkans, much of North America, India, most of Central and South America, most of China and the island nation of Japan, Africa and East Asia. We cannot live without uncontaminated water. Nevertheless, industries, multinational corporations, military organizations and the industrialized nations continue to condone the relentless pollution of ground water and aquifers at an increasing rate. This is a formula for extinction if allowed to continue unabated.

Atmospheric pollution has become the subject of intensely debated global politics. Of all the nations of the planet who can do something meaningful to curb atmospheric pollution, the United States is the single nation which refuses to be bound by the restrictions of the Kyoto Accords. For three centuries, the industrial machine which controls economics and politics has managed to indiscriminately despoil the planet with impunity. Today, the destruction of the ozone layer and the aggravation of the greenhouse effect have combined to fundamentally alter life on the planet. In Australia and New Zealand it has become customary to forswear direct exposure to the sun during certain seasons because of the absence of the ozone layer in the southern latitudes.

Since the 60's, an increasingly vocal social awareness of acid rain in the industrial nations has failed to meaningfully alter atmospheric pollution. Instead of implementing the guidelines developed by the Environmental Protection Agency, to which compliance would cost tens of billions of dollars, the leaders of the United States have instead implemented a policy by which the worst polluters can buy the rights to continue to pollute from other companies whose "pollution credits" are up for sale. The profit motive and short-sighted business practices continue to drive the engines of industry and government, in spite of the fact that we have long known how to fix the problem.

Since the dust storms of the 30's, which were largely the result of terminal contamination of the soil from the unrestricted use of chemical fertilizers, herbicides and insecticides, the industrial nations of the world have continued to sell chemical substances which, when placed in the soil, destroy essential microbes, leach out the essential rare earth minerals and render critical farming belts unusable in seven to ten year cycles. Many species of plants and animals have ceased to exist because of the indiscriminate use of herbicides

and pesticides all over the planet. This practice continues relatively unabated - in spite of the fact that the use of such chemicals as malathione and DDT have been prohibited in this country, they continue to be exported in record volumes to developing countries of the Third World. In this respect, it appears that many companies and governments still value life lower than short-term profits.

This is not happening because we have no alternatives. Organic farming has become almost a cult in recent years, a bastion of resistance against the relentless imposition of harmful chemicals on the food chain by a few die-hard producers who refuse to give in to market pressures and increasingly proscriptive regulation. As a result, the USDA expends more than 75% of its annual budget developing genetically engineered foods in order to sustain crop yields which are frustrated by decreasingly viable soils. Instead of remediating the damage to the soils and evolving our agricultural practices to accommodate what we have learned, we continue to contaminate them and allow chemical companies to profit by our short sightedness.

A heavy price is being paid for our failure to come to grips with the problem. The foods we eat, most of which are products of extensive hybridization and genetic engineering, are successively lower in nutritional value than the original strains. None of the naturally occurring foodstuffs grown in the US contain the rare earth minerals which are known to be essential to good health and longevity. Those substances have long since been leached out of the soils as a result of our continued, indiscriminate use of chemical fertilizers and herbicides.

As a result, we find ourselves eating more foods which are less nourishing. We are an overweight, seriously under-nourished culture whose fast food habits and suicidal life style has produced increasing rates of heart disease, cancers of all kinds, genetic mutations and a horrifying litany of related medical challenges. It is argued that these concerns are not properly considered since average life spans seem to be increasing. But it is clear from long-term studies published by the Journal of the American Medical Association, Lancet and other similar publications that much of the increase in longevity can be directly attributed to medical intervention and not as the result of any fundamental improvement in wellbeing.

Why do we allow this madness to continue? Because we value profit and political control more than we value our lives. It is as simple as that. In the West, we have demonstrated a singular arrogance. Our collective belief that we are the owners of the land rather than its custodians has long been bolstered by the scientific conceit which suggests that we are also its masters. In the same way we have allowed ourselves to believe we can exclude spirit stuff from our scientific paradigms, we have deluded ourselves into believing we are exempt from the consequences of our misbehaviors.

This brings us to an important question. Why is our belief in the correctness of the Standard Model of physics important, and what useful purpose is served by challenging its most fundamental tenets? Because our notions about it frame our attitudes about who we are and proscribe our beliefs about what we are doing here. As long as we persist in the unwarranted, irrational and suicidal belief that the standard model is correct and sufficient, we will have no reason beyond the prospect of our own eminent extinction to change our values and do something remedial.

In the final analysis, the wellbeing of humanity and all the rest of the life forms which live on this planet is not a matter of science or technology. Neither is it a matter which can be dealt with through politics, the enactment of laws or social engineering. Rather, it is a matter of the heart. Science without a heart has shown itself to be capable of the most egregious malignancies. That is why we persist in releasing genetically engineered plants and microbes into the ecosystem before we have any cogent idea at all what effects they will exert on the biosphere.

That is why we persist in the ruthless campaign to eradicate Native American and other aboriginal, indigenous peoples by burying toxic nuclear waste on their sacred ground and disenfranchising their cultures. That is why we allow the governments of the world to create microbes and chemicals which have the potential, all by themselves, to utterly eradicate life on this planet.

That is why we insist on drilling for oil in the last remaining primitive wilderness areas instead of converting the accumulations of municipal waste and biomass into usable fuels. That is why we allow the research establishment

---

to prevent viable treatments for cancer, AIDS and a whole host of life threatening diseases from being developed, commercialized and made available to the general population at reasonable prices.

Serious questions have been raised about the likelihood that the human species will survive beyond the middle of the 21<sup>st</sup> century. Nanotechnologies, genetically engineered viruses, computers capable of real intelligence, and the relentless accumulation of radioactive pollutants are all cited as proximate causes for the demise of our species. This is a case of technology run amok. It is not a pretty picture.

Perhaps more important is the relentless trend of converting the best and most advanced technologies, developed by the best and brightest scientists, to weapons of war and mass destruction in the name of “national security.” More than 70% of all the money expended for scientific research during the past 100 years has been dedicated or converted to this least noble of all purposes.

In fact, private research is so fundamentally threatened by the rights extended under Article 35 of the National Secrecy Act, which empowers the agencies of government to arbitrarily confiscate any technology deemed to be significant to national security issues, during the past 10 years more than 3,000 technologies described in patent applications submitted to the US Patent and Trademark Office have been summarily confiscated and classified top secret by agencies of the US government.

The technologies which have been confiscated constitute all the technologies, integrations, systems and devices which are needed to clean up the planet, eliminate our addiction to petroleum-based fuels and cure the most vexing diseases. At many of the scientific conferences and symposia I have recently attended, we find ourselves asking each other why we persist, in the face of such unrelenting madness. At the end of the day, we all know the answer.

After less than 300 years pursuing the current brand of science, which has almost exclusively been devoted to investigating the “physical stuff” described by Descartes and Newton, how have we come to be in such a horrifying state of affairs? I submit to you that we are in this mess, all of us together, precisely because the science we practice is devoid of a soul. So long as we persist in the

preposterous notion that Descartes' spirit stuff can be excluded from the pursuit of knowledge, that Newton's Cosmos is a clockwork mechanism which only needs reductionist means to give up its secrets, we condemn ourselves and each other to the increasing likelihood of mutually assured destruction.

It is time to leave the Flatland of conscienceless and unconscious scientific pursuits. It is time to move on to something greater and more noble. How do we do this? Do we have to suffer the ravages of near-extinction before we wake up and move in another direction? In this book, I have made it quite clear that a number of specific things can and must be changed in order for the practice of scientific pursuits to enable us to live more fully. The Standard Model of physics and the practices, publications and instructional materials which are used to teach the sciences must be modified to reflect the following improvements in our understanding:

The scenarios described in this book demonstrate that the Standard Model of physics must be modified to accommodate a whole litany of phenomena which cannot be currently explained. These include:

- A recognition of the fundamental role of complementarity at all scales.
- A recognition that everything is comprised fundamentally of information.
- A recognition that the Second Postulate of the Special Theory Relativity is no longer valid.  $E$  does not equal  $MC^2$  and never did.
- A recognition that the speed of light is not constant and that it is not the upper limit to rates of information transfer or mass velocities.
- A recognition that the four primary fields are not primary at all, but rather are derivatives of the underlying scalar potentials which operate at the fundament of reality-as-it-is, along with the non-local, non-linear information transport field we have chosen to call the torsion field.

- 
- A recognition that non-locality is an intrinsic attribute of the Cosmos and, further, that the torsion field is the mechanism which supports its functions.
  - A recognition that while the Universe is quantum by nature, it is also fractal at all scales and therefore holographic at all scales, in all respects. The local-linear model described by the current brand of physics disregards this component of the natural order.
  - A recognition that the Cosmos is a single, open, complex, self-organizing system, operating in real time at all scales, according to a set of simple, elegant, universal rules.
  - A recognition that the Universe is conscious, that it is, by definition self-referential and self-aware at all scales.
  - A recognition that all matter and therefore all energy arise from a causal plane of consciousness, which operates in the physical domain in both linear/local and non-linear/non-local manifestations at all scales, as a manifestation of information.
  - A recognition that Mind arises from the causal plane of consciousness as a fractal manifestation, operating in the time domain as a non-local/non-linear expression of reality-as-it-is.
  - A recognition that Mind couples with physicality according to a set of consistent, universal rules which are simple and elegant, and which can be measured, verified and replicated.
  - A recognition that all forms of consciousness are fractal expressions of the causal plane of consciousness, operating holographically as a species in all-where all-when, and as individuals within each species which are both fundamentally similar and fundamentally distinct.
  - A recognition that species consciousness and individuated consciousness are manifestations of Consciousness, pre-dating and surviving physical mortality, from lifetime to lifetime, evolving singly and together as a continuously evolving manifestation of the Great Chain of Being.
  - A recognition that human consciousness and individuation are but one expression of the Master Fractal, that by definition the Universe



must contain an infinite variety of evolving species and individuated minds, evolving in an infinite number of dimensions, because that is how Nature works.

The facts are inescapable. They have been cited and discussed. The sources are open for your inspection. We can only come to this conclusion - we are all manifestations of the same causal plane of consciousness and cannot in any meaningful sense be considered separate from each other. This is not an expression of any limp-wristed New Age nuttiness. Rather, it is the simple, elegant truth. Descartes was dead wrong when he decided physical stuff could be distinguished from spirit stuff. And until our pursuit of science recognizes how utterly irrational his conclusions were; until scientists alter their practices to include spirit stuff, we will not find the answers we are searching for. Without this fundamental revision in our thinking, we cannot hope to solve the problems which threaten our continued existence.

There are some specific things we can do to change all this. The changes have to begin at the top of the food chain, where economic and political control are wielded. Dr. Gell-Mann and his contemporaries at the great universities, together with Stuart Kaufman at the Santa Fe Institute and other organizations like it, have to lead the way. If they do, the sources of capital they control can be directed towards research which holds the promise of reversing the current trends.

Alternative sources of energy need to be developed rather than suppressed. We must find a methadone analog for energy if we are to break our addiction to petroleum-based fuels and energy sources. This is not a matter of technology. The technology has existed for more than 50 years to efficiently convert municipal waste and biomass into usable sources of gasoline, diesel fuel, high BTU synthetic gases and phenols. New patented technologies such as Tom Bearden's Motionless Electromagnetic Generator hold the promise of limitless, utterly benign energy production for the future. There is no technical justification whatsoever for burning another drop of petroleum or cubic centimeter of natural gas.

Instead, it is a matter of will. There is no shortage of energy now and there never has been. What is true about the current conundrum is that we are simply unwilling to efficiently use the renewable energy resources which are and always have been available. The fact of the matter is that we are within striking distance of developing energy production technologies which compare with the most spectacular scientific achievements of all time. What remains, then, is for us to decide, together, whether we will allow them to be confiscated or demand that they be ubiquitously employed to replace existing, suicidal technologies.

As a community of scientists, we must somehow be empowered to pursue a new kind of scientific path, one which is characterized by conscience and enlightened consciousness. The path to this goal can be paved by some intermediate steps which include, among other things, a fundamental amelioration of the current peer review practice. Peer review is only genuinely valuable when the reviewers are not anonymous.

Further, the trail blazed by Stuart Kaufmann and his colleagues at the Santa Fe Institute, Leo Burke, Jeff Bernel and their colleagues at Notre Dame's Gigot Institute For Entrepreneurial Studies and other similar institutions, must be carved wide and paved with financial support sufficient to embrace the curricula of all mainstream colleges and universities. We have discovered that there is nothing more irresistible or compelling than free, unfettered participation in a genuinely collegial environment.

Today's students of the sciences are a very special breed. They are brighter than we were at their age. They are altogether unintimidated by the challenges associated with acting in concert with intuition to pursue the fulfillment of their dreams. The only thing that stifles their creative genius and drive is the utterly fractionated system of higher education they are compelled to submit to in order to obtain training and credentials. The current system relies on the direction of academic advisors, virtually all of whom are tenured professors, to guide graduate and post graduate students into promising areas of research.

Instead of encouraging the new breed of students to pursue research tracks which could provide the meat to cover the bones of our new model, the current practice restricts students to areas of research which constitute the special

domain, intellectual province or territorial imperative of their advisors. Students who take the risk of venturing outside the proscribed guidelines are denied credentials and blacklisted from the professions. This is not the practice of an enlightened science - this is a suicidal intellectual tyranny.

After pursuing science for more than 300 years, after living together as a community for nearly 11,000 years, we still have not figured out how to stop annihilating each other and destroying the planet we live on. Whether you subscribe to the animistic model developed by Daniel Quinn in the *Ishmael* series or the transpersonal, psychological, meme-based Great Chain of Being model created by Ken Wilber, as described in his wonderful book ***A Theory of Everything***, one thing becomes unequivocally clear: without including spirit stuff in the science we practice, we are doomed by our own stupidity, greed and short sightedness to ever more serious challenges, not the least of which is the genuine prospect of our own extinction. There simply has to be a better way.

How do we put an end to this insanity? By helping each other to become well again, one person at a time. By recognizing our fears and choosing deliberately to step past them. By looking deeply within, identifying our prejudices, forgiving each other and learning to respect each other without condition. By trusting that each of us is an expression of the same dignity and majesty which is the well spring of the Cosmos. By living consciously with this in mind.

The exercise of focused, collective consciousness is the one truly powerful tool which cannot be resisted by the exercise of will. While individual consciousness may not by itself be irresistible, the combined exercise of disciplined consciousness has been shown to exert a profound, measurable effect on entire communities and regions of conflict. Because the Cosmos is quantum in its mechanisms, all that is really required to convert our self-destructive, suicidal behaviors into something genuinely kind and loving, is for enough of us to become well enough, whole enough, disciplined enough and personally powerful enough to exert an irresistible, quantum effect on the rest of humanity.

I am not suggesting that we impose our religious or philosophical beliefs on others. Neither am I suggesting that we should work to convert others to our own political way of seeing things. There have to be intrinsic differences in these points of view because complementarity demands it. Rather, I am suggesting that we learn to help each other without thought for reward or investment in an outcome. I am suggesting that we treat each other with kindness and compassion, that we learn to trust the process of just being, that we become so secure in our own sense of self that we can allow others to be authentic without imposing controls on them. This is a matter of understanding who we are and what we came here to do together. It is about tolerance, at the very least, and a considerable, long overdue measure of mutual respect.

In order to move to this level of engagement, each of us will have to confront and transcend our own fears and prejudices. We will have to give up our investment in bigotry and the relentless need to be right. We are compelled to learn how to forego winning at the expense of others and living in a paradigm of scarcity and lack. Most importantly, we have to learn how to be compassionate and forgiving with ourselves and each other, to give up our investment in judging others who try and fail. Trying and failing is essential to the process of learning and growing. Without repeated trials and error, we do not learn, grow or discover anything of value.

As a culture, we are not comfortable with the notion of death and dying. We ignore it, fear it, postpone doing anything about it and yet live in ways which accelerate it. We fear death for a lot of reasons, none of which are valid and all of which are based to one extent or another on the fundamental notion that our physical stuff can and ought to be distinguished from our spiritual stuff. This erroneous, self-destructive notion drives the way we practice science, the way we live, the way we treat each other and the way we deal with our mortality.

We do not, as a society, possess a set of socially acceptable skills which enable us to deal effectively with deep seated emotions such as fear, anger and frustration. There are no socially acceptable means for the expression of such feelings. In fact, we are taught from the outset that feelings of anger, fear and other deep seated emotions are simply not socially acceptable. Instead, we sublimate our repressed feelings into aggressive behaviors in the home,

workplace and on the road. The world we live in is characterized by a continual, relentless bombardment of the senses with an infinite variety of mixed messages, all of which assault our sense of self and combine to render us more and more numbed to the messages that really matter.

The addition of metaphysical disciplines to the way we practice science and, by extension, to the way we live our lives, serves two useful, essential purposes. First, by learning to sit quietly, alone and in the company of others, we can turn off the noise and really hear. By closing our eyes and looking within, we can learn to really see. By slowing our pulse rates, relaxing our breathing and developing the ability to focus without effort on the things which trouble and challenge us, we can allow our individual consciousness to tap into the eternal wellspring of infinite information to find solutions and answers.

Second, by looking deeply within, we can discover who we really are. This is genuinely frightening for those who are not accustomed to such practices. The fear arises from the specious, deeply enculturated notion that there is something intrinsically shameful about who and what we are. The very last thing any of us wants to know for sure is that we are, in fact, sinful, degraded, unlovable, undeserving and valueless lumps of worthless meat. While it does no good to argue about it, I can tell you without equivocation that nothing, absolutely nothing, could be further from the truth.

There is nothing to fear, as Franklin Roosevelt once said, but fear itself. By engaging in the disciplined practice of metaphysical pursuits, in the highest and best sense of the term, the only risk we run is that we will lack the courage to heed what our inner wisdom tells us. Even that is better than believing something that was never true about ourselves and each other. And if, in the process, we can harness the innate capacity of human consciousness to tap into the infinite reservoir of knowing, which operates at the fundament of the Cosmos, why would we hesitate?

Ken Wilber has explained this notion perhaps more eloquently than anyone before or since. At the core of it all, the only reliable means by which we can hope to uncover the mysteries of the Cosmos and survive our practice of science is to develop a new methodology, which puts the ghost back in the machine.

---

This is the challenge of the 21<sup>st</sup> century. If we do not succeed at this, who will be left to blame?

## INTRODUCTION

For three hundred years we have been taught that physical stuff and spirit stuff are so mutually exclusive that they cannot be accommodated by the same model of the physical world. The sciences of modern medicine are so severely crippled by this notion that they cannot explain how Mind couples with the body or understand how the body really functions. In fact, the brand of scientific investigation we are engaged in today denies that there is such a thing as Mind, operating separate and apart from the body.

Why does it matter what Science and the Standard Model of physics say about such things? It matters because our belief in the sufficiency, reliability and accuracy of that model determines in large measure what we believe about ourselves and the world we live in. If the model we rely on is severely flawed, we can expect our beliefs to be flawed and our behaviors to be dysfunctional. Few would disagree that the current state of world affairs suggests we are far from understanding how nature really works or our proper place in it.

The number of books which attempt to reconcile consciousness with physics is long and growing at what seems to be an accelerating rate. The fact that so many are being written and published suggests a significant sea change may be afoot. As a community, more and more of us are asking basic questions about the workings of the Cosmos and the nature of Being. We are not finding the answers we seek within the rigorous disciplines of science or the institutions of religion. Left with only our intuition and the basic tools architected into the nature of our being, many have begun looking for answers within.

This is certainly not the first book of its kind nor is it likely to be the last. Nevertheless, the writing of it serves at least two important purposes. First, coming to a point of understanding which makes it possible to even attempt such a task has been evolutionary for me. In the most real sense, the process has changed my life. Second, in the process of researching the subjects which are embraced in these pages, I have discovered some things which I have not seen discussed in quite this way before. If the publication of these insights

serves to clarify our collective understanding, then it will have been worth the doing.

During the process of creating the manuscript, readers and reviewers of many different stripes have commented that because the manuscript is widely encompassing, many of the terms and concepts I have included are not known to the average reader. This often requires repeated reference to the index or endnotes. This process is unnecessarily disruptive. Accordingly, beginning with Section One, I have attempted to mitigate this problem by laying out the groundwork, a roadmap of sorts, which defines the dimensions of the field and cites the order of engagement. In the first chapter, to further facilitate this process, definitions are provided for each of the most important concepts, terms and ideas.

In addition, since many of the primary sources I refer to are not generally known in the West, Chapter One also provides some background in the form of a summarized chronology. While many of the people whose work is referenced in the book are winners of the Nobel Prize for something or other, many others are not. In some important cases, the information arising from these so called secondary sources has not been accepted into the lexicon of the Standard Model of physics. When subject matter deemed essential to the fabric of the model I am creating arises from the work of someone whose work has been disallowed or ignored by mainstream science, I provide background information in either the text or endnotes which describes what happened and why it is important.

Perhaps more importantly, at the end of most chapters I summarize where the subject matter has taken us in relationship to everything which has preceded it. In this way, it is hoped that you will be able to sustain a sense of positioning with regard to the information contained in each portion of the book. In addition, if you open the book to any chapter without having read the chapters preceding it, all you have to do to catch up is read the summary at the end of the preceding chapter. The need for this mechanism arises from the fact that the range of subjects considered here is sufficiently diverse to confuse someone who is not familiar with some of the more arcane subjects.



Accordingly, it is hoped that by providing a repeated, cumulative point of reference, which tracks the evolution of the concepts contained in the model, you will be able to maintain a sense of connection with each new set of concepts as they are added.

### **Basic Principles**

Three basic concepts lie at the heart of the model described in these pages. These include the principle of *Complementarity*, the nature and fundamental importance of *Information* and a definition of *Consciousness*. In order to have a cogent conversation about the dynamics which operate at the heart of all things, we are compelled to define our terms about these and other important concepts. This is problematical because the process of defining terms automatically imposes a set of perceptual and semantic filters which skew our interpretation. Since it is true that all perception is the result of projection, this means that we will certainly fail to come to consensus on some key issues simply because the language we use and the filters which define the scope of our perception cannot find coherence. Unfortunately, this is unavoidable. It is, I suggest, one of the underlying reasons why so many others have attempted to tilt with the same windmills I have focused on here.

Nevertheless, while you may disagree with the way I have framed them, the definitions I have provided are reasonable. I do not mean to suggest that they are altogether precise – the nature of language precludes us from making that claim. Instead, what I have attempted to do is define my terms in such a way as to allow you to grasp the concepts and make your own interpretations, without necessarily being bound by my parochial notions about such things. Again, as you work your way through these pages, you will discover as I have that this is not always possible. Some things simply are what they are.

### **The Model**

This book asks a simple question.

*“Where do we go for valid, meaningful information about the workings of Nature and the Cosmos when a larger telescope, a more powerful microscope, the rigorous practices*

*of science and the institutions of religion can no longer be relied on to answer our most basic questions?”*

The model which has arisen out of the work reflected in these pages suggests something quite profound. The rules which govern the workings of the universe are both simple and elegant. The dynamics which operate at all scales of the Cosmos are uniform, universal and scalar. When the data are carefully examined in the absence of preconceived notions, I believe these conclusions are inescapable.

### **Complementarity**

The notion of complementarity is not new but it is difficult to visualize. As described in the ancient poetic literature of the East, the notion that the Cosmos arises from a universal causal plane in which duality does not yet exist, is several thousand years old. In quantum mechanics, which is the product of 20<sup>th</sup> century thinking, experimental evidence demonstrates that sub-atomic particles of a variety of different types do, indeed, behave in accordance with ancient Vedic principles. At various places in the book, I provide references to the Vedas and explain where they come from and what they mean.

Electrons are comprised of an information set which includes all the attributes of mass, measurable as discrete particles, and energy bundles, measurable as quanta of energy and waveforms, with discrete states of energetic oscillation. As important as this discovery is, we have also discovered that the principle of complementarity is not restricted to just this limited set of sub-atomic conditions. We have reason to believe that the principle of complementarity is the single, most fundamental attribute of the Cosmos. As we shall see, the cosmological implications which arise from this assumption are significant.

It is a simple concept. Where there is energy there must also be matter – indeed, at a primary level, matter and energy are equivalent, indistinguishable and contemporaneous. Wherever local, linear field effects operate (specifically, gravitational force, electromagnetic forces, strong and weak nuclear forces), we must also find non-local, non-linear field effects at work. This suggests something equally important – if this assumption can be supported with

experimentally verified evidence, it means that our notions about gravitational fields, electromagnetics and the nuclear forces will have to be fundamentally altered from their present form. A significant proportion of the book is devoted to examining non-linear phenomena and non-local field effects, describing what they are and evaluating how they work. Since we have no mathematical expressions to describe such things, this makes for an interesting, albeit often frustrating topic of discussion.

### **Information**

As an abstract notion, the idea that Information can be viewed as discrete by its primary nature, is also relatively recent. It is not just a product of the age of quantum physics, differential calculus and the digital computer. Interestingly enough, information is characterized in a way which is quite consistent with the rules of complementarity. In engineering functions, information is managed in terms of its complementary pairs, in either analog or digital form. Computer engineers have discovered that information cannot be specifically segregated into just one form or the other. In fact, it is the fundamental underlying duality of information, its complementary nature, which enables information to be transported, stored, manipulated and shared.

At the root of it all, we have reason to believe that information is the fundamental building block of the Cosmos. Not an indivisible, primary particle. Not a primal, disconnected waveform of energy. Just information. This is a new notion which is finding validation in a wide variety of disciplines. Again, the implications of this notion are important. They call into question one of the most generally accepted of all our cultural legacies, the notion that there is, at some infinitely minute scale, a primary, indivisible particle which is the primary building block of the Cosmos. If our insights are valid, it appears that instead of finding a fundamental, primary particle, we are more likely to find a primary manifestation of a digital/analog information set, oscillating into and out of physicality at a primary level, with measurable, predictable frequency.

## Consciousness

At some point in our discussion, we are compelled to ask the fundamental question, the only one that really matters.

*“Is consciousness, as reflected by Descartes’ **Cogito, ergo sum**, merely a manifestation of a sufficiently sophisticated complexity in matter, or does matter arise from a causal plane of Consciousness, as described in the ancient book of verses known as the Vedas?”*

This is not the question asked by science. Instead, science operates **a priori** on the premise that physical stuff is, by definition, fundamentally distinct from what Descartes called “spirit stuff.” After three centuries of working in this way, we have inherited a cultural prejudice which altogether denies that physical stuff and the stuff of Consciousness are in any way related.

As a matter of practicality, I have opted to define consciousness in terms which attempt to embrace both scientific and metaphysical conceits. For the purposes of this discussion, consciousness is defined as

*“...an underlying, primary field comprised of undifferentiated information which is characterized by infinite potential, operating in a manner which is self-referential in all-where/all-time and at all scales.”*

In the language of the ancient Eastern traditions, this is referred to as the One. In the language of physics, it is referred to by Maxwell and Whittaker as the primary field of infinite scalar potential.

In order to have a discussion about consciousness, we have to begin with some basic assumptions. As soon as we narrow the discussion in terms of specific assumptions, someone is going to take exception to the assumptions we have used. That is the nature of such discussions and is perhaps one of the reasons why so many books have been written about the subject. Since our discussion is based on the notion that everything is comprised solely of information, it soon becomes apparent that the rules conventionally applied to information theory, especially the rules of complementarity, are problematical.

**Language**

In order to engage in a discussion about these matters, we are left with two complementary, incomplete and fundamentally apposite means of expression - language and mathematics. Both are ambiguous and both are imprecise in their own way. Neither is more privileged than the other and both are subject to the same rules of complementarity. Indeed, both forms of expression are comprised of symbols which are combined to express ideas, concepts, notions, intuition, abstractions and relative frames of reference. In the final analysis, we cannot find completeness of meaning by relying on one to the exclusion of the other. Rather, we have to find a way to express our insights in terms of both in order to approach a level of understanding which satisfies the demands of the basic questions.

This is also problematical. In the West, particularly in North America, our culture is not fluent in the language of mathematics. We do arithmetic pretty well, so long as it applies to the balance in our bank account or the value of our stock portfolio. But when it comes to anything much more challenging than that, as a society we simply check out. The notion that mathematics is the province of genius, that the common man cannot understand it and might as well not even make the attempt, pervades our society like a plague. It is the same plague which once reserved reading as the exclusive province of the cult of priests, of males, of scholars and the privileged classes. It is a notion which is as invalid today as it ever was.

Nevertheless, in order to have this discussion, we are required to rely to a limited extent on mathematical terms and deal with a variety of important mathematical constructs. I only use two formulas in this book. One is the equation made famous by the Second Postulate of Einstein's Special Theory of Relativity,  $E=MC^2$ . The other is the formula developed by Benoit Mandelbrot,  $Z \rightleftharpoons Z^2+C$ , which defines the feedback functions which characterize fractal geometries. Both are simple and both are essential to our discussion. This does not mean that you have to be conversant in higher mathematics to meaningfully engage in the discussion. In fact, there are no differential equations anywhere in this book. But the notions embodied in these formulas

are quite profound. Because we, as a society, have come to rely on them to describe how Nature works, the time has come to decide whether this reliance is well founded or misguided in some fundamental way.

### **The Standard Model of Science**

Throughout the book, I repeatedly refer to the Standard Model. For scientists, mathematicians and engineers, this term has a generally uniform meaning. For others who are not so familiar with the disciplines of science, particularly particle and plasma physics, quantum mechanics and other such arcane and esoteric things, this term can be misleading. For the purposes of our discussion throughout, when I refer to the Standard Model I mean the model currently in use by mainstream science which attempts to define the way the world works in terms of mathematical constructs and expressions. The model is comprised of mathematical formulations which seek to define and describe such things as gravitational forces, electromagnetism, the forces which operate in the nucleus of the atom, thermodynamics, the properties and behaviors of light, mass, force, acceleration and so on.

The Standard Model as currently constructed represents the officially sanctioned set of rules, assumptions and expressions which are accepted by the scientific community and taught in colleges and universities. It rests on several fundamental assumptions which are carefully reconsidered in this book. The historical basis of the Standard Model is almost as important as the expressions and assumptions embodied in the model itself. In the final analysis, the Standard Model is a cultural expression of the way we view the Cosmos. To the extent that its primary assumptions, rigors and means of expression are invalid, incomplete or in error, our way of thinking about such things will also be flawed.

Several fundamental principles embodied in the Standard Model are specifically challenged. The strategy I have employed to conduct this discussion is intended to provide you with (a) sufficient information to understand what the Standard Model claims, (b) an analysis of experimentally verified evidence which calls the assumptions of the Standard Model into question, and (c) citations of additional, experimentally verified evidence which provide sufficient

information to either amend or replace any assumptions which appear to be invalidated. This is, I submit to you, the essence of the best of science.

### **Section One**

The book is divided into two separate sections. Section One takes on the task of evaluating the Standard Model in terms of its assumptions about physical stuff. The windmills I tilt with include (a) the fundamentals of information theory, (b) the rules associated with self-organizing systems; (c) the role of fractal geometries in nature; (d) the relationships between fractal geometries and holograms; (e) light-based phenomena, including superluminal effects; and (f) the reconciliation of the four primary fields with non-local field effects, all of which suggest there is something much more fundamental afoot than our current formulations can accommodate.

By the end of Section One, which consists of nine chapters, the physical rules comprising the new model should become both apparent and understandable to you. If they are not, the fault is certainly mine. Nevertheless, after reducing the current miasma of conflicting laws, rules and theories to a set of disarmingly simple, elegant rules which describe how the physical stuff works, I then take on the challenge of reconciling those rules with the stuff Descartes left out.

### **Section Two**

Section Two, which contains eleven chapters, begins with an overview of a broad range of subjects, experiments, observations, practices and applications related to the study of consciousness. While I do not pretend to dispose of the entire subject in a single chapter, I have defined the terms related to the subject in such a way as to enable you to evaluate what we can observe, measure, test and replicate about it. Section Two explores what we know about consciousness from a variety of impeccably documented perspectives. I define what it is, examine how it works and investigate its attributes.

In the process, I repeat some of the most important questions which have been posed by others in the context of the new model. By so doing, I hope to demonstrate that the new model is sufficiently robust to not only accommodate

what we already observe about consciousness-related phenomena, but also to provide a basis for predicting discoveries not already in the lexicon. Again, this is the true test of the reliability of any hypothesis. After subjecting the model to independent peer review over a period of several years, I am satisfied that the model is sufficiently robust to warrant taking your time and attention.

### **Fundamental Questions**

The questions we ask are fundamental. What is Mind? How is Mind related to matter? Can the mechanisms which couple Mind and matter be identified, measured, tested and validated in a way which is unequivocal and universally consistent? How is it that descriptions of the fundamental inner workings of the Cosmos, from the smallest scale to the largest, as described in terms of the high order mathematics employed in such expressions as super string (M) theory, are anticipated and precisely mirrored by ancient books of religious, poetic verse? How is it that the fundamental structure of physical reality in this dimension can be described with equal precision using both the rigorous methodology of empirical science and the disciplined practice of meditative introspection?

Is Mind timeless? Does individual Mind pre-exist physical mortality? Does it survive physical death? Does consciousness as we have defined it operate according to the same rules and principles which are manifest in physical reality? If so, how do we discover the truth about such things? Does Mind operate independent of physicality, or does Mind arise from physicality? Does physicality arise from a causal plane of consciousness? What rules operate in common with both the causal plane of consciousness and physicality in this observable dimension, if any?

### **Sources**

At each step, I have relied on the best information I could find. I have evaluated my sources to make certain that they are reasonable, well documented and fairly presented. Many of the references contained in the list of suggested readings, hyperlinks, the bibliography and endnotes are not commonly available or easily accessed. Access to many of the sources cited in



the endnotes has been made available to me because of personal relationships I have worked hard to develop over the years. To the extent that those references are privileged and not generally available, I have attempted to extrapolate salient information to help explain the points in question. In all other aspects, however, the sources I have cited are available to everyone.

### **Valid Sources**

The question of sources is an important one. It bears directly on the credibility of the assumptions employed to construct this new model. Western science has long engaged in an incestuous relationship with the publications which broadcast its findings. In order to compete for funding, scientists are compelled to publish or perish. This becomes problematical in a number of respects because it frustrates our ability to be circumspect in our work. The notion that scientists operate with dispassionate detachment, that they are capable of evaluating the work of others without consideration of the relative merits of their own, is simply not realistic. Perhaps in an ideal world we might eventually aspire to this level of integrity and enlightenment, but in the real world of science and research budgets, prestige, fame, awards and notoriety, all combine to exert political power and control over budgets, content, proprietary intellectual property and philosophical influence. The fact of the matter is that dispassionate peer review is a myth.

### **The Myth of Peer Review**

Unfortunately, the peer review process is used more often than not to protect privileged intellectual turf rather than to foster innovation and achievement. As currently practiced, the peer review process allows the reviewer to remain anonymous and thereby enables senior scientists to prevent publication of leading edge discoveries by their juniors or those less well known or politically connected. This is especially true when new findings challenge the existing order. Peer reviewers with ulterior motives are allowed to operate with both anonymity and impunity. As a result, senior scientists often succeed in unreasonably disenfranchising and often stealing the breakthrough work of others with impunity.

Likewise, mainstream scientific publications exert a very effective stranglehold on competing points of view. Accordingly, it has become standard practice for the leading lights of science to prevent dissent and engineer social policy by specifically controlling the kinds of science which are officially reported. Thus, the work of scientists which has not been published in mainstream peer reviewed publications is usually dismissed out of hand as unworthy of consideration. In our vaunted view of our own scientific primacy, we also dismiss the value, credibility or reliability of work produced in other countries if it has not been published in one of the accepted peer reviewed journals published in the West.

I have always taken issue with this practice because it is suicidal. If left to my own devices, I would solve the problem by summarily eliminating the anonymity allowed to peer reviewers by compelling them to publish their identities along with their comments. I would require them to declare conflicts of interest and shine a bright light on their review methodologies. As you will discover, much of the ground breaking work which makes it possible to answer the most challenging questions has been conducted by dedicated scientists in other countries whose work is simply not known in the West. I have cited their work where appropriate and leave it to you to decide how relevant, valuable and reliable it is.

### **A Parting Comment**

In the final analysis, this book provides a unique framework for examining the issues which fill its pages. The precepts embodied in the model are the result of the work of hundreds, perhaps thousands, of dedicated, competent, deeply committed people. Some of them are scientists, some engineers, technicians or inventors. Others are genuinely enlightened practitioners of a wide variety of metaphysical arts, whose discoveries, methodologies, techniques and insights have lighted our way to an exciting new level of understanding about how the Cosmos works. To the extent that the conclusions I have drawn from their work are justified and supportable, I am pleased to share them with you. To the extent that I have misinterpreted their work or taken it out of context, the fault is entirely mine.

Regardless of how far we push back the envelope of our understanding, we are compelled to run up hard against the ultimate mysteries. What is life? and What does it mean? are questions we will probably always struggle to find answers for. Nevertheless, if we can understand more clearly how the Universe operates, if we can gain some insight into the relationships between Mind and physicality, it may then become possible for us to alter the suicidal, destructive cycle of madness which has come to characterize humanity's stewardship of the planet.

This book is not just about technology, although improved technologies may make it possible for us to develop better means of measurement and testing. Nor is it just about science. Clearly, science and technology do not, by themselves, enable us to live more fully or completely. Nor is this book just about consciousness, although it is becoming increasingly clear that without some understanding of what consciousness is and how it works, we cannot hope to have any real understanding about the workings of the Cosmos and the nature of being.

In the final analysis, this book is about people. Its findings and discussions are based on the work, insights, genius, values and sacrifices of people. In the process of evaluating their work, I have had occasion to examine their lives, values and personal histories. As a result, much of what is discussed here is profoundly interesting and very personal to me. As you will see, some of the work I refer to is simply wonderful. The insights arising from the best work are both inspiring and uplifting. Unfortunately, some of what I needed to know came to light as the result of work by scientists and technologists which can only be described as demented and genuinely diabolical.

Taken together, the information considered in these pages constitutes an authentic cross section of the values, insights, opinions, findings and experimentally validated discoveries of people from all over the earth, across a span of more than 9,000 years. The most magical part of this journey of discovery has been the realization that the information needed to understand the workings of the Cosmos is not now and never has been the special preserve of any single discipline, privileged class, means of expression, culture or

heritage. Where information about the inner workings of the Cosmos is concerned, there is no room for privileged access or arbitrary control.

During the process of writing this book, I discovered that we are all inextricably connected to one another and the planet we live on. Because we are all on the inside of the great system, looking outwards for understanding and meaning with the tools of science, and looking inwards for meaning with the disciplined practices of metaphysics, the answers we seek are contained in all of them, taken together, rather than in any one of them, separately considered.

This book is an expression of my personal values more than anything else. From time to time, you will see traces of the deep-seated rage I feel about the way we have perverted what we know to hurt each other and damage the planet we live on. My anger is not unilaterally directed only at those who practice science without conscience. You will also see expressions which border on the ecstatic when I discuss some of my personal insights. What I discovered during this process fundamentally altered my view of myself, my role in life and my appreciation for the sacredness of all things.

More than anything else, I hope you will come to share my commitment to cut through the proscriptive linguistic, cultural and semantic filters which make it possible for us to take refuge behind our own bigotry. Like you, I want to know what *really* makes nature work, not just what is filtered through the mainstream scientific journals, not just what the institutions of religion trot out as truth, not just what I discover through my own introspective practices. To the extent that this book helps you discover how the Cosmos works, the work will have been worth the doing. To the extent that you find occasion to disagree with my conclusions or methodology, you are invited to share your observations, criticisms and suggestions with me. My hope is that you will find the information contained in these pages as exciting and compelling as I have. And most importantly, I hope you have a good read.

## SECTION ONE

### *Looking For Simple, Elegant Solutions*

## CHAPTER ONE

### *A World of Mystery and Wonder*

The world we live in is a place of mystery and fascination. In the late 60's, an obscure Austrian physicist named Fritjof Capra had a spontaneous experience which forever altered his view of himself as separate from the rest of the Universe. When the veil of **Seeing** was removed from his conscious apprehension of the world around him, he witnessed

*"...cascades of energy coming down from outer space, in which particles were created and destroyed in rhythmic pulses; ..."saw" the atoms of the elements and those of my body participating in this cosmic dance of energy; ...felt its rhythm and "heard" its sound, and in that moment ...knew that this was the dance of Shiva..."*

As a result of this remarkable experience, he was able to intuit the inextricable connection between the material world and his own consciousness. He was able to integrate his insight into a model which synthesized the world of quantum physics with the mystical philosophies of the East. His book ***The Tao of Physics***<sup>1</sup> still stands as the watershed event which propelled our generation into a whole new way of apprehending the world. Over the past 30 years, since the publication of his book, scientists have succeeded in verifying many of his predictions about the "mystical" relationships he described.

Since then, we have discovered a number of things which were inconceivable to Dr. Capra and his contemporaries at that time. Newspapers and magazines, public television, documentaries and news groups on the Internet describe the discovery of such things as complementarity,<sup>2</sup> zero point energy, dark matter,<sup>3</sup> Buckey balls,<sup>4</sup> self-organizing criticality [autopoiesis] in complex systems,<sup>5</sup> the

*Looking For Simple, Elegant Solutions*

---

way coherent light exchanges information at the interference fringe,<sup>6</sup> the creation of particles of mass with nothing but intersecting beams of light,<sup>7</sup> the connections between consciousness and quantum physics,<sup>8</sup> and the discovery of quarks and sub-quarks.<sup>9</sup>

Other discoveries, such as Nicolas Gisin's experimental demonstration of the phenomenon known as simultaneity (non-local effects at a distance)<sup>10</sup> and synchronicity, verified by the experiments of Alain Aspect<sup>11</sup> and Nobel astrophysicist Dr. John Wheeler,<sup>12</sup> suggest that the single, immutable constant upon which virtually all the sciences have agreed is no longer valid. The speed of light is not the upper limit to velocity.<sup>13</sup> Further, there is compelling reason to postulate the existence of a holographic field which has been shown to convey information non-locally at least  $10^9$  times faster than the speed of light.<sup>14</sup> If we can verify these notions, the basic assumptions which comprise the Standard Model will have to be reconsidered. It appears that many of our most commonly held notions about the Cosmos may be seriously flawed.

Consider: a group of Ukrainian scientists has developed a whole new mathematics to describe the world we live in, which is so different from the one we are accustomed to using that we can scarcely believe they were both developed by the same species on the same planet.<sup>15</sup> Our confusion is compounded by discoveries recently made by scholars of antiquities who have unearthed ancient records which strongly suggest that we are merely rediscovering information which was already common knowledge to civilizations which preceded the ancient Sumerians, much of which appears to have been long since been forgotten.<sup>16</sup> What are we to do with this information? How do we reconcile what we think we know with what we believe, when it is clear that we cannot rely on the model of the physical universe which is now the accepted standard?

These avenues of discovery have led us to a moment in time when it is no longer possible to make sense of what we know without examining information in a whole new context. The work of Danish mathematician Dr. Per Bak and his colleagues at the Brookhaven National Laboratories provides a perfect example.

In an effort to validate the predictions developed by a new mathematical model of complex open systems, Dr. Bak and his colleagues designed an experiment which has caused a furor in the scientific community. His experiment was simplicity itself - it simply asked the question,

*“How high can we build a pile of sand, depositing one grain of sand at a time on top of another, before the whole pile collapses under its own mass?”*

His attempts to develop a mathematical model to predict the precise moment at which the point of criticality is reached have opened a whole new window on our quest for understanding how Nature works.<sup>17</sup>

This deceptively simple project was designed to answer a much more important question. By determining the underlying dynamics which operate at the precise slope angle at which the sand pile begins to collapse [known as the point of criticality], Dr. Bak hypothesized that a model could be constructed to predict the behavior of other, more complex systems, particularly as their structural complexity approaches a condition where catastrophic annihilation and spontaneous creation coincide. He theorized that the model could perhaps be used to predict the location and magnitude of earthquakes, the weather, El Nino and other manifestations of complex systems which have thus far thwarted the best efforts of the finest minds in science.

Bak discovered, among other things, that all complex systems spontaneously organize themselves to a point of criticality. This is an underlying principle which appears to be common to all complex systems at all stages of development, at all scales, everywhere in the Universe. His discoveries are substantially altering the way we consider our role in the scheme of things. Punctuated equilibrium, power laws and logarithmic relationships, the role of fractal geometry and  $1/f$  noise thresholds constitute a family of new concepts which have to be included in our model and our vocabulary. And, unfortunately, he concluded that not only can we not apply the principles of self-organizing criticality to predicting earthquakes and such, we probably cannot predict the local magnitude or frequency of any occurrences in such complex systems at all.

It is curious to note in passing that the slope angle of Dr. Bak's sand pile is precisely the same as the slope of the Great Pyramid of Giza.<sup>18</sup> Is that merely a coincidence? Or does this discovery suggest that the engineers who designed and built those ancient monuments may have understood the relationships which define the behaviors of self organizing systems and encrypted a carefully encoded message into the structure of their creation? If there is a message there, what does it mean?

It is time to take the next intuitive leap, to create a new context for re-examining newly discovered information which cannot be accommodated by the current model of quantum mechanics. It is now time to ask the questions which naturally arise from Dr. Capra's seminal work:

*"Is there a limit to what we can know? What are those limits? Where is the edge of knowing?"*

### **The Problem With Language**

The moment we begin to conceptualize about these issues, in the very instant we attempt to talk about them, we crash headlong into the first of many powerful dynamic mechanisms which limit our ability to see clearly - language. Without language, we are unable to communicate meaning in the form of abstract concepts. We call these notions "ideas." Indeed, it is by engaging in the process of conceptualizing that we encounter at first hand one of the primary dynamics which operates in the background we refer to as "reality-as-it-is." The very idea that the reality we see - the one we look at and measure every day - is only a small part of reality-as-it-is, is so novel that it has only been in the very recent past, since Maxwell formulated the electrodynamic quaternions, that scientists in the West have been willing to concede the possibility.

In the ancient traditions of the East, this notion has been thoroughly integrated into the fabric of language and culture for thousands of years.<sup>19</sup> Indeed, in the modern era, it appears we have forgotten much of what has long been known by the sages.



It is language which governs the way we think.<sup>20</sup> Language exerts a fundamentally limiting, restrictive influence on what we can know and how we can know and express it.<sup>21</sup> Without language, we have no other way to impute meaning to our experience or communicate our experience to others.<sup>22</sup> This paradox is mirrored in every aspect of creation. It is the essence of the phenomenon known as complementarity.

### **Finding The Edge**

In the pages which follow, this point of departure is our baseline. This point of reference relies on the notion that there is, indeed, an Edge, a finite scale in the physical world beyond which we cannot travel with the intellect and physical observation alone. It is that place where bigger, more powerful telescopes and stronger, higher resolution microscopes cannot take us. It is in that place, where intellectual understanding meets intuition, in the realm of things which cannot be visualized, that we will find the answers we seek. This is the Edge of Knowing, the interference fringe, the point of criticality where order meets chaos, where creation meets catastrophe, where **looking** meets **seeing**, where mind meets matter. This is the place of creation, where the things we are discovering operate according to a set of rules we do not yet fully understand.

### **Language, Math and Semantics**

The Edge of knowing lies beyond the reach of language, even [sometimes, especially] mathematics. Although mathematicians will argue to the death against such heresies, just as there is no such thing as a simple, non-dynamic language,<sup>23</sup> neither is there is such a thing as a pure or privileged language.<sup>24</sup> Like every other kind of form of symbolic expression developed by man, mathematics is as susceptible to the nuances of semantics, ambiguity, and complementarity as any other means of human expression. This is true because in its most sophisticated forms, mathematics is simply another means for expressing intuition. The notion that a consistent, universal one-to-one

relationship exists between the symbols used in mathematical expressions and the reality of the physical world has long since been invalidated.

The mathematical language in current use in the West is derived directly from the notion that all life emerges from matter -- in the conventional scientific community, this is taken as a dictum. But what if all matter emerges from a background reality which is pure consciousness? What use is the language of mathematics then? What if the process of creation is driven by non-local forces which are non-linear in nature? This is problematical because we have not yet created a non-linear mathematical expression which describes such things.

It is because of the kind of precision made possible by mathematics that we now know that the more precisely we are able to measure and predict any aspect of the material world, the less relevant that information is. This leads us to the heart of the problem - it is not possible to describe quantum phenomena adequately using only the language of mathematics. This leads us to the place where Jung first ventured - the realm of archetypal forms and symbols, where fundamental shapes, forms and tones carry the information which drives the creative processes of the Cosmos. This is the place of metaphysics, semantic language and information theory.

### **The Art of Seeing**

The Edge is that place where non-material science [the art of "seeing"] meets material physics [the science of "looking"]. In our world, within our culture, within the confines of our limited ability to conceptualize, there is precious little distinction made between looking and seeing. However, after the realm shifting work of Alain Aspect, John Wheeler and Nicolas Gisin, we can now be certain that apprehending something with the senses and explaining it with the intellect has little or nothing to do with "seeing" the true nature of things, understanding what they mean or comprehending how they work. The I Ching describes this conundrum when it says,

*We can know the ineffable, but when we attempt to explain it,  
all understanding is sacrificed.<sup>25</sup>*

What can we do when the biggest telescope and the most powerful microscope we can imagine will no longer allow us to examine the dynamic forces which drive the Cosmos? How can we "see" past the Edge? It is because we have encountered the outer limits of "looking" that we are compelled to have the conversation about "seeing" – about knowing in the intuitive sense rather than simply apprehending things in terms of measurement. What we are beginning to suspect is that there is an underlying reality from which everything is constantly emerging, unfolding, adapting and organizing, which cannot be apprehended with the tools we are accustomed to using.

### **The Place of Creation**

Where do we find the spawning grounds of creation? How do we come to know them, understand what they do and how they work, explain the forces which drive them, and conceptualize them in ways which can be understood and unambiguously communicated to others? Fortunately, we do not have to look very far to find a suitable entry point. Fritjof Capra made a giant leap when he intuited that there are distinct commonalities in both the mystical traditions of Eastern religious philosophies and the world described by quantum physics. Since he wrote *The Tao of Physics*,<sup>26</sup> our collective curiosity has produced a wealth of information to which he did not have access and could scarcely have imagined. We follow Dr. Capra's footsteps to the Edge of creation by synthesizing this new information into a paradigm.

### **Things We Know But Do Not Understand**

Decades ago, Marcel Vogel<sup>27</sup> and Sir Jagadis Chandra Bose<sup>28</sup> produced a body of impeccably documented pioneering work which graphically demonstrates how thin is the line which separates living from non-living matter. Alain Aspect<sup>29</sup> and John Wheeler<sup>30</sup> both proved that a more powerful microscope or bigger telescope will only take us to the Edge of Knowing, into a world where the conscious choices of the observer and the means of observation cannot be separated from the act of observation. Today, there can be no doubt that we are connected to both electrons and photons by the dynamics of

consciousness. This is no longer debatable. But what those bonds are and how they work, however, are issues we clearly [at least in a scientific sense] have not understood at all.

Recent developments in the science of photonics have taken us one step closer to the Edge. Scientists have developed devices which are capable of emitting and detecting quarter wavelengths of light which have been successfully used to turn other beams of light on and off, without the interposition of an intermediary physical material.<sup>31</sup> More recently, a team of British scientists demonstrated that two beams of circularly polarized light can be used actually move minute particles, when the beams are slowly rotated around each other.<sup>32</sup> This work demonstrates that it is in the interference fringe, the area where wave forms of light interfere with each other, that some of the mysteries of creation may be understood. The things made possible by these insights into the semantic properties of light are quite revealing.

At the Santa Fe Institute, Nobel laureates from dozens of different disciplines are discovering that the forces which drive the behavior of atoms at the interference fringe are precisely the same forces which drive all other aspects of creation, including especially the behaviors of open, complex systems.<sup>33</sup> And while we cannot “see” the inner workings of physical materials at the quantum level, we can observe the dynamics and laws which govern such things by witnessing the fascinating emergence of the Internet. At the societal level, this is clearly one of those phenomena which demonstrates what happens in that place of pure creation, where order meets chaos, where undifferentiated fields of information take on polarity, at the interference fringe.

### **Metaphysics**

If we are to truly see beyond the Edge, we must somehow identify and understand the rules which operate in the realm of non-material physics. We find ourselves in that avenue of inquiry and experience referred to derisively as pseudo-science by scientists and embraced as manna by philosophers, known as Metaphysics. The cultural, societal, religious and linguistic conceits which

prevent us from examining these considerations in a careful, systematic, organized manner are ponderous. Few in the scientific community who value their hard-won academic credentials have been willing to spend any significant amount of time or money in this sort of research. The risk of censure, ostracism and professional ridicule are so daunting that only the most fearless or foolish dare tread this ground.

Fortunately, there have been some intrepid heroes who have defied the pressure to conform – Marcel Vogel [the genius behind the creation of IBM whose work on liquid crystals is still not completely understood], Sir Jagadis Chandra Bose [whose impeccable, voluminous work described the connection between human consciousness and plants],<sup>34</sup> Nikola Tesla [whose discoveries regarding the etheric transmission of electric power have become the stuff of myth and legend],<sup>35</sup> and others whose work could, if the context of the discussion could be expanded to allow it, considerably alter the paradigm which defines the way we which we apprehend the world around us.<sup>36</sup>

In addition, we have the extraordinary work of Charles W. Leadbeater<sup>37</sup> and Annie Besant<sup>38</sup> to examine. Under the direction of the legendary J. Krishnamurti, they relied entirely on their carefully honed ability to delve deeply into consciousness to discover the secrets at the heart of the atom. Dr. Stephen Phillips' work chronicles how these two researchers identified the sub-atomic particle named the "quark" as early as 1927.<sup>39</sup>

Without the aid of either physical measuring or observational devices, in the days before quantum mechanics was even a cogent idea, when Cartan and Einstein had no notion of the nature and importance of spinors in the sub-atomic realm, Leadbeater and Besant created a journal which spanned more than 30 years of impeccably documented psychic research into the sub-atomic structure and behaviors of matter. Some 60 years later, Dr. Murray Gell-Mann was awarded a Nobel Prize for his "discovery" of what was then believed to be the primary, indivisible material component of the Universe, which was also called the quark. Has anyone of our generation ever heard of Leadbeater and Besant?

**Complexity**

A whole new avenue of inquiry has been opened up in the past few years which examines what Menas Kafatos and Robert Nadeau refer to as “reality-as-it-is”, that place from which all creation emerges. This new science is referred to as “Complexity.” Its point of departure is marked by the outer limits of chaos theory, string theory, super symmetry, autopoiesis [self-organizing principles], emergence, adaptation and the effect of positive feedback loops on systems, fractal geometry and the role of holographic memory functions in human intelligence. This new synthesis of information is being derived from a wide variety of long-accepted scientific disciplines. Its contributors are mostly Nobel Prize winners.

It is an honest attempt by the finest minds on the planet to discover the simple, elegant underlying sets of rules which drive the processes of creation. If the underlying dynamics which govern self-organizing criticality and the phenomena associated with the transfer of information in the interference fringe can be defined, we will have taken a giant leap toward understanding not only how we have come to be, but where we came from and how we got here. While this does not answer the question “Why are we here?” it does provide a new context within which the question can at least be asked without the risk of professional suicide.

**Creating A New Context**

This avenue of inquiry holds the keys to unraveling some of the most intriguing mysteries of the Cosmos. The phenomenon of the interference fringe, the place where it is difficult [if not altogether impossible] to observe and measure things with physical devices, is also the realm within which the forces which drive the engine of creation and consciousness operate. And it is in the examination of these phenomena where I believe we will find the most fascinating clues to the way the world in and around us really works. We do not yet have a cogent, universally accepted paradigm which makes it possible in our culture to consider the mathematical physics of Nobel Laureate Murray

Gell-Mann and the techniques of quantum healing espoused by Deepak Chopra, with equal grace.

This is true in spite of the fact that Murray Gell-Mann's brand of mathematics and quantum physics strongly implied that science would never discover an atomic particle smaller than a quark. The world still venerates him in spite of the fact that in 1996 scientists operating the linear accelerator at FermiLabs near Chicago, Illinois, not only discovered the sub-quark, but captured a record of its dash-space-dash-space tracing on a photographic emulsion plate, as it shifted into and out of "reality" before mysteriously disappearing.<sup>40</sup>

Why does the community we live in not venerate the discoveries and investigative techniques of Dr's Chopra and Gell-Mann with equal measure? Is Dr. Gell-Mann's description of the quark any more valid than the description provided by Charles W. Leadbeater and Annie Besant, whose psychic viewing techniques provided an impeccably documented view of the quantum world of the quark in 1927? Who ever heard of these people and their work? Is the knowing acquired by these means any less valid or important than information which can be measured by physicists or predicted by mathematicians? I leave it to you decide.

In our society, we vest certitude in a very narrow spectrum of carefully controlled kinds of information to the exclusion of other, less socially acceptable varieties. If the truth were known, I believe we would find [as Capra predicted] that the disciplined practice of metaphysics can be relied on to produce information which is less speculative and imprecise than many of the conventions of science which condemn it. Truly, we cannot have a complete understanding of the Cosmos without employing both kinds of knowing because they are complementary to each other.

### **The Principles of Complementarity**

How do we resolve this apparent impasse? By demonstrating that the generalized principles of complementarity operate with equal facility in the construction of all human realities. We are forced to bridge the gulf which

*Looking For Simple, Elegant Solutions*

---

separates hard science from metaphysics by acknowledging that consciousness cannot be divorced from the methods of examination employed by conventional science. The realization that everything which operates in and around us is inextricably interwoven provides us with a way of understanding the Universe in a context which is devoid of conceptual conflict.<sup>41</sup>

Complementarity is a term coined by physicists which has to do with an attribute of information which cannot be visualized in common experience. It embraces the idea that a sub-atomic component [like an electron or a photon] can manifest multiple qualities [electrons can be detected as particles with measurable mass and as energy quanta with waveform characteristics] simultaneously. Electrons have been shown to exhibit either one or the other of those attributes individually, when called upon by the conscious choice of an observer to do so. We have Alain Aspect to thank for proving in 1982 what Dr. Capra intuited in 1967<sup>42</sup>. He proved with physical science what the mystics have always said, that we are connected to all we observe by the very fact of our consciousness.

In a similar experiment, Nobel Laureate Dr. John Wheeler proved Rupert Sheldrake's profound intuition that we are equally connected to the stars by the simple act of gazing at them.<sup>43</sup> How our conscious choices effect the process of creation, in both a material and non-material sense, is one of the primary points of focus for this book. And this is the real crux of the matter.

It is in the context of this discussion that we are able to take a whole new look at reality-as-it-is. In the context of this paradigm, we can make a convincing case that the current scientific viewpoint about creation may be seriously flawed. It is at the Edge where we will discover whether life emerged from matter [as science currently declares] or matter is emerging from consciousness in every moment.

**A Journey of Discovery**

In the final analysis, while I do not pretend to provide answers for any of the fundamental Cosmic questions, I am convinced that the very nature of our



inquiry can serve to provide a broader scope within which all such questions can be framed and examined. After all, as any competent alchemist will tell you, the answer to every question is implicit in the form of the question itself. If all we do here is succeed in reframing the way we formulate our inquiries, we cannot help but succeed in arriving at new and ever more fascinating insights, ***somewhere beyond the Edge...***

## **SECTION ONE**

### ***Looking For Simple, Elegant Solutions***

## **CHAPTER TWO**

### ***Everything Is Information***

One of the legacies of Science (big "S") is the explicit verification that we cannot trust the validity of the information provided by either our senses or our heritage. We have become automatically accustomed to thinking of the Cosmos as made up of "things" in an exclusively material sense. This notion effects our way of thinking about all the manifestations of the physical world in and around us. We automatically think of the world in terms which are physical, down to the smallest sub-atomic components. Since this phenomenon is part of our linguistic and cultural heritage, this is hardly surprising.

Our senses tell us that our notions are true. We experience validation of our physicality in an infinite variety of ways all the time. If you step in front of a moving bus, the outcome is entirely predictable. Physical stuff is physical. In a sense, the notion that physical stuff is material to its indivisible core is so deeply engrained in us that we can scarcely envision our material world in any other way. This set of values is everywhere manifest in our language, in our mathematics, in our concepts of time and space and our personal values.

The ancient Greek philosopher Plato believed that everything in the world could be divided into what he called "atoms." So did Galileo. His algebra and geometries were based on the fundamental notion of a single, dimensionless, massive particle, the ultimate subdivision of matter, operating in proximity to a host of other similar primary particles, in a vacuum<sup>44</sup>. We must not underestimate the power of this concept. The very fact that Galileo could articulate this idea, in a climate of such fundamental ignorance that he was

threatened with death and excommunication for simply discussing it, suggests rare genius.

The concepts embodied in Galileo's formulations were so cogent that Newton incorporated them into his calculus. This fundamental mathematical language has formed the basis for all scientific pursuits for 250 years. It is still so powerfully embedded in our cultural psyche that it is parroted by college physics texts to this very day. Newton's *Principia*<sup>45</sup> is a compelling work of such consummate genius that it continues to exert a profound effect on the way we attribute meaning to the world around us.

Rene` Descartes followed suit. In his own inimical way, he added another construct to the equation. Descartes reasoned that, in accordance with his interpretation of Holy Writ and the dictates of the Catholic Church, the Universe is comprised of two fundamentally distinct elements – "physical stuff" and "spirit stuff."<sup>46</sup> That is what he really called it. Even though he was driven to this conclusion by arbitrarily imposed political restrictions, Descartes made an enormous mental leap with the formulation of his philosophy. He reasoned that inasmuch as everything that is real [as opposed to those things that are not demonstrably real] in the material world can be described by mathematics and verified by observation, clearly the Universe must be constructed logically, sequentially, with linear relationships, much as a clockwork mechanism of infinite complexity.

By this reasoning, he concluded that the Universe and everything in it can be understood perfectly if the physical pieces can be subdivided into their primary, indivisible components. There was no room in his universe for "spirit stuff", that which cannot be seen or is rarely experimentally verified and examined. This was largely the result of the turf deal Descartes cut with the Catholic Church. Accordingly, for 250 years the practitioners of Science have assiduously avoided and aggressively prevented each other from investigating the role of "spirit stuff" in Nature.

As a society, we have inherited this fundamentally flawed set of notions. Until very recently, the science of our day has been as devoid of "spirit stuff" as

*Looking For Simple, Elegant Solutions*

---

was the science of the 17<sup>th</sup> century. Only in the past few decades have scientists run headlong against the inevitable barriers created by Descartes' unilateral dismissal of "spirit stuff" from the realm of reality and scientific investigation.

As a result of some astonishingly good science, we have become aware of a number of troubling, enigmatic phenomena which cannot be explained, validated, demonstrated nor measured by any of the tools available to conventional science. The experimental verification that these phenomena exist or operate is undeniable, but no one has yet developed a model which explains **how** they work. The discovery of such things as quarks and the creation of matter with measurable mass, from nothing more than photons propagated by visible light, provide a fascinating clue to what this all means.

**The Discovery of Quarks**

Since the discovery of the class of sub-atomic particles called quarks<sup>47</sup> by Nobel Laureate Murray Gell-Mann of FermiLabs in Chicago, physicists have continued to smugly cling to the notion of a material world made up of indivisible primary particles. In some important respects, the notion of Descartes' "clockwork mechanism" is still alive and well, even at this late date. Its side effects are manifest today in the irresistible need to describe every observable phenomenon recorded by scientists in reductionist, mechanical terms. The pursuit of the Human Genome Project perfectly typifies this approach.<sup>48</sup>

The discovery of quarks led to a series of major, unparalleled confrontations between advocates of Dr. Gell-Mann's hypothesis and other Nobel nominees at such prestigious institutions as M.I.T., Princeton, and Columbia University. The argument centered around the notion that quarks can be accepted into the lexicon of sub-atomic particles, even though they specifically violate what is known as the Pauli Exclusion Principle.<sup>49</sup> Dr. Ruggero Santilli led the initiative to exclude Gell-Mann's Quarks from the lexicon of accepted sub-atomic particles and was forced to resign from MIT because of it.<sup>50</sup> More importantly, because particles with measurable mass are by definition subject to

gravitational forces, quarks (it was argued) ought to be excluded as a new class since they appear to operate without regard to gravitational force.

The mainline conventionalists prevailed, if for no other reason than because they controlled the purse strings of those institutions and could therefore arbitrarily silence scientific heresy. But the fallout resulting from the war of academic supremacy occasioned by the discovery of quarks has yet to be fully counted. In spite of very good reasons why it ought not be added to the list, the official version of the standard model now holds that the quark is the single, primary, indivisible class of sub-atomic particles which constitute all matter, everywhere in the Cosmos. The ancient Greeks and Isaac Newton, it appeared, may have been quite right.

### **The Discovery of Sub-Quarks**

However, in 1994, nine years after Dr. Gell-Mann and his colleagues announced their experimental verification of two of the six quarks predicted by their mathematical model, a team of 450 equally competent scientists, also working at FermiLabs and using the same linear particle accelerator facility employed by Dr. Gell-Mann, announced their discovery of matched pairs of particles which they called "sub-quarks."<sup>51</sup> In order to make certain that they had not succumbed to the Pons and Fleischmann "cold fusion" syndrome, the CDF Collaboration team worked for another four years to perfect their technique, re-evaluate their mathematical model, replicate their original test protocols and results, and confirm their data. Their discovery literally turned the apple cart of physics upside down.

Gell-Mann's mathematical model predicted that the quark was the smallest sub-atomic particle possible. According to that model, the quark was believed to be indivisible into smaller components. Dr. Gell-Mann was awarded the Nobel Prize for Physics in 1986 because the scientific world believed he had discovered the Holy Grail of physics, the fundamental, indivisible primary unit of matter. In an article published in *Physics Letters* in 1998, the Fermi team announced their discovery of sub-quark pairs and accompanied their

*Looking For Simple, Elegant Solutions*

---

announcement with such unequivocal scientific validation that the result seemed to be unarguable.

The mathematical model used to predict the existence of the sub-quark pairs was the product of the CDF team's collective genius. It required the work of a team of 450 mathematicians, theoretical physicists and others over a period of more than 12 years to complete the mathematical language which was used to predict their discovery. Unfortunately, as with other discoveries which have challenged accepted scientific dogma, the reaction of the main stream scientific community was to first dismiss the discovery by subjecting it to ridicule.

The establishment then attacked their methodology, discounted the validity of the mathematical model and finally, when nothing else seemed to be working, attempted to personally discredit the discoverers.<sup>52</sup> Such is the state of enlightened science as it is practiced today in the West.

**The Sub-Quark Scandal**

Finally, when the dust settled and the discovery could not be dismissed as the work of cranks and crack pots, an attitude of profound discomfort settled onto the community of theoretical physicists. No banner headlines appeared on the front page of the New York Times nor did we hear any announcements about the discovery of sub-quarks on CNN, in spite of the fact that the attributes demonstrated by sub-quarks raise questions of the most profound significance about how the material world really works. In fact, most physicists are still quite ignorant of the discovery and even fewer appreciate its significance.

In an act of unparalleled self-interest, the American Physical Society and Gell-Mann's supporters brought enormous pressure on the CDF team to withdraw the report of their findings. When they flatly refused to do so, the APS and their cronies prevailed on the publications which had agreed to publish the CDF paper to withdraw their offer to publish. In addition, it is reliably reported by members of the CDF team who have since resigned, that the report was

finally withdrawn only because the team and FermiLabs itself were threatened with economic and professional extinction unless they complied with the demand to withdraw.

The notion that the CDF Collaboration team withdrew their findings from publication because their methodology was somehow flawed has been successfully perpetrated on an unsuspecting public by Gell-Mann's defenders. Many of us are astonished at the unconscionable methods employed to protect the territorial imperatives of those who discovered the quark and, more importantly, to discredit one of the truly great discoveries of modern science.

Nevertheless, in the inner circle, among those whose work and insights are pushing the envelope of our understanding toward a more complete knowledge, this discovery has proven to be quite literally earth shaking. Based on the information supplied by the CDF, and a careful review of the data they have supplied, it is irrational to suggest that their discovery is anything less than unequivocal. Sub-quarks are a fact of life, whether Dr Gell-Mann or the American Physical Society like it or not.

The nature of the sub-quark [and other less well known and more estoeric sub-atomic units] has proven to be somewhat troublesome to scientific purists.<sup>53</sup> The sub-quark demonstrates a most peculiar behavior, both physically and mathematically. As each sub-quark matches the spin and polarity of its partner, [in much the same way as positron-electron pairs behave], it demonstrates a phased pulsing behavior which shows up on a photographic emulsion plate as a series of dashes separated by discrete spaces. As the film plates developed at FermiLabs show, the first track of a sub-quark separated from its paired partner looked like this: \_\_\_\_\_  
\_\_\_\_\_.

When pressed to explain this phenomenon, the CDF team at first suggested a variety of possible alternatives: Perhaps the particle was so much smaller than the granular density of the film emulsion that it could not be consistently displayed. This was considered a distinct possibility and later thoroughly discounted by experimental trials. Perhaps it was so much smaller than the

*Looking For Simple, Elegant Solutions*

---

quarter-wave frequency used by the scanning electron microscope to capture the image that its image was incorrectly displayed. Perhaps there was something about the way the sub-quark was spinning, or was polarized at the time of impact, that distorted its magnetic field or unaccountably refracted the laser light used to capture the image of its passage across the screen.

After years of work and the introduction of significant refinements to the image capturing process, the report they published clearly demonstrates that the attributes demonstrated by the dash-space-dash-space signature of the sub-quark are the result of a fascinating set of attributes which appear to be unique to sub-quarks. This behavior has only been observed in the vacuum environment of a high-speed linear particle accelerator under carefully controlled conditions – with one notable exception.<sup>54</sup>

**The Importance of the Sub-Quark**

First, the experimental results suggest that the dash-space-dash-space signature demonstrated by sub-quarks is probably unique to each elemental material and is not simply a sub-quark attribute in general. Researchers are still investigating whether this constitutes a kind of sub-quarkian finger print by which elemental materials could be conclusively identified as they form. If it can be verified, this would provide a result with implications reaching far beyond the domain of the current state of the art of particle physics.

Second and perhaps equally intriguing is the realization that the sub-quark film track probably demonstrates a time-domain polarization attribute of this sub-atomic unit. The sub-quark's track looks the way it does because the particle exists and then does not exist, exists and then does not exist, in our space-time continuum. With the discovery of the sub-quark, we observe for the very first time a scientifically verified instance of multi-dimensional behavior in a measurable physical component.

The behavior of the sub-quark is uniquely profound - in the rarified environment of the particle accelerator, the sub-quark exists-disappears-exists-disappears with a consistent, repeated, predictable frequency pattern which



may be distinct and mutually exclusive to each of the fundamental elements and many of their isotopes.<sup>55</sup>

The questions which arise from the observation of this phenomenon are legion, but the fundamental issue which concerns us is simply this:

*“What are the underlying laws which govern the behavior of the sub-quark and define its unique attributes at the point of materialization and de-materialization?”*

Indeed, when we witness this event, we are brought literally to the Edge of creation. Understanding the rules which govern this phenomenon could tell us much of what we need to know about how the material world really operates.

What is the sub-quark really comprised of? It is observable, at least insofar as its existence can be traced on the surface of a film emulsion plate. It ceases to be observable with equally consistent, predictable regularity, but does not cease to exist. Indeed, it reappears as another "dash" track on the film plate, with quantum regularity. Where is it when we cannot observe it? More to the point, ***what*** is it that pulses into and out of observability in our space-time dimension with such consistent predictability? To answer this question, we are compelled to re-examine our point of reference and re-evaluate many of our pre-conceived notions about such things.

### **Matter Created From Light: $E \neq MC^2$**

In the Spring of 1997, a team consisting of more than 20 scientists from half a dozen of the finest physics labs in the United States, gathered at the Stanford Linear Accelerator facility in California. Their objective was revolutionary - they sought nothing less than to create particles of measurable mass using nothing but coherent beams of visible light.<sup>56</sup> To do so, they knew they would have to defy a fundamental tenet of main stream particle physics. The notions underlying this principle are described in Einstein's Second Postulate of the Special Theory of Relativity, made famous by the equation  $E=MC^2$ . Their work was scorned as the quintessence of scientific heresy by the organs of the physics industry. None of the mainstream scientific journals would publish

*Looking For Simple, Elegant Solutions*

---

their results - instead, their work was first reported by ***Discover Magazine***. Here is what they did and why it is important.

At the Stanford Linear Accelerator facility in California, the team succeeded in creating electron-positron pairs, with measurable density and particle mass, by crashing two high-intensity laser beams of monochromatic light together in a vacuum. Their experiment was not an accident – they set out to do it deliberately and kept working at it for more than six months until they succeeded. Why is this event significant? Because the conventional model of Quantum mechanics and the Second Postulate to Einstein's Special Theory of Relativity specifically prohibit the creation of matter with nothing more than photons, in any environment, under any circumstances.<sup>57</sup>

Nevertheless, the result speaks for itself. This part of the Special Theory, which has come to be treasured and rigorously defended as one of the unassailable bastions of modern science, appears to have been invalidated by their results. Since the results of this work cannot be denied, since it has been successfully replicated now at other particle accelerator facilities, there must be something incomplete about the way the Standard Model defines the way the world works. One of the important clues to this enigma can be found in the exhaustive work of P. Anastasovski, who has demonstrated experimentally that under certain conditions, photons of real light display measurable mass.<sup>58</sup>

**Information - The Common Denominator**

The question we have to ask now is this:

*What do sub-quarks and photons have in common? What is the common property which allows scientists to harness the dimensionless, perhaps mass-less attributes of photons of light to create matter, which manifests the same attributes as sub-quark pairs?*

There is only one thing common to both at this primary scale, and that is what we call Information. The definition of information is problematical. For physicists, the definition is distinctly different than for linguists, religionists or philosophers. According to the ancient Hindu verses known as the Vedas,

information in its most fundamental state is an unpaired vibration which arises from the causal background of absolute silence.<sup>59</sup>

According to M-theory [more commonly referred to as super string theory], information exists as one-dimensional strings which vibrate singly around each other in a web of increasingly complex relationships.<sup>60</sup>

Ken Wilber suggests that information is something else entirely. In his view, information can only be defined as that which enables our senses to distinguish that which is from that which is not.<sup>61</sup>

In technical terms, particularly those which apply to information theory, for our purposes information is defined as a datum. This begs the question because we are then left to determine what constitutes a datum. In digital computer language, a datum is a single unit of information combined with another such unit to constitute a unit of data. This is helpful, but still not definitive, since we have little notion in either mathematics or physics about what constitutes a single datum. This is Galileo's dimensionless point.

Interestingly enough, there is a singular semantic similarity between the Greek word data and the Sanskrit expression which connotes its underlying linguistic predecessor. In Sanskrit, the symbol for the “R” sound, which is the data-half of the full expression “Rk,” corresponds directly with the Greek word “data.” This is of more than passing interest because it suggests that as far back as 3,500 b.c.e., the book of verses known as the Rk Veda, which describes the processes of creation and annihilation in the Cosmos, contained in its first expression the fundamental elements which correlate with our word, information.

By definition, according to the Vedas, the “R” sound connotes the beginning of the cycle of creation. Its nature is defined by its beginning as a resonant, reverberant vibrational continuity which bridges a gap of silence to pair with its polar opposite, the “K” sound, which by its very nature signals an ending. Taken together, the combination of the “R” and “K” sounds across the gap which separates them, forms a single expression which is the analog of creation. Alpha and Omega. Two mutually exclusive, previously separated,

*Looking For Simple, Elegant Solutions*

---

semantically distinct data arise from a background of absolute silence to create the beginning and the end in a single elegant expression.

Accordingly, for the purposes of this discussion throughout the book, I define information as the linguistic equivalent of the “R” and “K” sounds. That is, they may reasonably be considered distinct, primary data bits which can be combined according to a set of simple, elegant rules to produce a datum, a paired unit which has a beginning and an end, which contains sufficient information to convey meaning at a primary level. This is the essence of the rule of complementarity at its genesis.

For these and other reasons which will shortly become evident, we have reason to believe that at its core, everything is information<sup>62</sup>. Absolutely everything. The implications of this notion are so staggering that we are still struggling to accommodate them. Rene' Descartes was mistaken. The Universe is not a clock-work mechanism which can be arbitrarily disassembled into its constituent parts. Indeed, at every scale, the stuff of matter cannot be dissociated from the stuff of spirit. What lies at the basis of all things, without respect to time, space or distance is information.

The realization that everything is comprised of information strikes at the very heart of the scientific method. It means, among other things, that we cannot arbitrarily accept one of kind of information and ignore another without doing irreparable violence to the conclusions we draw from our investigations. It means that no single strategy for obtaining information is any more valid or reliable than any other, given that each avenue of inquiry is practiced with commensurate discipline.

It also suggests that information derived from external, empirical experimental processes cannot completely describe reality-as-it-is any more than information derived from purely introspective consciousness-based practices. Indeed, both kinds of information are required in order for a fully robust description of the Cosmos to be possible at all. The rules of complementarity demand that it be so.

Any scientist or religionist worthy of the name will tell you that this is problematical. How do we integrate information obtained via the disciplined application of scientific methodology, which is empirically quantifiable and replicable, with experiential information which cannot be measured, validated or replicated on demand by any known conventional methods?

To be more precise, what standards of validity are equally applicable to the work accomplished by Murray Gell-Mann<sup>63</sup> and Charles Leadbeater and Annie Besant?<sup>64</sup> How is it that super string [M] theory and the verses of the ancient verses known as the Vedas<sup>65</sup> describe the processes of creation and annihilation, with equal symmetry and precision, in terms which are precisely equivalent?

Super string [M] theory, despite its obvious shortcomings, provides a model which is used to describe the processes associated with the creation and destruction of all forms of matter and energy. Its principles and axioms are defined by the most rigorous of mathematical disciplines.<sup>66</sup> There is an ill-concealed skeleton in the closet of physics:

*"As they are currently formulated, general relativity and quantum mechanics cannot both be right."*

Each is exceedingly accurate in its field: general relativity explains the behavior of the universe at large scales, while quantum mechanics describes the behavior of subatomic particles. Yet the theories collide horribly under extreme conditions such as black holes or times close to the big bang. Brian Greene, a specialist in quantum field theory, believes that the two pillars of physics can be reconciled in superstring theory, a theory of everything.

Yet we discover that the structure, harmonic resonances and constructions of the ancient Hindu text known as the Vedas define exactly the same dynamics as super string theory. The Vedas were constructed as the result of disciplined introspection, metaphysics in its highest and best sense. This is a phenomenon which we are finding replicated in other areas long thought to be the exclusive domain of science.

*Looking For Simple, Elegant Solutions*

---

What this idea suggests is that if we know where and how to focus our research, and if we are willing to accommodate valid information wherever it is to be found, we may yet find a simple, elegant common denominator, a unifying set of dynamics common to the most fundamental inner workings of all things. Our quest is to identify and describe that set of unifying principles in a whole new way. To the extent we succeed in achieving this long sought-after goal, we will have ascended to an entirely new vantage point from which to view the Cosmos.

No one is suggesting the transition will be easy or simple. If we are to succeed, we will have to take on a host of daunting dragons - cultural inertia, the territorial imperative, institutional resistance, the profit motive, New Age nuttiness, evolutionary positioning in the Great Chain of Being...in their lairs, face to face. Some of our most cherished cultural, scientific and religious beliefs may perish as a result of our findings. It is likely that we will be forced to re-learn and re-think much of what we have long assumed we already knew. This is as it should be.

## **SECTION ONE**

### ***Looking For Simple, Elegant Solutions***

## **CHAPTER THREE**

### ***Experience Is Only Half Experience***

#### **A Journey of Discovery**

In these pages we embark on a journey of discovery together. While we are at it, we are going to re-ask some of the BIG questions which have framed the age of science as we know it. We reframe our questions to take advantage of a kit of wonderful new tools which have been devised by some of the most creative and intuitive geniuses of modern times. In short, we are going to re-examine what we think we know in a broader context, so we can make some cogent choices about where to begin the next phase of our search for answers about the Universe.

I have always subscribed to the notion that the answer to any question is implicit in the context and structure of the question itself. I am convinced that if we are to have any reasonable expectation of making sense of what we experience, including a long and troublesome list of scientifically documented phenomena which simply do not fit any of the best models modern science can devise, we must begin by reconsidering the way we ask our questions. If we are to harbor any realistic notions about getting answers which really matter, we must review the data we gather, regardless of its source, without preconceived prohibitions. This is the essence of what Ken Wilber refers to as *integral science*.<sup>67</sup>

This process of re-framing, of reconstructing the context which governs the way we interact with the world, is tantamount to altering the way we “see.” In the broadest sense, this is what ***Seeing Past The Edge*** is all about. In the instant we attempt to go beyond the Edge, beyond that place where a more powerful microscope or larger telescope can no longer provide any useful information, we run headlong into the first of a long list of difficult, perhaps impossible, challenges.

At the outset, we are forced to recognize that we cannot trust what we see with our natural eyes, nor can we trust the way our intelligence interprets our experience.<sup>68</sup> The human experience is all about processing information – all our systems are configured to receive, process and find meaning in the stream of information which flows through and around us. And depending on where we find ourselves along the evolutionary path represented by the Spiral Levels enfolded into the Great Chain of Being, our point of view will inevitably skew the way we interpret our experience.

### **Experience is Only Half Experience**

It is true that “...all experience is only half experience.”<sup>69</sup> Except perhaps through the disciplined practice of some disciplines of metaphysics, where consciousness finds release by operating temporarily without direct reliance on the physical senses, human consciousness experiences nothing of the world around us directly. The architecture of our physical equipment provides an interface between our conscious awareness and the world as it is, at all scales or quadrants. Our experience of reality is therefore colored by the way we are physically architected.

Until we learn to recognize and accommodate this aspect of our makeup, we will continue to allow some serious errors in judgment to color the way we frame our questions and interpret the answers we obtain. In order to really understand what makes the world operate as it does, we are compelled to find ways to eliminate the information errors which are introduced into our experience by the architecture of our sensing and information processing



equipment. To do this, we have to understand what those limitations are and how they work.

The effects of these errors in judgment can be categorical. We sometimes despair at the extent to which our ability to understand is limited by our physicality. Because we experience the world around us in terms of contrasts, we are compelled to believe certain things about our experience which are simply not accurate. This is the basis of the intriguing puzzles we are faced with.

It is the nature of the human condition that we are not content to simply process information. We are not simply survival mechanisms.<sup>70</sup> A unique aspect of our humanness is the irresistible compulsion to attribute meaning to our experience. We have developed some exceedingly clever strategies for aggregating information into orderly, meaningful lots. As a community, in the broadest sense, we are driven by an irresistible compulsion to understand why life works the way it does. This drives us collectively in our quest for meaning

### **The Myth of Detachment**

The sensory facilities architected into the human condition are so complex in their many levels of functionality that we cannot hope to understand them by simply observing the functional processes and the physical equipment by themselves, in isolation. We cannot understand them alone by examining them alone because they do not operate in isolation from each other.<sup>71</sup> Instead, we have to find a way to see past the processes and physical organs themselves in order to discover the dynamic forces which govern the way they function together. If we can get a firm grip on this level of insight, if we can understand the rules, relationships and dynamics which cause information to operate as it does in the human condition, in us and around us, then perhaps we will have found a revolutionary new vantage point from which to assess how Nature works.

Where shall we begin? At which point in the cycle of this merry-go-round we call the human condition do we step off? How do we achieve a level of

*Looking For Simple, Elegant Solutions*

---

detachment from which to acquire an undistorted view of the way the Cosmos works? If what we think we know about such things is accurate, even if we can find a way to incorporate all our information gathering and processing functions into a cohesive whole, there is probably no way any of us can become truly detached. When we engage in any practices which seek total detachment, we enter the realm of the mystical. Interestingly enough, quantum physics and the mystical traditions tell us the same thing - we are each an intrinsic component of the fabric of the Cosmos and cannot, in any real sense, extricate ourselves from it.<sup>72</sup>

What is compelling about this comparison is that modern science seeks to evaluate the Cosmos in a state of arbitrarily defined and artificially imposed detachment by dismantling the cosmos into its constituent parts. Throughout the ages, mystics have attempted to comprehend the nature of the Universe by training their physical equipment to deliberately experience a state of detachment which merges all sensory input into a state of undifferentiated unity. Later on, we'll define our approach to this consideration by relying on the recent work of Francisco Varela<sup>73</sup>, Anatoly Akimov<sup>74</sup>, V. Kaznacheev<sup>75</sup> and others as our point of departure.

For the moment, we recognize a simple baseline axiom - it is impossible to separate the human attribute we call consciousness from the effect it exerts on the world around us. The role of consciousness is not passive.<sup>76</sup> This is no longer an abstruse, isolated notion. The act of observation exerts a demonstrable, measurable, repeatable effect on everything we observe.

The act of processing information, of observing, thinking and intending, exerts an effect on that which is being considered.<sup>7778</sup> The act of observing simply cannot be separated in any meaningful way from the means of observation nor from that which is being observed. Later on, we will closely examine the breakthrough work of Alain Aspect, John Wheeler, Dean Radin, Dale Graff and others who have experimentally validated some important aspects of the mind-matter connection.

Physicist David Bohm intuited this feature of the fields which interpenetrate the Cosmos when he wrote,

*“We’re all connected through and operate within living fields of thought and perception...the point,” he said, “is that we are all linked by a fabric of unseen connections, and those fields are influenced by our intention and ways of being.”<sup>79</sup>*

### **Bell’s Theorem**

In 1964, a Swiss physicist named J.S. Bell, advanced a theorem which has come to be known as Bell’s Theorem<sup>80</sup>. Bell’s theorem predicted that the exercise of choice by an observer would eventually be demonstrated to exert a fundamental effect on the way sub-atomic particles manifest themselves while being observed. Eight years later, French physicist Alain Aspect and his team at the University of Paris experimentally proved that Bell’s prediction was quite correct. This is one of the most profound discoveries of all time because it establishes with categorical certainty the mind-matter connection. One of our biggest challenges is to discover how this connection operates.

Bell’s Theorem also predicted that matched pairs of sub-atomic particles, called positron-electron pairs, whose polarity, spin and other attributes are perfectly matched, would instantaneously readjust themselves if the attributes of one were to be altered by some outside force, such as an electro-magnetic field, regardless of how far apart they might be separated from one another. This prediction had to wait until 1997 to be verified<sup>81</sup>.

A team of physicists at the CERN particle accelerator facility in Geneva, Switzerland, led by Dr. Nicolas Gisin, demonstrated that there is a field which conveys information throughout our universe instantaneously, regardless of time or distance, at least  $10^9$  times faster than C, the speed of light. This is our entry point – this is where we penetrate the problem to establish a new vantage point. This is, indeed, the Edge of our current understanding about primary fields and field theory.

**The Role of Complementarity in Information Processing**

Before we jump to any conclusions about what this means, however, let's first consider an important aspect of our search for meaning. It is known in the language of quantum physics as complementarity. In our culture, in the English-speaking culture of North America and in many of the European cultures from which it originated, the way we have become accustomed to framing our questions is dramatically effected by the process of enculturation.<sup>82</sup> In the West, our notions about how the world works, that is, the context within which we attribute meaning to the things we observe, is bounded by a set of concepts which have been relied on for two hundred fifty years, since the work of Rene Descartes and Sir Isaac Newton. These concepts form the bedrock of the scientific method. The conceptual flaws which characterize this contextual set is illustrative of the nature and magnitude of the challenges associated with our attempts to extract meaning from our experience.

Complementarity is an attribute intrinsic to every aspect of the world we live in because it is a fundamental aspect of information itself<sup>83</sup>. As a point of reference, it is reasonable to say that complementarity is that aspect of quantum systems which marries seemingly irreconcilable opposites together into an inseparable whole. For example, Alain Aspect's experiments demonstrated that an electron carries all the attributes of wave form, energy quanta and particles with measurable mass, at the same time. An electron carries the information which characterizes all of these seemingly mutually distinct attributes at the same time, and manifests each or all of them on an as-needed basis.

To our rational minds this simply doesn't make sense. Even though it cannot be visualized, it is nevertheless true. When we reach the point at which we attempt to iron the distortions out of the information we are analyzing, an understanding of this aspect of information theory becomes indispensable.

**Rene' Descartes**

For the purpose of clarity, let's begin at the beginning of the modern scientific era. When the French philosopher Rene' Descartes began examining the way the world works, he concluded that the world is comprised of two distinctly different kinds of "stuff." He characterized them as *physical stuff* and "*spiritual stuff*".<sup>84</sup> His notion about such things was that "physical stuff" and "spiritual stuff" are so primarily distinct that they are mutually exclusive; that is, they are separate kinds of stuff which have nothing whatever to do with each other, except as directed by God and as allowed by his turf deal with the Catholic church.

Based on this notion, he also concluded that the Universe operates as a clockwork mechanism, made up of discrete bits and pieces, which can be assembled and disassembled in the same way and to the same extent as any other kind of machine. His thesis was that if we can find all the bits and figure out how to disassemble them, we will be able to understand everything there is to know about the Cosmos. At the time, it was a revolutionary idea, so elegant in its simplicity that it was irresistible. Even though we now know Descartes was very much mistaken in this notion, the result of his hypothesis continues to exert a profound influence on the way we examine these issues today.

**Newtonian Physics**

Sir Isaac Newton crossed the conceptual bridge provided by Copernicus and Descartes when he wrote a book which has never been rivaled in its brilliance, entitled *Principia*.<sup>85</sup> This conceptual masterpiece became the cornerstone of differential calculus and the bedrock of classical physics. With it, Newton succeeded in creating a kind of orderliness which had not existed in human considerations before. Descartes' separation of stuff and Newton's laws of motion and gravitation created the fundamental basis for the scientific method we use today.

Perhaps more important was the agreement among "scientists" (natural philosophers) which denied the possibility that anything observable could be

*Looking For Simple, Elegant Solutions*

---

caused or affected by any non-material influence. The notion that "spirit stuff" could not exert any real influence on the material world has become so powerfully embedded in our collective Western psyche that mediums were imprisoned in England as recently as World War II, when things they "saw", which were afterwards physically verified in the field, were not deemed possible by conventional scientific standards.

The notion that "physical stuff" and "spirit stuff" are distinct and mutually exclusive propelled the entire Western world into the industrial age and was relied on as the key to unlocking the mysteries of the Universe. This trend continued unabated until Max Planck, Niels Bohr, Werner Heisenberg, Albert Einstein and others developed a new set of revolutionary insights to accommodate many of the anomalies which could not be explained by classical Newtonian physics.

**Reductionist Science**

Today, two and a half centuries after Descartes, we are both the beneficiaries of their extraordinary genius and the victims of their conceptual limitations. As a result, we find ourselves in territory Ken Wilber has called the Flatland.<sup>86</sup> Because Descartes and Newton [and those who followed them] believed that "spirit stuff" could be entirely excluded from the process of inquiry, they succeeded in isolating some of the gross mechanical components of the material world into discrete categories – solids, gases and liquids; animal, vegetable and mineral; chromosome, DNA strand, genome address, and so on. Methods of scientific classification and identification were developed so that the sub-sets of each of the more gross categories of things could be separated from one another and evaluated separately.

Reduction of the Universe to mechanical simplicity and separation of its stuff into smaller and smaller components has become the order of the day. Witness, for example, the media attention given to the much heralded Human Genome Project<sup>87</sup>. As a society, we are still deeply invested in the notion that by reducing the constituents of DNA to their genome addresses, we may really know something about how DNA works. Recent Russian research illustrates

*Experience is Only Half Experience*

---

how seriously flawed this line of reasoning is. In the process, we have succeeded in narrowing our collective focus to include only a fraction of the information which is really available. This is the reason many of our notions about how the world works are so narrowly defined and arbitrarily skewed.

After two and a half centuries of thinking and acting in this way, we have come to understand intuitively that separateness is an intrinsic attribute of the Cosmos. More importantly, the idea of separateness has become so embedded in our nature, in our language and culture and, therefore, in the context within which we automatically attribute meaning to our experience, that we interpret virtually everything we experience from the vantage point of separation and other-ness.

We don't consciously think about it – we just do it.<sup>88</sup> This response to our experience is so automatic that it is almost impossible to escape the conceptual limitations associated with such basic ideas as “this or that,” “mine or yours,” “here or there,” “theirs or ours” “now or then” and so on. Our whole way of interpreting our experience is couched in terms of duality, largely as a result of the way we have learned to view it, and not necessarily because that is the way it really is. Indeed, if we consider such things in terms of complementarity, the “or” becomes “and”, a condition of simultaneity rather than exclusivity.

We are beginning to recognize the extent to which this limited way of “seeing” limits the way we interpret our human experience. When we attempt to step back and reframe our inquiries in terms that take us past the erroneous notions embedded in the context of mutual exclusivity, we find ourselves on ground which is altogether foreign to the Western mind. In order to even have the discussion, we are compelled to recognize that the tools at our disposal are somewhat primitive.

It is now quite clear that our method of assessing our experience, the way we collect and evaluate information, distorts our perception because it provides us with

(1) information which is incomplete and seriously skewed by our cultural filters;

*Looking For Simple, Elegant Solutions*

---

(2) information which is limited by the conceptual context (e.g., Wilber's meme) from within which we view the world;

(3) information which is limited by the linguistic tools we use to communicate with each other;

(4) information which is unavoidably limited by our inability and unwillingness to integrate information found in one privileged source with that which is provided by other sources which are not ideologically acceptable, and

(5) information which we simply do not comprehend.

**The Role of Ambiguity in Communication**

Communicating meaning is an exercise in limiting ambiguity.<sup>89</sup> Ambiguity is an intrinsic, inseparable component of all means of communication devised by humans and is an intrinsic property of complementarity.<sup>90</sup> We have to recognize it, understand how it operates and learn to deal with it because it cannot, by definition, be eliminated from any of the processes associated with human perception and communication. Each level of the information gathering process evidences the limitations we have identified.

The process itself operates with a set of filters which are defined by a common set of underlying perceptual, cultural and linguistic dynamics. One of the greatest discoveries of our time is that the dynamics which govern the way information operates in the Cosmos appear to be universally consistent, operating in every manifestation of everything in and around us at all scales.<sup>91</sup> This insight provides invaluable clues to the nature and behavior of the dynamic forces which operate at the baseline of the causal plane.

In order to understand what dynamic forces operate at the interface between the causal plane and our space-time dimension, we begin with what has come to be referred to in the literature as the Vedic Model of the Unified Field.<sup>92</sup> Recent work by Dr. John Hagelin of M.I.T.<sup>93</sup>, Per Bak of Brookhaven National Laboratories and London University<sup>94</sup>, Brian Greene,<sup>95</sup> Anatoly Akimov<sup>96</sup>, and V. Kaznacheev<sup>97</sup> and their colleagues at PERM University, are illustrative.<sup>98</sup>



The point is simply this: human perception and expression are an intrinsic part of the problem - they are manifestations of the attributes of complementarity which are also intrinsic to the human condition. Expression and perception are controlled and defined at the most fundamental level by a common set of perceptual and information processing filters. The limitations of human perception and expression are hardwired into the architecture of human physicality and, therefore, cannot be studied separately as simply physical functions. The "mind" is no more a computer than the Universe is a clockwork mechanism. So long as we allow ourselves to believe that Descartes' "spiritual stuff" is really separable from the physical component of the human experience, we will continue to make the mistake of interpreting our experience in the fundamentally limited context of a 17<sup>th</sup> century paradigm.

Today, as a community, Western science has altogether failed to accommodate the relationships between our physical experience and our consciousness. In this context, because of the way we have framed our inquiries in the past, consciousness, Descartes' "spiritual stuff", has altogether been excluded from the scientific method of inquiry. This is a serious issue – if we are to build a bridge to a deeper level of understanding, we are compelled to carefully re-examine the philosophical underpinnings of the scientific method and make some important adjustments to the way we conduct our research in the future.

## **SECTION ONE**

### ***Looking For Simple, Elegant Solutions***

## **CHAPTER FOUR**

### ***How Nature Works: Self-Organizing Criticality in Complex Open Systems***

#### **Catastrophic Events**

Have you ever wondered why it is that all at once, without warning, while your life seems to be rolling smoothly along just as you planned it, out of nowhere something happens which catastrophically tips everything upside down? After the catastrophe has taken its toll and passed, do you re-run the film of those events in your mind, re-examining them, analyzing them, searching for a clue to something you may have missed along the way which might have made it possible to avoid or minimize the damage?

Unless you are somehow exempt from the rules which govern the rest of humanity, the human experience consists primarily of periods of relative calmness [getting up in the morning, going to work, doing our tasks, dealing with the up's and down's of everyday life, day in and day out], which flow without interruption in a generally consistent routine. Once in awhile, however, something happens without warning which fundamentally alters the way we live.

Pilots have a saying which is illustrative. Flying, it is said, consists of hours and hours of endless tedium periodically interrupted by moments of stark terror. Try as we may, there seems to be nothing we can do to prevent or avoid these events. And we ask ourselves, "What does this mean? Why did this happen? Will it happen again? And if so, when? How can I avoid it next time?" In the emerging science of complexity, this phenomenon is called "punctuated equilibrium."

A few years ago, after my marriage of twenty-nine years had ended badly, I traveled to the California coast to see some friends and get away from myself. After spending a day communing with the towering redwoods of the John Muir National Monument North of San Francisco, I decided to sit on the beach for awhile and watch the waves. As sometimes happens with me, I found myself completely fixated by the repetitive rhythmical undulation of the waves against the shore. I sat mesmerized for hours watching them ebb and flow. At some point in time, perhaps three o'clock in the morning, the sky cleared and the full moon began to illuminate the seascape.

The crests of the waves became visible all the way to the horizon, marching in an elegant, flowing undulation towards me. I was mesmerized by this Zen moment. Every now and again, I noticed that a rogue wave would flow across the prevailing pattern, coming from out of nowhere. The anomalous appearance of those waves really intrigued me. For hours, I tried to predict which direction the next one would come from. I tried to discern whether some pattern or subtle rhythm governed their direction and magnitude. But try as I might, I was forced by the time the sun came up to conclude that their origins and attributes were random and not related to the normal flow in any obvious way.

This experience was truly magical for me. As with other moments of powerful intuition in my life, I realized without understanding why that the waves I was watching were an analog of all of life and Nature. As I have reflected on my own life, I can see clearly that the momentous events which have had the most significant impact on me came from a direction I could not have anticipated and operated in ways that I could not predict. So it is, I believe, with all of Nature.

### **The Sand Pile Experiment**

Part of the mystery which defines how Nature [big "N"] and the human experience work can be observed in something as simple as a pile of sand. This is an experiment anyone can perform. It goes like this: begin by accumulating a supply of dry sand. Start by placing one grain of sand on top of the next on

*Looking For Simple, Elegant Solutions*

---

any flat, level surface. The size of the grains of sand is not important. The experiment works as well with gravel and dried peas as it does with sand.

On top of the first grain of sand, place a second and then a third and so on.<sup>99</sup> As the grains of sand are stacked progressively on top of each other, a most extraordinary thing begins to happen. As the mound of particles grows higher and higher, as the slope angle which defines it becomes steeper and steeper, the mound begins to manifest a prototypical behavior. At some point in the process, when a single grain is placed atop the mound, somewhere along the surface of the sand pile another grain, which is not directly connected by impact or proximity, will roll off the side towards the base. For reasons which are only now becoming evident, the information set represented by the placement of the single additional grain at the top of the pile is transmitted instantaneously throughout the pile to all the other grains. At this precise moment, the sand pile ceases to simply be a stack of units. Instead, it now exhibits all the characteristics of an open, complex, self-organizing system which has reached a state researchers call "criticality."

If we continue to add grains of sand beyond this point, eventually somewhere along the slope of the pile a catastrophic event will occur. In the language of complex systems, this event is referred to as an "avalanche." We have all seen it before.

*When we were kids, we used to play a game which capitalized on this phenomenon - after a pile of sand was built up to the point at which it was almost ready to collapse, we would shove a stick down into the apex of the mound. The objective of the game was to scoop away small sections of the mound until, at the very end, the removal of even a single grain would cause the stick to fall. The game was fun precisely because no one could predict which scoop of material would cause the stick to fall.<sup>100</sup>*

**How Nature Works:*****Self Organizing Criticality in Complex, Open Systems***

---

We have all seen it before. At some point in time, an entire section of the sand pile will eventually collapse on its own if we continue to add material to the top.

More importantly, it is interesting to note what does **not** happen. As we continue to add grains to the top, we do not observe another single grain sloughing off repeatedly as a consistent consequence. There is no one-to-one relationship at work in such a system. Trivial as this may seem, for the purposes of this discussion, this is a most important distinction. It is also important to observe that we cannot predict which grain of sand will trigger an avalanche, nor can we predict how catastrophic the avalanche will be when it occurs. We cannot predict where in the pile the avalanche will begin nor how far it will carry. This behavior is a hallmark of all complex, open, self-organizing systems.<sup>101</sup>

Dr. Per Bak and his colleagues at the Brookhaven National Laboratories in Long Island, New York, have developed a simple, elegant model which describes why the sand pile behaves as it does. In his book ***How Nature Works***,<sup>102</sup> Dr. Bak describes four elemental dynamics which characterize the behavior of all complex open systems. I highly recommend this book - it is extremely articulate and very readable.

**Complex, Self-organizing Systems**

For the purposes of this discussion, a complex, open, self-organizing system is defined as one which demonstrates the characteristics of the condition known as criticality. For purposes of illustration, at the grandest of scales, the Milky Way Galaxy is a complex, open self-organizing system<sup>103</sup>. The fact that this is universally acknowledged to be true presents some intriguing problems for astrophysics which cannot be accommodated by the Standard Model of physics currently in general use. Why this is so and what needs to be done to remedy this conundrum is one of the reasons we are engaged in this exercise.

The same is true of our solar system. In every sense, it demonstrates all the characteristics, attributes and behaviors associated with self-organizing

*Looking For Simple, Elegant Solutions*

---

systems.<sup>104</sup> So does our planet. Taken by itself as a single comprehensive unit, the Earth and its sub-systems all demonstrate the attributes of self-organizing criticality at every scale, from the sub-quark to the Earth's participation as a member of the solar system set<sup>105</sup>. All these systems operate in an integrated, indivisible aggregation of components which, in the final analysis, comprise a single overall system, just like our sand pile.

If we can sort out what causes the sand pile to behave as it does, perhaps we will be able to extend that insight to explain why a galaxy [as a macrocosm] and sub-quarks and other super-small sub-atomic particles [operating at the lower limits of the microcosm] operate as they do. Penetrating this level of insight into the dynamics of the processes which are universal to self-organizing systems, regardless of size, will take us well beyond the Edge and help us to understand human behaviors at all scales.

One more word before we begin. What we are attempting to do here is nothing less than create a fundamentally new approach to formulating a unified theory of the forces which govern the evolution of the Cosmos, in all its manifestations. This is what Ken Wilber refers to as a Theory of Everything. One of the benchmarks of all reliable universal models is that they are simple<sup>106</sup>. In order to succeed in describing universal phenomena, a unified model must be comprised of rules, dynamics and attributes which are themselves easily describable and which manifest their attributes at all scales in every open, complex, self-organizing system. The model proposed by Dr. Bak provides us with several of the key components of the model we are in the process of developing here. As you read through his work, I hope you will be struck by a single overriding impression - as sophisticated as his mathematical models are, the rules he derives from his observations are the quintessence of elegance and simplicity.

**Self Organizing Criticality**

It works like this: an open system does not become sufficiently complex to become self organizing until its level of organization breaches a threshold. In physics, this threshold is referred to as background noise, described by the

simple term  $I/f$ . In Darwinian terms, this means that in order for a system to begin to operate in a way that can be described as self organizing, the level of its organization, its volume, magnitude and complexity, must rise above a minimum, nominal level. This is consistent with everything we know about quantum mechanics - since the world we live in is a quantum world at every scale, this is also consistent with what we intuit and observe.<sup>107</sup>

A boulder does not move one micron [one millionth of a meter] until some outside force acts on it at some level which rises above the  $I/f$  threshold. You can push on a large boulder all day long, until you drop to the ground from exhaustion, but until you exert sufficient pressure to exceed the minimum force necessary to overcome inertia, the boulder will never move. However, once you have pushed hard enough to exceed the  $1/f$  threshold, it will certainly move. It always does. That is the law and it applies universally in the macrocosm.<sup>108</sup>

### **Entropy**

In their seminal book ***Order Out of Chaos***, Nobel laureates Ilya Prigogine and Isabelle Stengers<sup>109</sup> provide a road map which defines the track for man's new dialogue with nature. Their work broke totally new ground when it was published because it brought a simple, elegant order to our search for an answer to the question, "If the Universe operates in a perpetual state of chaos [which was what we believed before the book was published], why hasn't it self-destructed long before now?"

The underlying phenomena which give rise to this question revolve around a condition described in mathematical circles as "entropy". Entropy is a mathematical value which is used to describe the state of chaos which exists in a given system as the result of irreversible, externally imposed processes. In any system which has not reached a state of self-organizing criticality [the point at which creative and catastrophic events occur spontaneously within the system, without the intervention of outside forces], the rules of chaos and entropy operate with predictable consistency.

*Looking For Simple, Elegant Solutions*

---

Here is a practical example. A wine glass is a highly organized closed system of crystals defined by a rigid crystalline structure. Its state of organization is arbitrarily defined and rigidly reinforced. Its level of entropy (disorganization) is said to be extremely low, since its state of coherent organization is very high. But if the wine glass is dropped on the floor and shattered into thousands of pieces, this becomes an irreversible, externally imposed event. The system's state of coherence and organization are now entirely chaotic and its entropy is said to be high. This applies to a wine glass, as it does with all closed systems, because the wine glass itself is not self-organizing.

One of the questions which has plagued scientists for hundreds of years has to do with why we observe both destructive, dissipative events and self-organizing events of creation occurring simultaneously in a single universe. Thanks to the vitality of modern scientific techniques and instruments of observation, we can look out into the heavens and witness both the formation of new solar systems and stars in the same firmament in which we find unmistakable evidence of catastrophic events of mass destruction. The universe we live in is in a constant state of both self destruction and self organization, which we now know operates at every scale of creation. How can this be? What primary forces are in operation to define these processes and control their behaviors?

Thanks to the work of Prigogine/Stengers, Bak and others, we have a new context within which to seek answers to these questions. If our new integrated model is to work, it must answer these and a number of other critical questions with elegance and simplicity. In order to maintain a sense of order and perspective about this subject, let's first take a look at the four basic attributes of self-organizing systems provided by Dr. Bak. Then, after we have taken a moment to evaluate what they mean, we'll attempt to relate them to the other elements of our model.

All open, complex, self-organizing systems demonstrate all four of the following attributes:

**Punctuated Equilibrium:** Between each catastrophic event or "avalanche" there are long periods of relative stasis which are punctuated from



time to time by other "avalanches" of various magnitudes. These avalanches can be literal, as in the case of our sand pile or a snow covered slope, or they can take the form of mass extinctions, the rises and falls of the stock markets, the occurrence of solar flares, earthquakes, tornados, hurricanes or floods, wars, the Internet, etc.

**Power Laws:** The relationship between the magnitudes of avalanches and the frequency with which they occur can be expressed in terms of a simple exponential equation. There are no singular explanations for large events - the same forces which cause the Dow Jones Industrial Average to rise 5 points on one day also caused the crashes of 1929 and 1987. Wherever we find that a logarithmic relationship exists between a series of catastrophic events, we can be absolutely certain that the system which produced it is self-organizing.

**Fractal Geometry:** Discovered by Benoit Mandelbrot<sup>110</sup> of IBM, fractal geometry is a mathematical construct which illustrates that where a complex, open, self-organizing system exists anywhere in our space-time continuum, it is self-similar at all scales. In fact, fractals are the natural record of the evolution of natural, open, complex, self-organizing systems. The insights provided by this tool are essential to our new model.

**1/f Noise:** When a complex system evolves to a state of self-organizing criticality over a period of time, the record of its evolution can be described in terms which are also fractal. The shape of a river delta, the variegated slope of a mountain range, the shape of a coral reef, and the corrugated features of the human brain are all records of the evolution of self-organizing systems manifest in fractal form.

These properties are all so similar, when examined carefully, that we wonder if they are all manifestations of a single guiding principle. Is there a Newton's Law [ $f=ma$ ] of complex system behaviors? By the time we complete this discussion, it will become clear that self organized criticality, the spontaneous evolution of complex systems to a critical state, holds the key to understanding what these principles are and how they work.

**Punctuated Equilibrium**

So, let's begin. "Punctuated equilibrium" is a scientific term which describes events we observe every day. It is illustrated in its simplest form by referring again to our sand pile. As we add grains of sand - the process of adding periodic increments is analogous to the evolution of the system over time - we realize that we cannot predict when an avalanche, large or small, will occur. Nor can we predict its magnitude or its location. What we can predict, however, is that eventually, at one moment or another, when the addition of the next single grain of sand takes the sand pile to a point of criticality, an avalanche will occur.

In the short span of a single human life time, we all observe and are impacted by catastrophic events. They happen within and around us all the time, at an infinite number of levels, in all the sub-systems which comprise our physicality and the world we live in. These events are so much a part of our sensory experience that we become largely inured to all but the most catastrophic of them. What we notice and remember are the major catastrophic events of our lives. So it is with Nature. Changes occur in nature, not in a gradual way but as a consequence of major catastrophic events.<sup>111</sup>

On a broader scale, we can observe the record of a series of singularly catastrophic events which have occurred over periods spanning hundreds of millions of years. Mass extinctions, such as the collapse of the system which supported the dinosaurs, operate contemporaneously with a series of major geological events which continue to reconfigure the surface features of the planet.<sup>112</sup>

**Power Laws**

Power laws are expressions of a mathematical construct which describes the relationships between separate avalanche events. The simple exponential equations used to produce a graph of this information produce a straight line with a slope.<sup>113</sup> The points along the line represent single occurrences, avalanches, of a measured or estimated magnitude. As with earthquake

records, the occurrences of single events in any self-organizing system can be gauged in terms of their relative intensity.<sup>114</sup>

As we continue to build our sand pile, if we stay at it long enough, we will discover that for every event in which ten grains of sand slough off and tumble down the side [for example], there will be ten events in which only one grain of sand is liberated. For every event in which 100 grains of sand fall away in a single avalanche event, we will catalog ten events in which only 10 grains fall away.<sup>115</sup> This phenomenon is an identifying characteristic of all self-organizing systems. It is reflected in graphs taken from historical records based on the Richter Scale<sup>116</sup> of earthquake intensity and other historical records which catalogue events in systems which have not previously been recognized as self organizing.

When the record of earthquakes is taken as a whole, the logarithmic relationship between the individual events which occur within the system produces a single straight line with a slope. The slope angle characterizes the power relationships in self-organizing systems. The evidence is inescapable – the same power laws which apply to the behaviors of the sand pile apply with equal facility to earthquakes – the tectonic behavior of the earth's crust is unmistakably that of a complex, self-organizing system.

Over the past thirty years, studies performed by more than 100 teams of scientists and researchers have demonstrated that the world we live in, in all its manifestations, is comprised of an inextricably interconnected aggregation of complex, open, self-organizing systems and sub-systems which operate according to these dynamics at all scales.<sup>117</sup>

The power laws identified by Dr. Bak apply with equal facility to the systemic behaviors demonstrated by records of mass extinctions<sup>118</sup>, all weather-related events,<sup>119</sup> solar flares<sup>120</sup> and cellular automata<sup>121</sup>. An analysis of the patterns demonstrated by periodic measurements of rush hour traffic and the distribution of human settlements around the globe produces the characteristic single line with a power slope<sup>122</sup>. Apparently, human behavior also produces test results which suggest that what we do and how we operate in human

*Looking For Simple, Elegant Solutions*

---

communities are also part of a complex, self-organizing system. When we evaluate the periodic recurrence of key words, phrases and themes in the collected works of Shakespeare<sup>123</sup>, Beethoven, Mozart<sup>124</sup>, the Christian Bible, the Quran of Islam, the Vedas of ancient India and other voluminous collections of literature, art, music, mathematics and other forms of human expression, we find the same pattern being repeated. Power laws which describe the relationships between the frequency and relative magnitude of "avalanches" in any self-organizing system operate universally, with equal consistency at all scales of the Cosmos.

This is a discovery of monumental importance. It demonstrates the universal applicability of a single, simple, elegant operational dynamic which is common to all of creation, at every level and in every complex self-organizing system, regardless of its size. Understanding how the functions described by this model operate will help us unravel one of the perpetual mysteries of the Universe. Even though we have access to a whole lexicon of high technology observation and data collection devices, we are still altogether unable to reliably predict such things as earthquakes, local weather [tornados, hurricanes, floods, droughts, etc.], volcanic eruptions, the fluctuations in the stock markets or the dynamics of the Internet with any degree of reliability or consistency.

Why this is true is key to our understanding of how the Cosmos works. This insight is also indispensable to the construction of our model of the Cosmos because it suggests, among other things, that Descartes was seriously mistaken - it is not possible to separate "physical stuff" from "spirit stuff" in any meaningful way without doing suicidal violence to our search for understanding.

**The Role of Criticality**

As we construct our sand pile, there comes a time when the sand pile can no longer be considered just a stack of single, unrelated grains. As the mound of sand reaches the point of criticality - that point at which the  $I/f$  threshold has been reached and the power laws become operative - the sand pile becomes a single integrated system. As soon as this happens, it is no longer possible to

predict the magnitude, location or frequency of any single avalanche event. Even if we know everything there is to know about every single grain of sand comprising the pile simultaneously, the nature of open, complex and self-organizing systems is such that we would still not be able to improve the consistency, accuracy or reliability of our predictions.

We can predict only what the power laws permit. The importance of this insight cannot be overstated. It means, among other things, that in spite of all the best technology we will ever devise, we will never, under any circumstances be able to reliably predict the magnitude, location or timing of any events which occur as part of any self-organizing system<sup>125</sup>. This includes earthquakes<sup>126</sup>, solar flares, stock market behaviors, mass extinctions, meteor strikes, weather, geologic events or the behaviors of the Internet. If our way of thinking about the world we live in could be brought into alignment with the way the Cosmos really works, our approach to living would be altered in ways that are largely unimaginable.

One feature of the dynamic we call "criticality" flies in the face of the long-held notion about how the world has geologically evolved. For many decades, it was taken as gospel in the geological sciences that the geology of the planet evolved gradually, by slow, minimal, irresistible events. It is now unarguably clear that this notion was terribly mistaken<sup>127</sup>. The geology of the Grand Canyon, the appearance of the Rocky Mountains, the emergence of the Hawaiian Islands, the creation of the Gulf of Mexico are now known to be the results of catastrophic geological events.

In the human experience, we witness the same phenomenon. A phrase originating in the Middle East says it best: "The straw that broke the camel's back" illustrates what happens with our emotional state when we reach a state of criticality. A single insignificant event, perhaps unrelated to anything which has occurred in our recent past, often triggers a violent, seemingly senseless overreaction. This event, the triggering of violent emotional reactions which far outweigh in their magnitude the significance of the event which occasions them,

*Looking For Simple, Elegant Solutions*

---

is an avalanche of the purest sort, a catastrophic event which occurs out of all proportion to the causative event. Indeed, we are walking, talking, self-organizing systems, poised on the brink of catastrophic behavior all the time.<sup>128</sup>

Criticality is mathematically defined as the state of highest efficiency in a complex system.<sup>129</sup> At the point of criticality, catastrophic events happen in a big way, all at once, and not by gradual degrees. This is as true of rush hour traffic jams as it is of mass extinctions and major weather events. When we understand this aspect of complex systems, we also begin to understand something fundamental about the way Nature works.

**The World Wide Web**

One of my favorite examples of self-organizing criticality is the emergence of the World Wide Web and Internet over the past thirty years. The history of the Internet illustrates in a most dramatic and present way every aspect of self-organizing behavior in complex human systems. Before the system could manifest itself, a number of intermediate foundational steps had to occur first. In relative terms, the system has emerged as a series of clearly identifiable quantum events, none of which were predictable in advance, and all of which demonstrate strict adherence to the rules which govern self-organizing systems.

Once the infrastructure had been defined by a small number of original participants [government sponsored laboratories and university-based research groups], the system limped along in a state of stasis for nearly a decade before a single event of any significance occurred to alter its "shape." During this period, the Web was the almost exclusive province of a few researchers and scientists whose primary objective was to share and distribute research data.<sup>130</sup>

In the early 80's, a significant and altogether unanticipated series of "avalanches" occurred. With the emergence of (1) the personal computer and (2) the development of advanced telephony connectivity technologies, which enabled personal computers to talk to one another via conventional residential telephone lines, the stage was set for an explosive, catastrophic avalanche of new innovations which has fundamentally altered the global landscape of commerce and communications. Within the past ten years, personal computers

and the manner in which they facilitate access to ever-evolving kinds and volumes of information via the World Wide Web and the Internet have brought us to a point of criticality once again.

The economic consequences of this series of catastrophic events have always been fundamentally unpredictable. The cascade effect produced by the emergence of the Web and the Internet, as a generally distributed and universally available means of producing, transmitting and accessing information, has been documented by a number of prominent research organizations. Care to guess what the data accumulated by these groups looks like when plotted over time?<sup>131</sup> What is most fascinating about this social phenomenon is that the Internet as a system is evolving as it has because its practitioners recognize that everything is information.

By definition, the Internet traffics in a single commodity - information. It is likely that the long term effect of the emergence of the Internet will be to significantly reorient our thinking about how the world works, in all aspects of life on this planet, in the same way and perhaps to the same extent that a single catastrophic event caused the extermination of dinosaurs. If it continues to operate as it has in the past [and there is no assurance that it will], the predictions made by Arthur C. Clarke in 1984 could eventually come to pass.<sup>132</sup>

The emergence of the Internet and the recent catastrophic collapse of the dot-com stocks on the world's publicly traded stock markets demonstrate perhaps more clearly and powerfully than any other current phenomena how self-organizing systems operate in the human community. This insight is compelling because it takes us to a point of consideration not previously explored in this context. Does human behavior, taken as a whole without respect to individual behaviors, correspond to the rules which define self-organizing criticality in complex, open systems?

## **SECTION ONE**

### ***Looking For Simple, Elegant Solutions***

## **CHAPTER FIVE**

### ***The Myth of Upper Limits***

#### **Criticality At All Scales**

Thus far, we have examined the behavior of self-organizing systems in the middle ground - those which we can observe and measure directly. Do the same rules apply to the macrocosm, to the Galaxy and the rest of the Cosmos? Do they apply as well to the behaviors of the primary systems operating in the microcosm? If our data is to be believed, and if we can avoid taking too great a leap of imagination, perhaps we can demonstrate that the rules intrinsic to the behavior of self-organizing systems operate at all scales with equal facility.

The Milky Way Galaxy is, in the most real sense, a self-organizing system. The shape of the star system and its intrinsic, observable behaviors demonstrate all the attributes associated with such a system.<sup>133</sup> At the macrocosmic level, however, we have to ask some difficult questions. How is it, if the speed of light is the upper limit at which information can be conveyed across the physical universe, that stellar bodies separated by 100 million light years exert a real-time, measurable, instantaneous effect on each other?

By definition, all self-organizing systems operate in compliance with the principles of quantum mechanics referred to in Bell's Theorem and Gisin's experimental work, known as "Simultaneity: Non-local effects at a distance".<sup>134</sup> This is a scientific expression which simply means that in quantum systems, what happens in one locale has a measurable, instantaneous effect on every other component of the system, regardless of the distance which separates the components from each other. It happens in our sand pile and in all the mid-



sized self-organizing systems we know anything about. Is the Milky Way Galaxy any different?

### **Bell's Inequality**

Let us digress for a moment to reset the context for this discussion. J.S. Bell formulated a theorem which has come to be known as Bell's Theorem.<sup>135</sup> In simple terms, Bell's theorem predicted two fundamental behaviors of quantum systems which have vexed theoretical physicists for more than thirty years. First, he predicted that one day, an experiment would be devised which would demonstrate that the process and means of observation exert a measurable effect on that which is being observed. If proven correct, Bell's notion would mean that the fundamental underpinnings of the scientific method are flawed by design. This principle, which is central to quantum theory, lies at the heart of the issues Albert Einstein could not reconcile before his death.

The scientific method rests on a pillar called "detached observation," which requires that scientists observe the phenomena which characterize the world without in any meaningful way disturbing the process. Bell reasoned that if it could be shown that the simple act of observation exerts a demonstrable influence on the that which is being observed, everything about the way we conduct scientific evaluation would have to be fundamentally altered.

Second, Bell predicted that because we live in a quantum system, information originating in one part of the system is conveyed instantaneously to every other part of the system, without regard to time or distance. One of the founding fathers of quantum physics, Neils Bohr, agreed with him<sup>136</sup>. Again, this flies in the face of one of the fundamental pillars of modern science. This prediction, always thought to be nothing more than a speculation which would never be provable, suggests that the speed of light is not, as the Second Postulate of Einstein's Special Theory of Relativity claims, the upper limit at which information can be exchanged in our space-time continuum. Currently held notions regarding the absolute inviolability of this notion are so deeply embedded in the collective psyche of the scientific community that any direct

challenge to its validity elicits the most vigorous resistance. Nothing, it is said, absolutely nothing in the Cosmos can travel faster than the speed of light.<sup>137</sup>

### **The Aspect Experiments**

In 1991, a group of scientists led by Dr. Alain Aspect at the University of Paris, France, conducted a series of experiments which turned the scientific world on its ear. Aspect proved that the act of observation does, indeed, exert a demonstrable effect on the behavior of the material world.<sup>138</sup> His famous dual slit experiment with electrons demonstrated that in the moment a measurement is taken, the conscious choice of the observer (to measure the electron as a quantum of energy with waveform attributes or as a distinct particle with measurable mass) determines which attribute each single electron will exhibit at the moment of detection. The ripple effect of this astounding discovery has still yet to be fully absorbed by the scientific community a full ten years later.

Much time, energy and talent have been expended by scientists around the world to disprove Aspect's results. Since no one has yet succeeded in discrediting either Dr. Aspect himself, his methodology nor the results produced by his demonstrations, the current line of thinking in the scientific establishment is that this is simply an isolated case which cannot be generalized to other aspects of the material world beyond the microcosm.

Unfortunately, the lid to this Pandora's box has already been fully opened. Other scientists in other disciplines at laboratories all over the world are finding and reporting similar results in a broad variety of impeccably documented experiments. The most fundamental tenet of the ancient book of Hindu verses known as the Vedas has now been unarguably demonstrated. The act of observation and the means of observation cannot be separated from that which is being observed.<sup>139</sup>

### **The Wheeler Experiments**

This aspect of the nature of things does not apply just to the world of the microcosm. Dr. Archibald Wheeler, one of the scions of applied and theoretical

physics and winner of the Nobel Prize in Astrophysics, published the results of an experiment which should have been heralded on the front page of every newspaper in the world. Few outside the scientific community have ever heard of it and fewer still have grasped its fundamental importance.

In a carefully devised experiment, Dr. Wheeler set up a telescopic device to measure the light emitted by star clusters estimated to be 12-15 billion light years away. Until the deployment of the Hubble Space Telescope, this distance was believed by proponents of the now largely discounted Big Bang theory to be the outer limit of the Universe<sup>140</sup>. Today, after the introduction of the Hubble Telescope, it is becoming increasingly clear that there is probably no outer limit to the Universe, which appears to be expanding at an accelerating rate.

When a star emits light, it does so in a way which can be described as omnidirectional or spherical. Equal amounts of light energy are propagated in every direction with equal intensity. At a distance of 12 billion light years, what is detected by the observing device on Earth often consists of single photons. This is significant because the state of the art of our existing technology has not yet produced devices which can propagate single photons, the stuff of which light is comprised, one at a time.

So, the measurement of photon traffic from far distant stars gives us an opportunity to make observations which are not yet possible by any other means. It is paradoxical that observation of the largest of all systems provides us with the means to observe the behavior of the smallest known component of discrete information, the photon. In this instance, we witness again the role of complementarity at work in the Cosmos.

While Dr. Wheeler was conducting his experiments in observation, he introduced a variable means of interpreting the data provided by his telescopic device. The objective of the exercise was to discover whether photons emitted by far distant sources travel directly toward the earth in a straight line or whether, as predicted by Einstein's General Theory of Relativity, space-time is curved by

gravitational forces which bend light in a great arching curve, which eventually travels back to its point of origin<sup>141</sup>.

Wheeler had reason to believe that the photon detection devices he used made it possible for him to distinguish between photons which had traveled in a straight line and those which had arrived at his detector via a curvilinear route. As he was making his observations, a startling thing happened. He discovered that in the moment he elected to measure a photon as having traveled a linear course, it demonstrated linearity in its data set. But when he elected to measure the photon as if it had traveled a steeply curved path from the point of origin, it demonstrated that set of attributes instead.

He realized immediately that something spectacular was occurring which defied conventional scientific wisdom. A single photon cannot have traveled two separate routes simultaneously - according to conventional wisdom, each photon has to have traveled either one route or the other. Nevertheless, the simple act of observing appears to have dictated the behavior of each photon as it was detected.<sup>142</sup> Again, no one published these results on the 10:00 o'clock news.

As with Dr. Aspect's results, the scientific community has exhibited all the familiar symptoms of resistance to accepting a result which challenges the fundament of the conventional scientific model. Our cause has not been made easier by the fact that a whole generation of New Age pundits has attributed meaning to his experimental results which are quite irrational. Nevertheless, this result tells us something that is important.

The long held notion, propounded by Albert Einstein and generally accepted by the scientific community of the West, that the speed of light is absolute and everywhere constant, can no longer be given credence. We can no longer rely on any model which is based on this assumption.

Another result of Wheeler's work is even more difficult to accommodate in the framework of the Standard Model. Even though the photons he detected were emitted 12-15 billion years ago, his current choices exerted a demonstrable effect on the data set originally incorporated into the attributes of

each photon he measured, as he measured it. The ability to exert a teleological effect, that is, an effect which bridges the time domain, by exercising conscious choice, holds particularly significant meaning for us.

### **C.E.R.N. Non-Locality Experiments**

In 1996, Dr. Nicolas Gisin and his colleagues at Geneva's CERN linear particle accelerator facility made another incredible breakthrough related to Bell's Theorem and its predictions. Bell's predictions regarding non-local effects at a distance in a quantum system had never been verifiable because the physical devices needed to measure the instantaneous occurrence of two identical events at a distance had not yet been developed. But in 1996, Dr. Gisin and his colleagues performed an experiment which has earth shaking implications.<sup>143</sup>

In Switzerland, at the CERN Linear Accelerator Laboratories, a team of world class scientists succeeded in separating the twin particles of a positron-electron pair by sending them off in two opposite directions through more than 30 kilometers of fiber optic cable. As one of the particles was exposed to an electromagnetic field which altered its spin polarity, the second particle instantaneously accommodated this alteration by modifying its own spin polarity to compensate, in the same manner as it would have if the pair had not been separated.

After verifying this experiment a number of times, the team published a report which made the observation that the information which was shared between the two particles could not have been transmitted by light because the velocity of the information exchange occurred at least one order of magnitude (ten times) faster than the speed of light. They further suggested that the information must have been conveyed by a mechanism which is not known to science or accommodated by our current model of quantum mechanics. They have called their result "Simultaneity – Non-Local Effects at a Distance." This phenomenon is a key ingredient in the new model of the Universe we are attempting to build.

Another of the pillars of the scientific method currently in use is invalidated by this experiment. It proves that Bell was quite correct in his predictions – simultaneity does, indeed, operate at all scales of the physical world in which we live. Einstein's Special Theory of Relativity insists that the speed of light constitutes the upper limit for the rate of information transfer everywhere in the Universe, under all conditions. We now have reason to believe that this notion is quite mistaken. Accordingly, we are compelled to find a way to describe the mechanism which supports Gisin's demonstration of non-local effects at a distance. If light is not the carrier of such information, what is?

### **Hodowanec's Gravimetric Sensor Effect**

Scientist Greg Hodowanec made a startling discovery about a critical aspect of this otherwise unexplained phenomenon.<sup>144</sup> In his laboratory he had an electronic scale, a device used for measuring the mass of various substances, much like the electronic scales which are sold by dozens of manufacturers in North America. He noticed a peculiar thing about this particular device – before he could use it, he had to re-calibrate it to zero every morning and afternoon. Since it was an older device which did not have a self-calibrating circuit in its electronic architecture, he began to wonder why its calibration fluctuated as much as 10% on some days and at least 2%-3% twice every day. This conundrum is particularly applicable to our discussion because it compelled him to re-examine another of the bed rock fundamentals of the current model.

It has been long held, since the publication of the formulas describing gravitational force developed by Einstein, Podolski and Rosen,<sup>145</sup> that gravitational force is constant in any locale, except as that locale is acted upon by the gravitational force of bodies outside the locale, at some measurable distance.

The force of gravity is said to vary as an inverse proportion of the square of the distance separating the two bodies. Gravitational force is also claimed to operate as a fundamental manifestation of mass density – the greater the mass of any object, the greater its gravitational constant is supposed to be. The

Einstein-Podolski-Rosen (EPR) formulation describing gravitational forces is one of the bedrocks of the current scientific model.

Unfortunately, at the time Hodowanec was puzzling over the behavior of his scale, no one had developed a means by which to verify some of the basic assumptions associated with what has come to be generally accepted as the Law of Gravitational Force, as described by EPR. If the EPR formulations were to be taken at face value, Hodowanec reasoned he should be able to explain the fluctuations in the calibration of his electronic scale by charting the path of the nearest heavenly body known to exert a measurable gravitational effect on the Earth – the moon.

Try as he might, Hodowanec could not find a correlation between the cycles or location of the moon and the variations in the calibration of his device. After verifying that the electronic components used to construct the device were themselves sound and therefore not the source of oscillation in the system, he began to collect data from a wide variety of news sources and by measuring the fluctuations in the unaltered scale itself over a period of several years.

As luck would have it, on one particular morning, his recording device [a paper roll and pen device similar to a seismograph data recorder] began to oscillate wildly back and forth. He took note of the precise time at which this fluctuation was measured and wrote it by hand on the paper roll. The next morning, the NOAA reported the occurrence of a major solar flare, larger than any which had been observed before. The precise time given for the NOAA's recording of the event was 8 minutes 33 seconds later than the time shown on Hodowanec's paper recorder roll.<sup>146</sup>

In a series of subsequent experiments conducted over a period of more than 30 years, Hodowanec and a number of his colleagues, along with several Russian scientific teams, have developed gravimetric sensor devices which are both highly directional and extremely sensitive to the fluctuations in the gravitational force exerted by heavenly bodies<sup>147</sup>. His devices and techniques were simultaneously replicated by two teams of Russian scientists working

*Looking For Simple, Elegant Solutions*

---

under contract to the Russian Academy of Sciences. Neither knew of the work of the other until the summer of 1998, when the results of both sets of data were disclosed at the International Symposium of the New Energy Society held at the University of Utah in Salt Lake City.<sup>148</sup> The results reported by these independent teams of researchers demonstrates that information conveyed in the macrocosm operates in compliance with Bell's Theorem.

By virtue of a means not then understood, it was possible for Hodowanec and the Russian scientists to observe both the time and magnitude of the solar flare a full eight and a half minutes before the photons carrying the information arrived at the Earth. The magnitude of the catastrophic event represented by the solar flare did not operate within the context of gravitational force alone – something intrinsic to the structure of space-time in our dimension was shown to be operating in ways which are simply unexplainable by the conventional model.<sup>149</sup>

The importance of this information, coupled with the fundamental rules governing the operation of self-organizing systems, makes several things inescapably clear. First, notwithstanding the importance of Einstein's contributions to our ability to understand the way the world works, he was mistaken in several important regards. This does not mean he was wrong – he was not named the Man of the Century for nothing. What it does mean, however, is that we now have access to information that he did not possess.

This in turn requires us to fundamentally re-assess our notions about how the world works.<sup>150</sup> If we are to succeed at building a model which can be relied on to describe how nature works from top to bottom and everywhere in between, we are compelled to step away from notions we know to be inadequate, incomplete or incorrect.

This means that we are forced to step outside the box of conformity. We are compelled to re-examine the fundamental underpinnings which support the scientific method and re-engineer the Standard Model to comport with what we have observed and experimentally verified.



We are now equipped with sufficient information to know that several of the fundamental underpinnings of the Standard Model are in error. Armed with that information, it is time to begin reconstructing the model to accommodate experimentally observed results we cannot ignore or explain.

## **SECTION ONE**

### ***Looking For Simple, Elegant Solutions***

## **CHAPTER SIX**

### ***The Fractal Universe***

#### **Information Without Context**

The camera is mounted vertically so that its lens points straight down towards the ground during level flight. As the plane flies over the surface, the images it produces are stunning. Repetitive patterns of shimmering golden light ripple and writhe before us in stark contrast to a snaking counterpoint of darkening shadows.

At first, because our view is restricted to a narrowly defined frame, the patterns of light and dark have no meaning. They have no context or scale. While the flow of images is certainly beautiful and pleasing to observe, at this primary level the camera provides a montage whose meaning we can only speculate about. As beautiful as the images are, we feel distinctly uncomfortable after awhile because it is impossible for us sort out what we are looking at.

As the camera view ascends to a greater height, we eventually realize that the undulating patterns flowing across the screen are the peaks of an endless sea of sand dunes, defined with astonishing clarity by the shadows of sunset which separate them. Suddenly, we see the shadow of a Gypsy Moth biplane moving laterally below us across the surface of the desert - it dawns on us in a flash of insight that we are seeing what the pilot sees as he flies above the searing desert.<sup>151</sup> How we come to recognize what we have been viewing is the topic of a later chapter – it has to do with the way the human equipment is architected and imprinted with pattern recognition programs, structures and

operating routines which give meaning to the things we apprehend around us.<sup>152</sup>

The scenes which open the motion picture **The English Patient** provide a stunning example of how Nature works. It is no surprise that the beauty and magic captured by the images are made of sand, a seemingly endless sea of it, displaying all the fractal attributes of a self-organizing system, operating in the interference fringe, at the point of criticality. The patterns emerging from the sea of sand constitute a perfect example of fractal behavior and hold the key, I believe, to understanding one of the greatest of all the mysteries of creation.

Let us make a distinction here about the difference between the remains left by chaotic decay and the fractal appearance which represents the evolution of a self-organizing system. Benoit Mandelbrot of IBM's T.J. Watson Research Center in New York, coined the word "fractal" as descriptive of the geometrical structures which display self-referent features of all length scales.<sup>153</sup> In plain English, this means that wherever a naturally occurring geometrical feature is found which holds the record of evolution of a self-organizing system, with common features, attributes or structures occurring at each scale or level of measurement, then the image displayed by the structures is said to be fractal.

Features which represent fractal displays are all around us – the structure of mountain ranges,<sup>154</sup> the surface features which define a shoreline (which distinguish the points of interface between the land and water),<sup>155</sup> the surface features of the human brain<sup>156</sup>; the undulating landscape of the tropical rainforest<sup>157</sup> or the delta of any major riverine system when viewed from a satellite;<sup>158</sup> the structure of a coral atoll or the ancient Hindu pattern known as the paisley.<sup>159</sup> All of these patterns contain the record of evolution of complex, open, self-organizing systems.<sup>160</sup>

In contrast to the attributes of the fractal patterns arising from the behaviors of complex systems, we immediately recognize the results of chaotic, catastrophic events occurring in closed or insufficiently organized systems.<sup>161</sup> Impact sites where asteroids have struck the surface of the planet<sup>162</sup>, the ejecta patterns defining the eruption of Mount Saint Helens<sup>163</sup>, the dispersion patterns which characterize the explosion of a star in the heavens<sup>164</sup> - all these patterns

demonstrate the effects of chaos, the catastrophic, irreversible evidence which chronicles events occurring in systems which are either closed or which have not yet become sufficiently sophisticated to operate at the point of criticality. Chaos operates in terms of events precipitated by external causes – self-organizing behavior operates spontaneously without regard to external causes.

### **Nature is Fractal**

On March 1, 1980, Benoit Mandelbrot made what can only be described as one of the most important discoveries in all of science. In addition to announcing the discovery of fractal geometry, he was the first to make the astounding, revolutionary observation that Nature is by definition fractal.<sup>165</sup> We can appreciate the importance of his discovery by recognizing, for example, that the coast of Norway, which appears to be based on a hierarchical structure comprised of fjords, is instead comprised of fjords within fjords within fjords within fjords, ad infinitum. The question, "How long is a typical fjord?" has no answer - the phenomenon exhibits a set of attributes which are said to be "scale free," that is, an examination of the fjord attribute leads to the discovery of fjords within every level of fjords, regardless of our standard of measurement.<sup>166</sup>

If you see a picture of part of a fjord, or part of the coastline, you cannot make any reasonable guess about its length or size until the picture also provides a ruler to give you a sense of context or scale. Also, the length to be measured depends on the resolution of the measuring device. A very large ruler designed to measure features only on the scale of kilometers will yield much smaller estimates of overall length than if a fine ruler, which can follow details on the scale of meters or centimeters, is used. This attribute of geology, the creation of a fractal image which chronicles the history of a system's development and evolution, is common to all self-organizing systems.<sup>167</sup> This includes graphical representations of the behavior of traffic<sup>168</sup>, the long-term behaviors of the stock markets<sup>169</sup>, the extinction and emergence of new species in biology<sup>170</sup>, the history of warfare among humans, the structure of DNA and all other biological systems. Manfred Schroeder's extraordinary book **Fractals, Chaos, Power Laws: Minutes From An Infinite Paradise**<sup>171</sup>, provides a

splendid, breathtaking view of the beauty of fractals, illustrated by their general occurrence at all levels in Nature.

University libraries are filled with an ever-growing number of volumes which attempt to characterize the geometrical properties associated with fractals. However, the fundamental question, what Bak refers to as "the dynamical origins" of fractals, has yet to be satisfactorily answered. Where do fractals come from? What underlying mechanism defines and produces them? Are they common to all self-organizing systems? Do they operate at every scale of the Cosmos?

The importance of fractals and Mandelbrot's insight into their functions is as important a discovery as the work of Copernicus<sup>172</sup>, who first observed that the planets in our solar system orbit around the Sun. Isaac Newton developed a set of mathematical formulations to describe the dynamics of planetary motion<sup>173</sup> and Albert Einstein provided the theoretical bridge which allows us to rise above the outdated notion that Nature is just a clockwork mechanism<sup>174</sup>. The astonishing thing about fractals is that absolutely nothing arising from the evolution of physics since Galileo even hinted at their emergence. In the language of the science of complexity, this discovery was truly an "avalanche" event.

The significance of the discovery of the fractal nature of the Cosmos on our search for meaning and primal causes cannot be overstated. Taken by itself, our recognition of the role of fractals as an attribute of natural occurrence has already exerted a significant impact on the way we live. Satellite photographs illustrate the eerie majesty of surface features of the planet which are caught in the act of self-organization one frame at a time. We see the unmistakable hand of self-organizing criticality at work every time we watch the satellite photographs used by television weather forecasters. In the local weather behavior evidenced by tornadoes, hurricanes and floods, we witness a daily sequence of catastrophic events of varying magnitudes, all driven by the same set of forces. When we analyze weather as a global phenomenon, we see the record of evolution displayed in fractal patterns.<sup>175</sup>

Recognition among scientists and engineers of the fundamental nature of fractal geometry has led to the development of a whole new variety of terrain recognition programs<sup>176</sup>, pattern recognition algorithms<sup>177</sup>, image and data compression engines<sup>178</sup>, military hardware, law enforcement search engines and the sophisticated software routines which drive the Hubble Space Telescope. Law enforcement agencies now routinely use fractal recognition programs to analyze satellite photography of the mountainous regions of Columbia, Bolivia and Peru. Wherever the dimensioned corner of a manmade structure interrupts the fractal patterns of the rain forest, it is possible that a drug processing laboratory has been built there in concealment.

Economists have yet to come to terms with the fractal nature of the self-organizing behaviors of the capital markets<sup>179</sup>. CitiCorp recently paid the Santa Fe Institute eight million dollars to develop a tool which would enable the corporation to forecast capital and economic trends just twenty-four months into the future<sup>180</sup>. In spite of the sophisticated mathematics provided by a team of Nobel laureates, the model quickly proved to be inadequate and unreliable. So long as economists attempt to deal with the ebbs and flows of our capital economies in terms of empirical statistical predictors, rather than recognizing the invariant fractal nature of self-organizing systems, there is no likelihood that the Federal Reserve will demonstrate any higher degree of accuracy in its economic forecasts than the state of California has in its failed attempts to predict the location, timing and magnitude of earthquakes or energy supplies.<sup>181</sup>

Nevertheless, the role of fractals in our consideration of how Nature works has been seriously understated. Consider this: after nearly 100 years of intensive investigation by the best minds in the human community, three things [among others] have become abundantly clear. First, the Universe we live in is a quantum universe<sup>182</sup>. The universality of this insight could not be more important, for if it were not so, we would have no significant ability to understand or predict the workings of the material world beyond its grossest attributes.

Second, the Universe we live in is holographic.<sup>183</sup> While Descartes and Newton were creating their model of the material world in terms of "physical stuff," they completely and deliberately disregarded something which has now become self-evident. It is no longer possible to conduct valid scientific inquiry without incorporating "spirit stuff" as an intrinsic and indispensable source of information. What this means, why we know it is so and how it works has a direct, inextricable relationship with the phenomenon Mandelbrot called fractals. Third, the Universe is self-referent, "conscious" by its very nature.<sup>184</sup>

### **The Fractal Equation $Z \rightleftharpoons Z^2 + C$**

Taken together in a single context, the self-organizing attributes of the Universe can all be described in terms of a set of simple, elegant rules which are universally applicable to all of Nature. The nature of those rules, their attributes and functions, are largely functions of mathematical expressions. It is an axiom in publishing, at least with regards to books which are slated for general distribution in North America, that the addition of a single mathematical formula can be expected to result in a decrease of book sales by 50%. If this year's SAT scores are any indication, this may very well be true. In any event, nearly everyone who speaks the English language is familiar with at least one mathematical formula, Einstein's famous equation,  $E=MC^2$ . Perhaps we can take the liberty of bringing another disarmingly simple formula to your attention. While there is now considerable question about the validity of the first, there is little disagreement about the validity and significance of the second.

In the case of fractals, the formula is equally simple:  $Z \rightleftharpoons Z^2 + C$ .<sup>185</sup> There are two key differences between this equation and Einstein's. First, you will note that there is no "equals" sign (=) in the equation. It has been supplanted, instead, by a symbol which means "goes to and returns from" ( $\rightleftharpoons$ ). This means that the simple set of numerical values which are specified for the equation (this is the second difference) modify each other in an infinite, endless sequence of self-referencing computations, a feedback loop, until one side or the other either becomes "free" (reaches infinite values) or goes to zero.

This is the essence of the fractal function – a series of simple calculations based on the simplest of rules refers back and forth on each side's results until a numerical freedom is attained, in which case the value becomes represented by a series of infinitely complex patterns. The geometric patterns which arise in fractals are self-similar and infinitely variable at the same time. Again, we find unmistakable evidence of the primary principle of complementarity at work.

In the alternative, the computational results occasionally produce a null [zero] value which is totally deterministic. This means that when the computational result of a cycle becomes zero, the map coordinates represented by those values become captured, bound or defined by the "free" values on the other side of the equation.

This reciprocal function of the fractal variables produces both bounded states, which appear in the Mandelbrot Set as black, darkened areas (which are the "seed" areas from which other patterns emerge and differentiate), and "free" states, which manifest themselves in individuated patterns which are both similar and mutually distinct from each other in infinite variations of shape and color.<sup>186</sup>

It is in precisely this way that DNA, for example, is able to contain the encoding necessary to both define biological structures and create infinite similarity and variability in all the tissues, systems, organs and structures of living things.<sup>187</sup> This is the same set of baseline functions which operate in concert with Bak's rules of self-organizing criticality, to define species whose members are clearly similar but distinctly individuated. These functions operate in concert to produce the Nature we are expressions of.

The Cosmos operates in the same manner at all scales. While Mandelbrot and his colleagues may have intuited the extension of their discoveries to include the Cosmos at large, it was not until the Hubble space telescope was repaired and put into full operation in the Spring of 1993 that astronomers were able to actually verify the extraordinary extent of fractal functions operating in the most distant reaches of the Cosmos<sup>188</sup>. High-resolution color images of the Eagle and Crab Nebulae captured by Hubble and transmitted to astronomers on Earth, for example, stunningly demonstrate the operation of



fractal geometry in the vast cosmic nurseries in which stars and star systems are at this moment being born. Indeed, every attribute of the heavens subscribes to the functions of fractal geometry, at every observable scale in the macrocosm.<sup>189</sup>

In his wonderful book, **The Artful Universe**,<sup>190</sup> physicist John Barrow explains why we find inexpressible beauty and majesty in this recognition. Because the Cosmos is fractal, because we are fractal, because our architecture is fractal, because our essence is inextricably interwoven into the fabric of the Master Fractal, humankind has always recognized an ineffable connection with the extraordinary beauty we witness every night, as the vision of the heavens emerges from the darkness of night.

Whether fractal geometry functions as a defining force at an infinite scale of smallness throughout the microcosm is a question for which we do not as yet have a definitive answer. Stephen Hawking's belief is that the physical universe as we know it, in our four-dimensional continuum, does indeed appear to have a primary lower limit.<sup>191</sup> This dimension, cited as  $10^{-33}$  cm (a diameter defined as a period followed by 33 zeroes), was first defined by Max Planck, one of the fathers of Quantum Theory and one of the intellectual giants of the 20<sup>th</sup> century.<sup>192</sup> This dimension, known as the "Planck Length," constitutes a cornerstone of current mathematical estimations of the smallest possible size in the Universe. It is at a diameter approaching this point, for example, that sub-quarks demonstrate their dash--space--dash--space behavior. And it is at this point that super string [M] theory, theories of super-symmetry and other Western calculations of the origins of the material world, all find a common point of resolution.

### **Ian Stewart's Insight**

Dr. Ian Stewart, Chairman of the Mathematics Institute of Warwick University, first intuited the value of fractal geometry as a tool for general use by scientists and engineers.<sup>193</sup> Instead of applying linear-sequential standards of measurement conventionally employed to derive meaning from large volumes of data, he intuited that fractal formulations could be employed to allow the

*Looking For Simple, Elegant Solutions*

---

data to manifest itself in natural ways which cannot be intuited by conventional means of measurement. As a result, he and his colleagues at the Georgia Institute of Technology developed a revolutionary new method for compressing and decompressing digital images.

Dr. Michael Barnsley of the Georgia Institute of Technology, one of the leading lights of research into the nature and uses of fractal geometry, had an epiphany one night as he slept.<sup>194</sup> After working for months to find a way to apply fractal geometry to practical considerations, he experienced a repeat performance of a dream he had had repeatedly for more than 20 years. He describes the image in his dream state

*...of an infinite array of switch terminals connected by an equally infinite array of connecting lines, so that every junction was connected to every other junction throughout infinity.*

The jumble and clutter of the image as it grew in his imaginings would eventually become so disturbing and incomprehensible that it would wake him up. But in the last of these dreams, he suddenly realized that by using simple fractal geometrical formulas, he could both understand and recreate the images of the infinite interconnectivity he saw in his dream.

When he awoke, Dr. Barnsley drove immediately to his laboratory and began crafting computer codes which provided his software routines with a way to reduce an aggregation of complex data into a single set of variables, described by a simple fractal formula. Eventually, after much work and refinement, Dr. Barnsley was able to create software routines which recognize images of natural objects, derive the fractal formula which defines their appearance and then, using the formulas alone, reproduce the objects themselves in stunning variety and detail. Today, the power of this brilliant insight is being harnessed for a number of commercial applications which hold the promise of enormous productivity for the future.

Since that time, other scientists, mathematicians and engineers have developed variations on fractal geometries which now make it possible for artists, engineers and scientists to create images of clouds, mountains, river

deltas, geographical coastlines, thousands of varieties of plant and animal forms and so on.<sup>195</sup>

What this means for our considerations is simply this: the universe we live in is fractal to its most primary functions. This applies universally because in the final analysis, what fractals do is provide a template which defines the forms and functions for everything which exists, by applying a simple, elegant set of rules to the self-organizing behavior manifest by the most basic set of data. Fractals organize information to produce the manifestations of physicality and, as we have shown, everything, absolutely everything, is information.<sup>196</sup>

In order to understand why this is so and how it works, we are compelled to see if we can discover any primary relationship between fractal geometry and the laser-produced light effect known as the hologram. Unraveling the particulars which comprise this fundamental relationship constitutes the ragged Edge of our understanding. It is also key to answering many fundamental questions not yet answered about fractals, such as, where do they come from and what role do they play in the evolution of the Cosmos?

There is only one other phenomenon in the known universe which manifests the localized functional attributes found in fractal geometry on a non-local basis. We have come to know it as the hologram. The importance of the relationship between fractal geometry and the attributes of holograms has not been explicitly stated before. I am convinced that the relationship between them is significant and constitutes one of the foundational premises supporting the new model we are creating.<sup>197</sup>

### **Fractals Are Not Just Ideas**

As we pass through this hole in the looking glass, remember one important thing: the fractal forms produced by the Mandelbrot Set are not just imaginary. They are as real as the air you breathe and the ground you walk on. They manifest an infinite variety of similarly individuated forms, all of which contain in each local scale of detail all the information contained in the whole set, even if the full expression reaches virtually infinite physical proportions. Regardless of where you begin examining or displaying the pictorial images produced by

the Mandelbrot Set, eventually you will find that you have obtained access to all the information contained in the entire formulation.

Dr. Barnsley estimates that a fully expressed Mandelbrot Set would have a radius reaching from the Earth to the star system known as Sirius, the Dog Star, located 3.7 light years away. The importance of this attribute of fractals is stunningly illustrated in the film produced by Arthur C. Clarke entitled, "**Colors of Infinity**"<sup>198</sup>, which is available in most video rental and sales outlets. I highly recommend it. Nothing in our experience reflects more graphically and immediately how breathtakingly beautiful this notion is.

### **Holograms and Fractals**

Similarly, when any part of the photographic film plate used to produce a holographic image is introduced into the image-production environment, regardless of how physically small the segment may be, the entire original image can still be produced. What this means, among other things, is that within the information set which defines the structure of each phenomenon found in Nature, there is embedded a fractal record containing sufficient information, at any level of resolution, to enable us to reproduce a complete three-dimensional image of the entire object. Remember: when we create a holographic image with laser light, we are relying on nothing more than the interference patterns produced by coherent light, passed through a two-dimensional image (a photographic plate) of the object, to recreate a three dimensional image of the object in real space.<sup>199</sup>

What does this mean with respect to our quest for understanding how Nature works? For one thing, it means that if it can be established that the Universe is holographic as well as fractal, we will have discovered a solid link between the simple, elegant set of rules which define the appearance, form, behaviors and attributes of all things found in Nature, at all scales, with the fundamental template implicit to the implicate structure of the Cosmos. Is Nature holographic? I believe we can show without question that it most certainly is.

## **SECTION ONE**

### ***Looking For Simple, Elegant Solutions***

## **CHAPTER SEVEN**

### ***The Holographic Universe: Implicate Non-locality***

#### **The History of Holograms**

If you use a credit or debit card, you are the proud owner of a hologram. Most of us tote a handful of them around wherever we go. The remarkable extent to which holograms have been successfully employed to securitize credit cards is an important validation that at least part of the material world operates according to holographic principles.

The story surrounding the discovery of holograms is instructive. It illustrates how completely the results of our research are dictated by the way we formulate our questions. The development of holographic imaging only became possible when the scientific community realized that the prevailing model of quantum mechanics was fundamentally incomplete. In the spring of 1970, many of the world's foremost mathematicians, physicists and cosmologists convened a working conference in Copenhagen, Denmark.<sup>200</sup> The conference, which came to be known as the "Copenhagen School," convened because the leading lights of the scientific community realized that the model they were using to direct their research did not explain or accommodate a broad spectrum of anomalous phenomena. Together, they realized that something about the way the model had been constructed was both inadequate and fundamentally flawed.

During the 15 months the conference members worked together, a number of breathtaking insights, many of which were purely intuitive, yielded the clues they needed to fundamentally re-engineer what has come to be known as the Standard Model. The resulting model altered many of their notions about the

way electrons behave, about the waveform attributes of light and the implicit quantum interactions which cause the phenomenon we call complementarity.

It was precisely because a community of scientists was compelled to discover and correct the flaws in their model [many of them, incidentally, were perceived at the time to be heretical in their revolutionary notions about quantum mechanics and particle physics] that a significantly modified model emerged. The old model was simply not adequate and had to be re-evaluated. In its place, a new model emerged which has fundamentally altered the world we live in.

It is compelling to note that the Copenhagen Model was not first constructed with mathematical formulations. The ideas came first. The brilliant insights which led to the reformulation of the prior model were first expressed as ideas, notions and concepts. Initially, they were articulated in linguistic terms much as we are attempting to do here. The notes and diaries of the participants tell us that many of their insights came at times when they were not consciously working at all. Rather, they recount numerous incidents during which stunning intuitive insights came to them in a flash, while they were sitting in the hot tub, walking on the beach, sleeping and dreaming<sup>201</sup>.

When the notions and concepts were found to be deductively sound, then the slide rules came out. The hand held pocket calculators we have become so accustomed to using today had not been invented then, at least not with extended memory and scientific functions. The working groups first fleshed out their theoretical notions by hand, with pencil and paper [how archaic that sounds, even though it was just thirty years ago]. Then, when they believed they had reached a consensus, computer time on an early generation mainframe computer was co-opted. By current standards, it was a cumbersome, laborious and time-consuming process.

When the report of the "Copenhagen School" was released in 1972, its effect on the scientific community was immediate and profound. One of the more startling findings of the report was its disclosure that (in at least some of its attributes), under carefully controlled conditions, light in the visible spectrum

does not behave as an electromagnetic phenomenon. The implications of this finding are so profound that within just a few years, scientists and engineers were able to capitalize on it by developing a revolutionary new way of propagating light with a device they called the Laser.<sup>202</sup>

What a laser does and how it operates is an essential ingredient of our discussion. Our notions about what light is and how it operates in the Cosmos define the limits of our ability to formulate cogent questions about how Nature works. This is so because at the macrocosmic level, in the part of the Universe we can observe directly, light in the visible spectrum plays a vital role. For the purposes of this discussion, I suggest the primary function of visible light is to transport information locally. Indeed, in our way of thinking, the finite component of light called the photon is considered to *be* localized information in its purest form.<sup>203</sup>

### **Erroneous Notions**

Before we discuss the properties which make lasers unique, we must first deal with an outmoded notion about light and its role in the scheme of things. In spite of the wealth of impeccably documented scientific evidence to the contrary, scientists in the West persist in the irrational notion that  $C$ , the mathematical term which defines the velocity of light at 186,000 miles per second, constitutes the absolute upper limit at which information can be transported. This notion is perpetuated in spite of the widely publicized and often repeated results of Dr. Gisin's<sup>204</sup> experimental verification of non-local effects at a distance.

Other, equally impeccable experimental results suggest that information can be transported from one point to another, either point-to-point or non-locally, at least  $10^9$  times faster than  $C$ .<sup>205</sup> That is, the speed of light has been exceeded by a factor of at least  $10^9$  (1,000,000,000) times in carefully controlled, impeccably documented experiments by scientists whose credentials are utterly above reproach.

In addition, during the past twenty-five years, the Ukrainian and Russian Academies of Science have commissioned numerous research projects among their top scientific institutes, under which a totally revolutionary model, based on a unique and totally new mathematical construct, has been developed. Scientists working in the former Soviet Union have independently verified the lower limits of data transport reported by Dr. Gisin at  $10^9$  times C.<sup>206</sup> Their model predicts that information can probably be transported at least  $10^{20}$  times C under ideal conditions and suggests, further, that some information functions can be operationalized instantaneously, without regard to time or distance.

Further, because of the formulations made more than a century ago by Maxwell and Faraday, which attempted to define the rules and dynamics associated with electricity, magnetism and electromagnetic phenomena, it has long been held that light is exclusively an electromagnetic phenomenon. Today, after the expenditure of billions of dollars in basic research focused on harnessing the basic capacity of light for transporting information, we now have substantial reason to believe that under at least some carefully controlled conditions, light may not be an electromagnetic phenomenon at all.

To illustrate the point, consider the article published in *The Register* on May 12, 2001, by Kieren McCarthy. The article reports a remarkable discovery by scientists at St. Andrews University Edinburgh, Scotland, which speaks directly to the point.

*British boffins – fresh from creating the thought-controlled computer – have now built the world's first tractor beam. Rather than pulling in spaceships, it works on a slightly smaller scale. Well, molecular scale. It's a tiny beam of twisted laser light that acts like a corkscrew. This can fix on molecules and move them about – rotate them and pull/push them.*

*It can be used for precise positioning and movement of extremely tiny particles. Hence, biologists, chemists and other sorts of micro-scientists can work on a tiny scale without having to touch particles physically or separate them chemically.*



**The Holographic Universe: Implicate Non-locality**

---

*The system works by using two laser beams and setting up an interference pattern. The beams refract on hitting an object, causing that object to move into the brightest part of the beam. By adjusting the interference pattern, the object can be pushed/pulled and rotated.*

*The beam can be used for driving motors or small rotating parts of machinery. It may also increase the efficiency of machines, as there won't be frictional effects of brushes, commutators, etc., on the motor itself.*

This article suggests something genuinely profound about the nature of light, which is not accommodated by the Standard Model. Why do we care about it? Because until we understand how light really works, we cannot claim to have any real comprehension about how nature works at all. This is fundamental.<sup>207</sup>

**Lasers**

Light in the visible spectrum appears to be unique in all the Cosmos. It is the only portion of the entire radio frequency spectrum which can be refracted into a set of distinct, mutually exclusive color (1/4 wave frequency) sets. It is because of this unique attribute that it is possible to construct laser devices at all. This primary attribute of light, the fact that it operates in mutually exclusive data sets [which we call "colors"], which can be separated into at least 16.7 million separate  $\frac{1}{4}$  wave frequencies, means that researchers were able to interpret the conclusions provided by the Copenhagen Model in terms of the behavioral characteristics of light. Scientists quickly made the intuitive connection between the waveform interference patterns predicted by the Copenhagen Model, which operate as a set of quantum functions at the sub-atomic level, and light's unique ability to act as a conduit for narrowly defined, discrete bits of information.

A laser device propagates visible light in only one of its 16.7 million colors. What makes lasers truly extraordinary is that a principle referred to as "waveform phase conjugation" is used to generate a beam of light in which all the waveform characteristics operate in perfect synchrony<sup>208</sup>. Because the frequency, amplitude, waveform characteristics, polarization and intensity of every waveform generated by the laser are identical to and synchronized with the characteristics of every other waveform propagated into the beam, a condition not found in nature is created.

Laser light is referred to as "coherent" light because that is precisely what it is - everything about the beam is in synchrony. When a laser beam strikes a variegated surface [a photographic plate, a CD-ROM disk, etc.], the lock-step synchrony of the beam is specifically interrupted. The information set created by the localized disruptions of the beam's synchrony can therefore be perfectly and completely distinguished from the original synchronous beam as the beam is detected by a suitably engineered collector.<sup>209</sup>

This is the feature of laser technology which has been successfully commercialized to support the operations of computer hard drives, CD-ROM music disk players, DVD digital motion picture disks, fiber optic data transmission networks and a whole new world of emerging technologies which exploit these attributes. It is this feature of laser light which makes it possible for a properly engineered array of photographic plates and mirrors to produce holographic images.

### **Holograms**

Holograms are truly magical. Here is how they are made. A beam of laser light is split into two identical beams by a specially engineered light diffraction device called a prism. One beam of light is simply reflected around a series of turns to a point which focuses it on an area intersected by the second beam. The second beam of light is simultaneously bounced off the surface of a specially prepared photographic plate to intersect with the first beam. Prior to intersecting, both beams of light are passed through a device known as a

diffuser - this device defines the size of the image to be produced at the point of intersection.

When the second beam strikes the photographic plate, a startling thing occurs. The photographic plate is, for all practical purposes, a ***two dimensional*** surface. The information contained on the plate, the "image," is just like any photo image printed on any emulsified film print paper, except that it has been converted to a series of waveform "negatives" taken from the original image. The information picked up by the laser beam, which takes the form of specific disruptions in the synchrony of the second beam, becomes transformed at the point of intersection with the first beam into a fully configured ***three dimensional*** image.

The three-dimensional image becomes visible because the distortions picked up by the second beam, as it reflects from the surface of the photographic plate, create visual interference patterns at the point of intersection with the first beam. These are the self-same interference patterns which operate at the sub-atomic level, which confirmed the experimental results of Alain Aspect in the extremes of the microcosm and Dr. John Wheeler's long-range photon experiments in the far reaches of the macrocosm.

What the photographic plate contains is simply information. The format by which the information is defined on the surface of the plate is two dimensional by design. But when the information picked up by the second beam is converted into visual interference patterns at the point of intersection, the image somehow becomes three dimensional.

One of the truly remarkable things about holography is the discovery that each piece of any two dimensional image fixed to the photographic plate contains sufficient information to reconstitute the whole three-dimensional holographic image. As the pieces of the original film plate become smaller and smaller, the resolution of the image begins to noticeably deteriorate. But the spectacular thing about the process is that the whole image continues to be replicable down to the scale of a single atom.

**Holographic Universe**

In what represents another giant step toward a new age in computing, IBM researchers have demonstrated a holographic effect that could one day be used to transmit information within electronic circuits too small to accommodate wires. Research into this phenomenon, known as a "quantum mirage," demonstrates that the holographic data set operates on scales of nanometers [billionths of a meter]. The research conducted by Donald Eigler and his colleagues at IBM's Almaden Research Center, was published in the February 2000 issue of the prestigious scientific journal *Nature*.<sup>210</sup> The emerging technology hints at a "fundamentally new way to transport information through a solid."

The researchers were able to manipulate individual cobalt atoms so that electron waves introduced at one point became focused and mirrored at another point, all within a closed "quantum" corral 20 nanometers in diameter. The corral was constructed in the form of an ellipse made up of several dozen cobalt atoms, positioned on a copper surface. Those atoms served as a reflector for the copper's surface electrons, creating a wave pattern like ripples in an elliptical pool. Using a scanning tunneling electron microscope, the researchers placed a magnetic cobalt atom at a focus of the ellipse. This interrupted the wave pattern in a way characteristic of holographic imaging.

Here's the magical twist: the electronic signature of the disruption showed up not only where the cobalt atom was actually placed, but a fully configured image of the cobalt atom also appeared at the other focus of the ellipse – a ghostly image of an atom that wasn't really there. This is an impeccably documented instance of holographic behavior in the material world at the quantum level.

**Holographic Quantum Teleportation**

What this suggests, then, is that the material world is holographic at all scales. The implications of this discovery fit nicely with the other cornerstones we have crafted to support our new model. We have shown that the material

world operates in compliance with the laws of self-organizing complexity, that the Universe and its functions are defined at every level by the template of fractal geometry and, now, that the Cosmos operates holographically as part of its implicate structure.

### **Quantum Teleportation**

In the final analysis, the challenge we are confronted with is to find practical ways to use this information. In addition to providing the basis for today's advanced data storage and information management technologies, researchers at the Institute for Experimental Physics in Innsbruck, Austria, have developed an experimental application which, if it could be commercialized, could significantly alter life as we know it. Gene Roddenberry's mega-hit Star Trek series captured our imagination by introducing a technology which seemed so far out as to be fundamentally impractical – teleportation.

Scientists Dik Bouwmeester, Jian-Wei Pan, Klaus Mattle and their colleagues have demonstrated that at least on the photonic level, it is possible to literally teleport physical matter in the form of information sets, from one quantum location to another, regardless of distance.<sup>211</sup> The important thing to recognize when reviewing this extraordinary experimental process is that it operates with single and paired photons, the basic elements of light, as an information transport process. The implications of this work are compelling because it means that the model we are constructing is predicated on experimentally verified results produced by mainstream scientists whose credentials and methodology are above reproach.

If we can now discover the means by which information is conveyed non-locally to accommodate the experimental results produced by Dr. Gisin at CERN and the teleportation results produced at the Institute for Experimental Physics, we will have opened the door to a whole new world of ideas. With this model, we will then be able to predict how information contained in one locale can be accessed holographically and instantaneously, from any remote point in the Cosmos, without regard to time or distance.

## **SECTION ONE**

### ***Looking For Simple, Elegant Solutions***

## **CHAPTER EIGHT**

### ***Phenomena Which Cannot Be Accommodated***

#### **Simple, Elegant Rules**

Thus far, we have laid four essential foundational elements to support our new model. In the process, we have established that Nature operates according to a set of simple, elegant rules at all scales.

The first cornerstone is that the fundamental building block of the Cosmos is information. Everything consists of information. The corollary to this insight is the fact that light is both comprised of information at the primary scale, in the form of photons, and that light is by its unique nature the carrier of information through the physical domain. In Section Two, two additional attributes of light will be discussed – time domain polarization of photons as a distinct characteristic of the Cosmos, and the role of the interference fringe in information transfer functions.

Second, the rules governing the behavior of dissipative structures in closed systems, or those which are not self-organizing, drive the processes of chaotic, irreversible events<sup>212</sup>. The processes associated with self-organization, the self-driven processes of spontaneous emergence and catastrophic "avalanches," operate according to the rules of self-organizing criticality<sup>213</sup>. The contemporaneous operation of these two sets of rules, which are really complementary aspects of the same set of rules, govern the processes of self-organizing creation and destruction which operate side-by-side throughout the Cosmos.

Third, the record of the evolution of all complex, self-organizing systems is manifested as a function of fractal geometry<sup>214</sup>. The fractal template defines the

processes of evolution by repeating a set of simple, self-referencing functions in an infinite feedback loop to produce infinite variation, fundamental similarity and mutual exclusivity in the form of individuation. The process operates at every scale, from the Planck Length to the infinite reaches of the Cosmos. Its effect is to define forms and functions, with infinite variation and similarity occurring simultaneously, in every naturally occurring system. A key aspect of this function is that all the information contained in the entire system can be accessed through any detail and at every local scale. Fractal geometries constitute the local, linear component of information organization in the physical domain.

Fourth, Nature is holographic at all scales<sup>215</sup>. The relationship between the defining attributes of the fractal geometries and the operating dynamics of holograms provides a revealing new insight – fractal geometry structures Nature in such a way that all information about any part of the system is contained in every component of the system, at every locale and scale. Fractal geometry is local, observable and distinguishable in its most minute local characteristics.

Holographic functions operate in concert with the dynamics of fractal geometry by providing the mechanism which makes local information accessible non-locally, in all-where all-when. The hologram is the complementary counterpart of fractal geometry – it operates in a ??? which is non-linear and non-local at all scales. The holographic attributes of the Cosmos operate at all scales in Nature, from the Planck length to ends of the Cosmos, as an intrinsic attribute of reality-as-it-is. The Universe, it now appears, is a single, complex, self-organizing system. These components, operating together, comprise what physicist David Bohm described as the "implicate order" of the Universe<sup>216</sup>.

### **How Information is Transported**

What remains, then, is for us to discover the means by which the information contained in a local address of the Universe can be accessed in another, regardless of the time, space or distance which separates them. So long as we subscribe to the Standard Model in current use in the West, we should not expect to find what we are looking for. If everything is information; if

the Milky Way Galaxy [for example] is an open, complex, self-organizing system, with a diameter of 100,000 light years; and if  $C$ , the speed of light, is the upper limit at which information can be transported in our Universe, how is it that the galaxy operates as a coherent self-organizing system, a cosmic sand pile operating at the point of criticality across vast distances? How is it that super galaxies consisting of millions of individual galaxies operate in the same way?

Clearly, notwithstanding recent attempts to explain this conundrum away by resorting to mathematical contortions of the laws of gravitational force, Dr. Gisin's experimental verification of the predictions made in Bell's Inequality Theorem cannot be disregarded. The non-local effect demonstrated by his experiments cannot be accommodated by merely tinkering with the mathematical functions associated with the Einstein-Podolski-Rosen [EPR] formulation of the laws of gravitational force. It is likely, then, that something genuinely fundamental has been ignored in the construction of the Standard Model.

### **A New Approach**

What we are proposing here is nothing less than a new Unified Theory of primary fields. We really have no choice. It is necessary because of the numerous important, irrefutable phenomenological anomalies [scientific jargon for things which are observed but cannot be explained] not accommodated by the current model of quantum mechanics. The basic idea is this: the Standard Model, which relies on four primary fields [strong and weak atomic forces, electromagnetic forces and gravitational forces] is incomplete and basically flawed in a number of primary aspects.

Two things should be kept in mind while we are working our way through this exercise. First, what we are doing here is perfectly straightforward. We are defining what needs to be done to bring the Standard Model into alignment with what has been experimentally verified. You do not need to be a theoretical physicist to understand these concepts. The prevailing notion that you have to have an advanced degree in mathematics or some sort of rocket science in order to comprehend this material is simply nonsense.



If, on the other hand, you are a theoretical physicist or mathematician, you will appreciate the need to discuss these issues in linguistic rather than mathematical terms. This of necessity generates a discussion in terms which are more conceptual than you are perhaps accustomed to. In the event you should prefer to examine the evidence for yourself, I have provided a detailed set of notes and original source references for your use.

Second, and perhaps more importantly, what we are attempting to do here is create a baseline of thought, based on the most current and far reaching information currently available to us, in terms of the scientific constructs which are focused on the material aspects of Nature. After we have examined the empirical information related to the physical, material side of things, we will take up the other part of the discussion which deals with Descarte's "spirit stuff"<sup>217</sup>."

Ultimately, our model attempts to integrate the best of empirical science with the disciplined practice of metaphysics. However, before we can grapple with consciousness-related issues, we are compelled to first deal with the task of re-examining the model of physical reality we already have. Let us begin, then, by re-examining the basics.

### **Background**

We have already discussed the work of the Copenhagen School in a limited context. In order to reset the meter, let's digress for a moment and re-examine what happened there. By the late 60's, the Western scientific community realized that their model of quantum mechanics was incomplete. In what has come to be recognized as one of the most unique events of the 20<sup>th</sup> century, Neils Bohr worked with a group of the world's leading physicists to reconstruct the paradigm which had been used to characterize the way the world works. It is enlightening to read the transcripts of the proceedings of the Copenhagen School. The scientists and mathematicians who participated had the great, good sense to re-examine the assumptions on which their model was based in the context of a long list of observable phenomena which could not be accommodated by it.

*Looking For Simple, Elegant Solutions*

---

In the end, they succeeded in crafting a wholesale restructuring of their model so that it could, indeed, explain phenomena which at the time were inconsistent with what they thought they knew. Thirty years later, we find ourselves in the same predicament.

As a result, they published what has come to be known as the Copenhagen Interpretation<sup>218</sup>. Its publication was a signal event – a genuine milestone in the development of the modern theories associated with quantum physics. During the following ten years, the model they developed provided the springboard for a new world of sciences, technologies and materials such as the world had never imagined. The result of their work has been manifest in such things as lasers, fiber optics, photonics, atomically engineered carbon and a vast array of electronic devices. The modern desktop computer represents perhaps the most ubiquitous integration of the technologies resulting from their work. They changed the way the world works simply because they were willing to risk their professional reputations to develop a new way of looking beyond the limits of their understanding.

We can say without fear of contradiction that our lives have been immeasurably enriched by the courage and foresight demonstrated by those intrepid scientists who were willing to risk the censure of the mainstream scientific community by stepping out of the box. This is the essence of truly great science. It is because of such courage that we have come to appreciate the inordinate value of science, when it is practiced with courage and integrity.

**Phenomenological Anomalies**

Today, we find ourselves on the brink of a similar crisis of nerve. The scientific community and the model of quantum mechanics currently in general use have been shaken to their very foundations by a whole litany of newly discovered phenomena which cannot be explained or accommodated by the current laws of quantum mechanics. The list is long and getting longer.

I have cited a number of examples, some of which are quite understandable to everyone and some of which, unfortunately, are more arcane. As you read through this list, you will find reference to some experimentally verified

phenomena which can only be classified as among the most esoteric. Not to worry. As you will soon discover, there are plenty of things in this list to discuss which virtually anyone can understand. Among other things, the list includes the following:

### **Simultaneity - Non-local Effects at a Distance**

Again, let us digress to a prior conversation to establish a context for the discussion which follows. I have referred several times to the work of Nicolas Gisin at CERN in the late 90's. It is important to revisit the details of his work to set the stage for our discussion about the mechanics associated with his experimental results.

Recall that in Switzerland, at the CERN Linear Accelerator Laboratories, a team of world class scientists succeeded in separating the twin particles of an electron-positron pair<sup>219</sup> by sending them off in two opposite directions through more than 15 kilometers of fiber optic cable. As one of the particles was exposed to an electromagnetic field which altered its spin polarity, the second particle instantaneously accommodated this alteration by modifying its own spin polarity to compensate, in the precise manner as it would have if the pair had not been separated.

After verifying this experiment a number of times, the team published a report which made the observation that the information which was shared between the two particles could not have been transmitted by light because the velocity of the information exchange occurred at least nine orders of magnitude faster than the speed of light.<sup>220</sup> They further suggested that the information must have been conveyed by a mechanism which is not known to science or accommodated by the standard model of quantum mechanics. They have called their result "*Simultaneity – Non-local Effects at a Distance.*"

This phenomenon is key to our considerations. This experiment was executed again in 1999 over a distance of more than 100 kilometers. In the later experiments, cesium clocks with an accuracy measured in single digit nanoseconds (billionths of a second) were used to improve the precision of the

measurements. As with the earlier experiments, the elapsed time between the alteration of the polarity of one particle was accommodated at a distance of 100 kilometers instantaneously. All nine digits of the cesium clock readout displayed a zero. This spectacular result proved one of the key predictions made by J.S. Bell in what has come to be known as Bell's Theorem.

### **Creating Matter From Light**

In Chapter Two, we briefly examined a similarly important experimental result produced in California. In 1997, a team of more than 20 scientists on loan from a half dozen of America's top physics lab's participated in an experiment which has world altering implications. The fact that no one saw this result posted in banner headlines on the 10:00 o'clock news should not be surprising.

At the Stanford Linear Accelerator facility in California, this team succeeded in creating electron-positron pairs, with measurable density and particle mass, by crashing two high-intensity laser beams of monochromatic light together in a vacuum. Their experiment was not an accident – they set out to do it deliberately and kept working at it for six months until they succeeded<sup>221</sup>. Their result has since been replicated by other prestigious labs elsewhere in the world<sup>222</sup>.

Quantum mechanics and Einstein's equations assert that it is not possible to create matter with nothing more than real photons, in any environment, under any circumstances, except as expressed by the equation  $E=MC^2$ . Nevertheless, the experimental result speaks for itself. The Second Postulate of the Special Theory of Relativity appears to have been invalidated by their results. Since the results of this work cannot be denied, there must be something incomplete about the way the Special Theory and quantum physics define the way the world works.

This experiment validates a prime theorem of our new model. It proves that light is information. It is equally clear that matter is comprised of information at its primary sub-atomic structural level. In terms of the Second Postulate of the

Special Theory of Relativity, this result can be expressed in terms of a modification of Einstein's famous equation.

Instead of  $E=MC^2$ , we propose to modify the equation to read

$$E=MCv \geq 0.$$

Don't let this put you off. Here's how it works.  $E$  is the same function, connoting energy. So is  $M$  (mass) and  $C$  (the speed of light). What is different, however, is that instead of the speed of light being squared – that is, multiplied by itself to produce a value of almost infinite proportions, possessing 12 zeros, this formulation suggests that under some conditions  $E$  equals  $M$  as the speed of light approaches zero. This is precisely the opposite of the prediction contained in the Second Postulate of the Special Theory of Relativity. If this result can be verified in other physical phenomena, we will have no alternative but to examine the dynamics of physical reality from a fundamentally different point of view. Consider the following:

### **Mass At Rest = Energy**

At the Institute For Problems of Materials Science in L'vov, Republic of Ukraine, Academician Trefilov, a Senior Fellow of the Russian Academy of Sciences and Vice-President of Mathematics of the Ukrainian Academy of Sciences, headed up a team which has produced a solid-state, non-chemical, carbon-lattice energy storage device called an "energy accumulator."

When the energy accumulator device is fully charged, it demonstrates a mass appreciably higher than when it is discharged. This result, verified by scientists at DARPA, INEEL and AMTL, is specifically prohibited by the Second Postulate of the Special Theory. The measurable mass of this solid-state device varies only with the measurable mass of electrons residing at rest in "energy wells" defined by the crystalline lattice. In this specific instance, energy and mass are shown to be precisely equivalent when both the mass and the electrons are at rest.<sup>223</sup>

Our formula  $E=MC_{v \geq 0}$  [energy equals mass as its velocity approaches zero] has been independently verified by experimental means.  $E=MC^2$  is shown to be

invalidated. The scientifically validated attributes of this material suggest, among other things, that E [energy] and M [matter] become equivalent under some complementary conditions at the electron level, as the velocity of the primary sub-atomic mass approaches zero. This formula and its derivatives play a fundamental role in the architecture of our new model.

### **Unexplained Anomalies**

In the wake of a growing list of books and articles which are critical of the current practices embraced by mainstream science, anyone who mounts an assault on the standard model risks being accused of science bashing. Accordingly, I have taken the liberty of providing a list of some intriguing experimental results which call the validity of the Standard Model into question so you can begin to engage in this dialog yourself. If allowing the results provided by the methodology of science calls the model into question, we are required to allow the results to speak for themselves.

The list of phenomena which are not accommodated by the Standard Model is long and troublesome. While this list is intriguing, it is by no means exhaustive.

- The seminal work of Alain Aspect demonstrated beyond question the inseparable relationship which operates at the quantum level between the conscious choices of the observer, the means of observation and that which is being observed. Since quantum physics absolutely excludes the role of consciousness in things material, this conundrum will require another kind of explanation.
- The equally stunning work of Dr. John Wheeler demonstrated conclusively that photons of light originating with stellar objects billions of light years distant behave, at the moment of detection, according to the conscious choice of the observer at the time, place and by the means of observation<sup>224</sup>. The most stunning implication of Wheeler's experimentally verified results is that choices made in the current moment exert a demonstrable effect on events which are believed to have occurred billions of years ago.
- The mind-matter connection and the teleological (time domain) effect demonstrated by Wheeler's work, which cannot be explained in terms of quantum mechanics, also operates in the macrocosm, in the far reaches of outer space. It is paradoxical to note that while observing the outer

*Phenomena Which Cannot Be Accommodated*

---

reaches of the macrocosm, Dr. Wheeler's results were determined by the behaviors exhibited by single photons, the smallest units of the sub-atomic realm. Unless we can find a way to accommodate this phenomenon, the Standard Model cannot explain how the known universe operates as a self-organizing system.

- The observable phenomenon of attraction and repulsion in laser beams is clearly prohibited by the current model of quantum mechanics<sup>225</sup>. This suggests, among other things, that light is probably not, as Faraday is falsely attributed to have claimed, an electromagnetic phenomenon. Unless we can explain how information is exchanged between coherent beams of monochromatic light in such a way as to demonstrate attraction and repulsion, we cannot explain how light operates as a carrier of information in the most basic sense.<sup>226</sup>
- The difference in neutron scatter on ortho- and para-hydrogen defies the current laws of quantum mechanics<sup>227</sup>. This may be a little esoteric for the non-technical reader, but if you have an interest in pursuing this anomaly, the end notes provide references to the research papers which discuss the subject. The significance of this anomaly is that it demonstrates an unpredicted behavior widely observed in certain isotopic forms of hydrogen which are unexplainable in terms of the standard model.
- The anomalous precession of neutrons as they are passed through a spin polarized target has been repeatedly observed and carefully documented – this behavior is prohibited by the current model.<sup>228</sup> It is explained with elegant precision, however, in Santilli's extraordinary new work which reformulates Hadronic Mechanics [the mechanics of the behaviors and attributes of sub-atomic particles]<sup>229</sup>. It also constitutes the basis for Dr. S-X Jin's ability to harness free protons with soliton ion acceleration structures to remediate the radioactivity of spent nuclear fuels.<sup>230</sup>
- The unusual change in hydrogen interference intensity in the states described as  $^2S_{1/2}$  and  $^2F_{1/2}$  are also excluded by the formulas which describe quantum interaction at the quark and sub-quark.<sup>231</sup>
- The shift in circularly polarized electromagnetic waves from the plane of incidence, depending on their chiral direction and helical sign, cannot be explained and, in fact, are specifically prohibited by the Standard Model.<sup>232</sup> This is one of the reasons the work conducted at St. Andrews University, which relies on circular entanglement in laser beams to exert “tractor beam” effects on ultra-fine particles is significant.
- The repeated observation that gyroscope weight varies in a non-stationary [non-equilibrium] state is also unexplainable and specifically prohibited by the EPR formulation of gravitational forces.<sup>233</sup> This work demonstrates that gyroscopic spin has been demonstrated to reduce

*Looking For Simple, Elegant Solutions*

---

inertial mass under controlled conditions. Reduction in inertial mass means, in simple terms, that the laws of gravitational force appear to be mitigated with certain kinds of spinning bodies.

- The phenomenon described as “dark matter” is, in my opinion, a demonstration of one of the most arrogant conceits of all time. It is rivaled in its obstinacy only by the notion that the Earth is flat and sits at the center of the Universe. The so-called hidden mass which is supposed to exist in the cosmos, in sufficient quantity to accommodate the predictions of the current model of gravitational force, has caused no end of speculation in recent years.<sup>234</sup>

There is no such thing as dark matter. It is equally unlikely that any matter is missing from the fabric of the universe. Rather, the fault is to be found in the Standard Model, which is incomplete and fails in a number of fundamental ways to recognize the dynamics by which the Cosmos really operates as a self-organizing, open and complex system. What we are witnessing in the debate over dark matter is an irrational, utterly unscientific refusal by the scientific community to admit that the laws of gravitational force as currently formulated are incorrect and incomplete.

Surveys of the heavens failed to identify sufficient matter to satisfy the demands of the General Theory of Relativity and the EPR formulations of gravitational force precisely because the formulations are in error, not because anything is missing from the heavens. In plain English, Science [big "S"] is getting the wrong answers because it is asking the wrong questions.

Of more than passing interest is the impeccably documented study cited in the Russian journal ***Achievements of Physics Sciences***.<sup>235</sup> This prestigious journal reports the results of a vast survey of the heavens conducted by team of world-class scientists under the aegis of the Russian Academy of Sciences, over a period of more than ten years.

Highly sensitive gravimetric sensors were integrated with spectroscopic telescopes to provide images which verify the existence of numerous astrophysical objects, shown to be traveling through the heavens at velocities well in excess of the speed of light. As unthinkable as it might seem to conventional scientists, we have examined the data and methodology reported in the journal and find it to be compelling. The implications of the formula  $E=MC^2$ , that matter may never approach the speed of light, have clearly been called into question by some of the world's most capable scientists.



**A Severely Crippled Physics**

While the foregoing is not an exhaustive list, it demonstrates that many of the answers we are getting are flawed because the questions we are asking are both imprecise and inaccurately targeted. There is one more physical feature of the Cosmos described by the Standard Model which is so important that I decided it deserves a chapter all its own.

**Time Domain Effects**

When we talk about the time-domain effects exerted by the act of observation on the behavior of photons originating in deep space 12-15 billion years ago, we are really calling into question one of the primary assumptions of the Standard Model. The notion crafted into the Standard Model which deals with the phenomenon of time suggests that time is simply a convenient, arbitrarily defined attribute of the physical world which allows us to measure what happens in terms of increments of time. This is described in terms of feet per second, miles per hour, etc.

In terms of the Standard Model, time is not described as a separate dimension, with energy density and attributes of its own, which are mutually exclusive and distinct from those of the x, y and z dimensions. This fundamental error is the result of two equally powerful forces – a flawed mathematical construct and political expediency. In Section Two, I provide a thorough analysis of this problem in the context of our discussions about the time-domain nature of Mind.

For the purposes of the present discussion, however, the most important consideration is that the Standard Model fails to comply with the demands of complementarity by restricting the rate of information transport through physical space to the erroneously applied upper limit ascribed to the speed of light by Einstein's formulations.

**A New Paradigm**

At this point, we are positioned to consider some constructive alternatives. We have established that the physical attributes of the Cosmos are

*Looking For Simple, Elegant Solutions*

---

manifestations of a universal set of simple, elegant rules which operate with uniformity at all scales. The principles of complementarity, the ever present marriage of intrinsic opposites, manifests itself at all scales and constitutes the single most important governing principle in the Cosmos.

We have shown that the physical model in current use by scientists in the West is fundamentally flawed and essentially incomplete. We have also shown that the act of observation exerts a direct, measurable, teleological effect on matter at the primary level. We have reason to believe, however, that Mind exerts a dramatic effect on physicality at all scales.

Perhaps as important is the demonstration that the speed of light is not the upper limit of information transport through the physical domain and that, as a corollary, matter and energy are equivalent at the primary level under some complementary circumstances. Taken together, these experimentally verified phenomena suggest something dramatic about the way the Cosmos really works.

## SECTION ONE

### *Looking For Simple, Elegant Solutions*

## CHAPTER NINE

### *The Torsion Field: Information Link to Infinity*

#### **Metaphysical Considerations**

There is another class of phenomena which, although equally well documented, is simply not allowed to impinge on the serious considerations of modern quantum physics. We refer to these phenomena collectively as Metaphysics. This is the "stuff" Descartes left out. We are all familiar with the controversial list which follows: the extensive studies which document the existence of such phenomena as Extra-Sensory Perception (ESP), remote viewing, pre-cognition, telekinesis and the interaction of human consciousness with plants, other biological organisms and manmade machines.

Dr. Dean Radin of the University of Nevada at Las Vegas has published the results of a lifetime of investigation on this subject in his beautifully documented book ***The Conscious Universe***.<sup>236</sup> If you have any doubts about whether the metaphysical phenomena I have just listed are documented with sufficient attention to satisfy today's demands for public verification and experimental repeatability, I suggest you read his book. There is simply no room left for any reasonable person to argue the existence or scientific validity of these phenomena.

Moreover, the life's work of Annie Besant and C.W. Leadbeater, as recorded in the carefully documented book ***Extra-Sensory Perception of Quarks***<sup>237</sup>, prepared by the eminent physicist Steven M. Phillips, demonstrates the value and legitimate role of a disciplined attempt to integrate the disciplined and impeccably documented practice of metaphysics with the best of empirical

science. Between 1895 and 1933, these two gifted and highly disciplined practitioners honed their metaphysical skills under the tutelage of the legendary mystic J. Krishnamurti.

They devoted their lives to exploring the quantum world using nothing more than their own psychic powers of observation and, in the process, kept an impeccably documented journal. Until 1980, the results of their work were simply ignored by quantum physicists. But when Murray Gell-Mann announced the discovery of the quark and mapped the structure and behavior of this family of sub-atomic particles, researchers were absolutely shocked to discover that Besant and Leadbeater had produced nearly identical drawings more than 60 years earlier, without the aid of a linear accelerator or a computer. Dr. Phillips' book makes fascinating reading and leads us to our next consideration.

### **The Conscious Universe**

Menas Kafatos and Robert Nadeau have developed what is perhaps the most cogent and articulate philosophical work to date in support of the thesis that the Universe and all its phenomena arise from a universal causal field which they refer to as "consciousness".<sup>238</sup> In their watershed book, also entitled ***The Conscious Universe***, they succeed in providing one of the principle philosophical underpinnings from which our proposed approach to a new theory of unified fields arises. They succeed in establishing a firm basis for two pieces of the cosmological puzzle which are central to our considerations.

First, they establish that the Universe is an open, complex, quantum system, operating at all scales according to the dynamic forces which we have observed in both the microcosm and macrocosm.

Second, they establish that when all phenomena in the Universe are viewed as manifestations of information, the attributes of consciousness become intrinsic to and inseparable from any model we can construct to describe how the world operates.

**Mind-Matter Connection**

Finally, in case there is any question that consciousness is inseparable from the most fundamental aspects of the world we live in, I highly recommend a stroll through the wonderful book ***The Secret Life of Plants***, written more than twenty years ago by imminent researchers Peter Tompkins and Christopher Bird.<sup>239</sup> It provides a fascinating account of the physical, emotional and spiritual relations which operate between plants and humans. In this simple paperback book is chronicled the impeccable work of Sir Jagadis Chandra Bose, whose demonstrations of the effect of human consciousness on plants is legendary. Bose's work covered a period of more than 40 years and was so unequivocal in its publicly demonstrable results that he was knighted and given his own university.

Baxter's effective use of plants as reliable detectors of truth in the criminal justice system is described there, as is the work of Marcel Vogel, whose explorations of the relations between liquid crystals and human consciousness has still not been fully appreciated. Pierre Paul Sauvin created an anxiety response device which interfaced plants with electronic sensors more than 100 times more sensitive than the best lie detector devices.

Perhaps most astonishing is the compelling work of Dr. Ken Hashimoto, Chief of Research and Development at Fuji Electronics Industries. His book, ***Introduction to ESP***, now in its 60<sup>th</sup> printing, established the basis under which plants have become regularly used as truth detectors in the Japanese criminal court system. His second book, ***Mysteries of the 4<sup>th</sup> Dimensional World***, now in its 80<sup>th</sup> printing, provides a voluminous catalog of carefully documented, often publicly repeated experimental results, which demonstrate that nothing in this physical world operates without being effected at a fundamental level by consciousness.<sup>240</sup>

**The Problem**

The Standard Model specifically prohibits the following scientifically verified findings:

*Looking For Simple, Elegant Solutions*

---

- Super-Luminal Velocities – It is generally held that no velocity can exceed the speed of light; and
- Metaphysical phenomena – Any connection between consciousness and the operational dynamics of the material world is not allowed; and
- The 5<sup>th</sup> Primary Field – The formulations describing the four primary fields (gravitational force, electromagnetics, strong and weak nuclear forces) are mutually exclusive and fundamentally distinct. It is generally held that if Michelson and Morley couldn't find the 5<sup>th</sup> field they called the "Aether," it simply doesn't exist.<sup>241</sup> In this case, the Standard Model prohibits complementarity.

This is the crux of the current dilemma. We are confronted today by a growing list of undeniable and inexplicable phenomena which cannot be accommodated by the Standard Model of quantum mechanics. The psychological and cultural barriers which lie between us and the development of a new model are the same ones confronted by Galileo, Copernicus and the Copenhagen School. Our alternatives are precisely the same as theirs – we have no choice but to attack this newly discovered set of problems from another point of view. We have to have courage and step out of the box, risk the censure of our peers and take the next giant leap.

**Torsion Field Phenomena:**

The new model proposes a new cosmology which accommodates many of the phenomena we observe and cannot explain. It also provides the framework for conducting our investigations well beyond the limits of current understanding. Here is how we think it works:

At the end of the 19<sup>th</sup> century, Michelson and Morley began looking for the mysterious energy source they called "field energy" They searched for seventeen years without success. Because of the restrictions imposed on them by their experimental methods and the technologies which were then available to them, they failed to identify the fifth field or confirm its existence until nearly twenty years later.<sup>242</sup> They called it the "aether".

Over the past 150 years, scientists from all over the world have been looking for evidence of its existence. They have given it all sorts of interesting names, including pseudo-magnetism; the 5<sup>th</sup> force; Tesla called it the Empty Wave; T.

**The Torsion Field: *Information Link to Infinity***

---

Henry Moray called it radiation energy; Fienberg referred to it as the Tachyon Field – Star Trek picked this one up because it sounded so good. A more current appellation is the “torsion field”. There are more than 50 other names which have been used to define the fabric of spaces, including the fundamental silliness proposed by super string theory which refers to it as “quantum foam.”

The fact that so many excellent scientists have attempted to name the field by describing it as a function of some of its observable attributes simply demonstrates that a sufficiently robust model has not yet been developed to accommodate the many interesting attributes which have been ascribed to it over the years. What is true about this field, which is generally referred to in current literature as the torsion field, is the following:

More than 4,000 papers have been published by more than 150 teams of scientists over the past one hundred twenty years, describing what it is, what functions it performs, how it works and where it is to be found.<sup>243</sup>

State-of-the-art devices which have been created to operate in this field are becoming more prolific and sophisticated every day. Today, anyone can buy a 5<sup>th</sup> field generator from any of four sources in the former Soviet states. Their devices have been constructed, operated, tested, documented and patented. They propagate information into and retrieve information out of the torsion field.<sup>244</sup>

The theoretical structure and functional dynamics of the physical vacuum and the role of the torsion field are becoming clearer every day. References are provided in the appendixes to more than 250 different papers, journals and books which describe many of the interesting features of the physical vacuum and the torsion field, including the research conducted by teams of scientists all over the world.

**A New Approach**

The new approach to constructing a unified theory is not exotic in the least. Collectively, let us do what the Copenhagen School did – let’s look at the current model with a different set of glasses for a moment. We propose that a unified medium – which we refer to as a matter of convenience as the physical

vacuum – exists in a variety of different phase polarization states. In the state of charge polarization, the medium manifests an electromagnetic field. In the state of longitudinal polarization, the medium manifests a gravitational field. In the state of transverse spin polarization, the same medium functions as a torsion field. The electromagnetic, gravitational, strong and weak nuclear forces, and torsion fields all correspond to polarization spin states of the physical vacuum. Please consider the following:

It is proposed that the weak and strong nuclear forces, electromagnetic fields and the gravitational field are not separate and distinct phenomena at all. Rather, they all arise from the same original causal plane and arise as distinct expressions of a single field, which E.T. Whittaker described as “scalar potentials<sup>245</sup>.” This is problematical because the Standard Model accommodates four fields which are considered to be primary. Whittaker’s formulations demonstrate, however, that the four primary fields are purely derivative and non-exclusionary.

As Akimov suggests, for a wide range of situations, it is useful to interpret all five of the primary fields as derivative polarized expressions arising from the primary scalar potentials. While it may be true that the spin polarization states  $S_L$  and  $S_R$  [spin left and spin right] contradict a rule of quantum mechanics referred to as the Pauli Prohibition<sup>246</sup>, we beg the question by suggesting that under quantum mechanical conditions, the fundamental laws of quantum physics operate in ways we do not yet really understand<sup>247</sup>. If it were not so, Murray Gell-Mann would not have been awarded a Nobel Prize for the discovery and description of quarks, which also violate the Pauli Exclusion Principle.

The fact that the mathematical structure Gell-Mann ascribed to the operational states of quarks violates the EPR formulations of gravitational effect, coupled with the fact that his mathematical model prohibited the existence of any smaller class of sub-atomic particles, does not speak well of the adequacy of the Standard Model. Just last year, for example, Gell-Mann’s former colleagues at FermiLabs announced the discovery of sub-quarks<sup>248</sup>, the constituent pairs of sub-atomic particles which are now known to comprise all



six quark particles. Presumably, these structures also violate the Pauli Exclusion Principle. The concept of a physical vacuum and the operation of five primary fields as expressions of a single field cannot reasonably be excluded unless the discovery of quarks and sub-quarks is also excluded.<sup>249</sup>

### **Torsion Field Attributes**

- A sizable list of attributes has been experimentally identified which demonstrates that the torsion field operates holographically, without regard to time and distance. Its operations are characterized by a variety of behaviors which have been described conceptually, experimentally and mathematically as functions of spin polarity, angular momentum and weighted waveform vector velocities.
- In August 1999, Dr. Myron Evans, Dr. Lawrence Crowell and a team of sixteen other physicists, engineers and mathematicians published the first reformulation of Maxwell's field equations in over a hundred years<sup>250</sup>. Contained in their extraordinary work are reformulations of the entire family of formulas which have been developed over the past 100 years to describe the attributes, functions and dynamics which characterize electromagnetic fields. Their seminal work demonstrates that the functions and attributes of the five primary fields, including those of the torsion field, can be expressed in terms of parallel geometricized equations<sup>251</sup>.
- A careful analysis of the basic formulas developed by Akimov<sup>252</sup>, Schwartz<sup>253</sup>, Anastasovski<sup>254</sup>, Trefilov<sup>255</sup>, Reed<sup>256</sup>, Santilli<sup>257</sup> and others, is extremely revealing – the most stunning thing about them is the discovery that the characteristics of all four primary fields and the 5<sup>th</sup> field [which we have called the torsion field] appear to be completely accommodated by the set of functions which comprise spin polarity in linear, longitudinal and transverse wave functions, and angular momentum at both the quantum and macrocosmic level. While there is still much work to be done here, it seems more than coincidental that these attributes are precisely what cause the torsion field to operate as it does. The formulas referred to include Einstein's equations, the Young-Mills equations and Geisenberg's equations.<sup>258</sup>
- It has been shown that information is conveyed via the torsion field at a rate which is at least  $10^9$  times faster than the speed of light. This revelation, which is largely due to the ground breaking work of Russian scientist V.A. Dubrovsky up to 1985, has now been confirmed by at least six other laboratories in the former Soviet states,<sup>259</sup> by Prof. Dr. Guenter Nimtz and his colleagues at Cologne University<sup>260</sup>, and Lijun Wang, Alexander Kuzmich and Arthur Dogariu of the NEC Institute<sup>261</sup>. The

*Looking For Simple, Elegant Solutions*

---

group velocity of torsion waves has also independently been shown to be at least  $10^9$  times the speed of light.<sup>262</sup>

- The litmus test regarding this issue is found in the recent award by NASA of a contract to develop a torsion field communications system. The award was announced on August 19, 1999, under the title, **NASA Glenn Announces Breakthrough Propulsion Physics Selections.**<sup>263</sup>
- A practical set of experiments which reveal just how important this concept is has been conducted both here and in the former Soviet states. Here in the United States, Bill Ramsay<sup>264</sup> describes an experiment in which Greg Hodowanec was able to record the occurrence of a solar flare more than eight and a half minutes before it was confirmed by NOAA, when the photons and particles liberated by the event entered the earth's atmosphere. He was also able to measure the magnitude of the event, as it occurred<sup>265</sup>.
- Nick Anthony Fiorenza and Alistair Couper have both reported on the use of gravimetric devices to record the actual transit locations of the planet Pluto, orders of magnitude faster than was possible using measurements based on conventional light wave sensing devices.<sup>266</sup> The devices used by Fiorenza and Couper have been employed by Russian astronomers to determine the precise real-time locations of stellar formations and planets<sup>267</sup>. The results of their work bears heavily on the assumption that information contained in any single location in the Cosmos can be instantaneously obtained at any other remote location, regardless of the extent to which events are separated by time, space or distance. This assumes the means of observation are engineered to comport with torsion field dynamics rather than relying on the data transfer rates associated with radio frequency emissions [light].
- We have reason to believe, based on the ground breaking work of V.A. Ablekov, David Bohm and Karl Pribram<sup>268</sup>, that the torsion field is holographic. The combination of the features identified by their research suggests that the phenomena associated with Bohm's Implicate Order and Pribram's holographic model of human consciousness, which are otherwise inexplicable, can now be accommodated.
- Unlike electromagnetism, where analogous charges repel and opposite charges attract, in torsion fields similar charges attract and opposite charges repulse.<sup>269</sup>
- As a torsion field is generated by the classical spin of a magnetic plate, we can observe and measure the precise effects of the alteration of spin state of the object or system which is encompassed by it. At the Institute for Problems of Materials Science in Kiev, scientists have for more than 25 years used torsion field generators as an essential component of the apparatus used to manufacture exceedingly exotic materials, for which

**The Torsion Field: *Information Link to Infinity***

---

we have no comparable products in the West. These include mono-molecular powdered metals, solid state energy accumulators and certain varieties of atomically engineered carbon.<sup>270</sup>

- Torsion field emissions are non-dissipative and are not attenuated by the interposition of mass or the effects of distance. Torsion fields cannot be screened by any known materials except aluminum, nor any known combination of materials or fields.<sup>271</sup> The results of the 1986 Moscow M2 torsion wave communications experiments have been widely distributed. In this demonstration, a directional torsion field was modulated with a simple variation of the Morse code. The signal was instantaneously received at a point more than 22 kilometers distant, using a similar low power gravimetric signal detection device. The signal was passed through steel reinforced concrete more than 50 meters thick, after having been propagated through a mountain more than 10 kilometers wide. Variations of this experiment have apparently been successfully performed in a number of other locations in the former Soviet states since that time<sup>272</sup>.
- The absence of loss of signal strength, referred as attenuation, during the spread of a torsion wave group, suggests that long-distance communication may one day be possible with the use of very low transmission power and unlimited bandwidth. The fact that torsion waves are not attenuated [weakened] by any known material substances or fields suggests that we may one day be able to devise systems which are capable of communicating through water or any density of physical material<sup>273</sup>. This concept also suggests that we should be able to devise communications systems capable of supporting real-time communication without regard to the vast distances of space.
- Since all known substances possess a non-zero collective spin state [this means, in simple terms, that everything is always in motion at all scales], then all substances must also create and exist within their own localized torsion fields. The expanse and frequency structure of any substance is determined by its chemical composition and the expanse structure of its molecules or crystalline lattice. A clear understanding of these mechanics will enable us to commercialize energy storage devices which have energy conversion characteristics well in excess of gasoline [650 watt hours/kg].<sup>274</sup>
- At the Institute for Problems of Materials Science located in Kiev, Republic of Ukraine, a scientific team led by Academicians Trefilov, Tovschuk and Kovalyuk created a solid-state energy cell which produces 850-1040 watt-hours/kilogram, in laboratory prototypes. This is at least 35-50 times the energy density of any known conventional energy storage devices developed in the West. The reliability of their claims regarding this technology has been verified by INEEL, DARPA and the AMTL. A key element of their crystalline lattice deposition method relies on the effects

*Looking For Simple, Elegant Solutions*

---

- of a torsion field beam.<sup>275</sup> Scientists working at Sandia Laboratories in Los Alamos, New Mexico, have reported the successful development of a thin-film solid-state energy storage device which reportedly demonstrates energy density in the range of 250-400 watt-hours/kilogram.
- It has been shown that torsion fields demonstrate persistence. This attribute is referred to in the literature as a "residual field effect."<sup>276</sup> A torsion source of a defined expanse and frequency has been consistently shown to polarize the localized region of the physical vacuum. Once the energizing space-spin source has been put in motion and a torsion field created, and then removed to another place, the space which surrounded the torsion field generator will continue to exhibit the effects of the torsion field for as long as several hours.
  - If we can delineate the dynamics which cause the persistence of residual field effects, we will be able to explain and harness the functional features attributed to dowsing, magnetically effected molecules of water and so on.<sup>277</sup> A clear and present example of the applications made possible by this information is illustrated by the work of a team of physicians from the CIS. Using the work of V. Kronin as the basis for their treatment modality, a team of Russian physicians has been working at the laboratories of the Centers For Disease Control in Atlanta, Georgia, and Baylor University Medical Research Center in Houston, Texas, for more than a year. Their project demonstrates a revolutionary new medical treatment modality which capitalizes on this attribute of torsion field mechanics, to fundamentally cure patients infected with the hepatitis-C virus.<sup>278</sup>
  - Teams of scientists from more than 50 laboratories have shown that it is now feasible to deliberately perform a wide variety of carefully calibrated functions using torsion field devices.<sup>279</sup> We can build torsion field generators of both static and radiating types.<sup>280</sup> We can select, adjust and fine-tune frequencies modulated into the field with a high degree of precision.<sup>281</sup> We can modulate into and retrieve data out of a torsion field, including via two dimensional spin matrices.<sup>282</sup> We can operate efficiently in a variety of different modes of signal radiation.<sup>283</sup> We can adjust and smooth the intensity of the S-waves and we can operate in both left and right S-wave chiral helicities.<sup>284</sup>
  - Torsion fields can be detected, generated and switched on and off (such as in communications applications).<sup>285</sup> We have demonstrated that torsion fields can be designed to interact with laser beams<sup>286</sup>, to modulate light frequencies and perform other functions. Torsion fields have been demonstrated to have a specific effect on biological processes<sup>287</sup> and have been shown to be generated by certain melting and solidifying materials.<sup>288</sup> Torsion fields affect the oscillation of quartz crystals<sup>289</sup>, affect the functional characteristics of some electronic

**The Torsion Field: *Information Link to Infinity***

---

components<sup>290</sup>, and have been shown to have verifiable, measurable and predictable effects on gravity.<sup>291</sup>

- In practical fact, we can point to a long list of applications which could benefit from carefully planned applications engineering which recognizes the properties of torsion fields and harnesses them for practical purposes. Among these are revolutionary new propulsion systems, communications devices, long-range sensors, astrophysical monitoring and metering devices, geo-physical devices which can be calibrated to locate mineral deposits, water and subterranean structures; photographic applications which are capable of imaging the interior of virtually any substance or structure without X-rays and so on.

**Practical Applications**

A consortium of technology developers and their partners around the world have embarked on an interesting development project. The project attempts to integrate the features of a newly designed torsion field pump with the information distribution properties discovered by Dr. John Hait.<sup>292</sup> In his patented applications of the photonic transistor, Dr. Hait has established that a special class of monochromatic lasers which emit polarized, coherent light with standing wave forms, can be used to switch other laser beams with similar wave forms “on” and “off,” without the interposition of an intermediary physical medium, such as an opto-electric crystalline substance.

The beams of coherent light propagated by such devices exchange information via an interference fringe which interpenetrates and surrounds each beam of light. Information which has been encoded into one beam of light is flawlessly transferred to the other beam of light to perform all seven of the standard Boolean logic functions incorporated into computer operating systems. This discovery opens the door to a new era of light speed information processing technologies.

With the assistance of a newly developed holographic compression algorithm, a new electrically pumped high-temperature full spectrum, tunable laser glass material, and a new torsion field generator design, it may soon be possible to send and retrieve holographic data packets into the torsion field and retrieve them with predictable precision, instantaneously at any remote site .

While there is still much work to be done to make this integration perform as we would like, our test data have convincingly demonstrated that the principles integrated into its design are sound.

### **Conclusions**

There is no longer any question about the existence of a holographic information transport field which interpenetrates all things at all scales, in all places in the Cosmos, and at all times. In short, torsion field technology is here to stay. By understanding how to operate in the context of torsion field mechanics, we hope eventually to be able to develop technologies and devices which will fundamentally alter the way we live. The practical applications to which this knowledge can be applied cover the spectrum of literally all human experience and endeavor. We'll expand on the implications of this notion in the next section.

### **Institutional Resistance**

Unfortunately, formidable barriers stand in the way of our pursuit of these avenues of inquiry. Physicists as a community are unwilling to give serious consideration to the investigation of superluminal phenomena. Conventional science continues to demonstrate an unwillingness to re-examine the findings and methodology of the Michelson-Morley experiments. It is generally held that the original methodology was so perfect that if Michelson et al couldn't demonstrate the existence of the physical vacuum in 1897, it simply doesn't exist.

Nevertheless, it should be noted that the extensive experiments conducted by Michelson and Gale<sup>293</sup>, which substantially supported the case for a physical vacuum, are never cited in conventional scientific publications, articles or physics texts. This is a peculiar case of selective recall and one of the disturbing symptoms that the pursuit of Science (big "S") is in danger of creating the very problems scientists are supposed to be dedicated to solving.

Anytime the institutions of Science refuse to allow their practitioners to ask legitimate questions about how and why Nature works as it does; any time the

leaders of the scientific community refuse to dispassionately support any and every avenue of reasonable inquiry in the pursuit of truth and knowledge; anytime dedicated practitioners of the scientific arts are sanctioned, punished or ostracized for simply being willing to investigate a subject matter not accommodated by the standard model, everyone's interest in achieving a clear, untainted understanding of truth is jeopardized. I have noted with growing dismay that the number of sacred cows, avenues of investigation either prohibited or aggressively discouraged by mainstream science, seems to be increasing rather than decreasing. It is cause for considerable alarm and provides a *prima facie* reason for stepping out of the box to re-examine the real relevance and validity of what we think we know.

The demonstrated existence of torsion fields appears to invalidate some of Einstein's postulates and equations. If torsion field phenomena are given credence, it will result at very least in the unequivocal invalidation of the Second Postulate of the Special Theory of Relativity. This by itself should be sufficient to cause scientists to dismantle much of the basis upon which quantum mechanics is predicated. This discovery can be reliably predicted to occasion the most strenuous resistance. In addition, in order to fully understand how the world works; that is, to formulate a robust theory of unified fields, we must also be able to accommodate the phenomenological aspects of metaphysics, in all their manifestations.

### **Consciousness Research**

Today, the Standard Model does not accommodate metaphysical phenomena – it simply dismisses them. Any consideration of metaphysics is not a part of the scientific method, by definition, and is therefore prohibited or considered irrelevant. To succeed with this undertaking, we must be willing to conduct our pursuit of truth in a fundamentally different way. The scientific method itself must be expanded or redefined to embrace metaphysical phenomena if we are ever to have any realistic hope of achieving a clear grasp of how Nature works.

The good news is that those of us who are exploring new technologies at the Edge are in good company. There are among us courageous, intrepid souls for

whom the importance of knowing the truth surpasses the value of any degrees, certificates, credentials or investment in being right about outmoded notions. It is time for the greatest scientific minds of our time to turn their collective attention to solving the riddles associated with the discoveries which still remain not accommodated by the current scientific model.

Much of what we witness in the pursuit of science is driven by the demands of culture. In our little corner of the world, scientists have learned to accumulate close to the sources of money like trout in a feeding pond. Those who dispense money have learned that science can be manipulated because it is only valued in the near term, so long as it produces technologies which can be patented, profitably commercialized or militarized. The result is predictable enough. The pursuit of pure science, research into the mysteries simply for the sake of obtaining knowledge, has become a seriously endangered species.

In its place, we discover that more than 70% of all scientific research is either funded by or geared toward applications of new technologies for weapons of mass destruction and related military uses. So long as our focus remains riveted on the selective pursuit of scientific advancements which hold the promise of near term profitability to the exclusion of supporting a generalized search for truth and meaning, leading edge science and research into areas of knowledge which challenge the established order will find little fertile ground.

Nevertheless, science is teetering on the precipice of vast new arenas of knowledge, standing in that place which overlooks the void where nothing more can be learned from more powerful microscopes or larger telescopes. To go beyond the restrictions of our current level of understanding, the Edge of Knowing, there are no alternatives but to reconcile the pursuit of physics with the disciplined practices of metaphysics. The world has waited long enough to do this. Fritjof Capra showed us the way in the ***Tao of Physics***. In the words of Star Trek's Captain Jean-Luc Picard, I suggest it is time we decided to "Make it so, Mr. Crusher... Engage."<sup>294</sup>



## SECTION TWO

### *The Stuff Descartes Left Out*

## CHAPTER ONE

### *Consciousness: The Fountainhead of Creation*

#### **All In Your Mind**

The scene opens with the camera focused on a child, sitting in the middle of the floor, holding a large silver spoon in his right hand. The child's appearance is striking. His head is clean shaven, and he is dressed in the orange robe of a Tibetan monk. The boy's head tilts gently from side to side in a slow, effortless rhythm while his eyes focus like a laser on the spoon, which he holds up at arm's length. Suddenly, and quite without warning, the head of the spoon wilts to the side of his hand as if the steel handle has turned to soft rubber.

A young man dressed in black stands beside the child, watching in silent fascination, while the child somehow causes the spoon to effortlessly bend and twist at will. "How do you do that?" he asks.

*"It's not about the spoon, you know," answers the child with a decidedly British accent. "It's all about yourself."<sup>295</sup>*

Movie-goers will recognize this scene from one of the most stunningly successful technological marriage of science fiction fantasy and special effects ever to hit the big screen. In ***The Matrix***, Keannu Reeves' recognition of the effect of his conscious choices on the world around him is expressed in this classic scene which depicts a phenomenon made popular by Uri Geller. Spoon bending, as it has been called, is a phenomenon which has been shared by perhaps millions of people over the past thirty or so years. That ordinary people, especially children, can perform this seemingly mystical feat is not arguable.<sup>296</sup> How it works and what it means, however, is central to our discussion of a new model of unified fields.

*The Stuff Descartes Left Out*

---

In spite of all the subjects about which scientists and metaphysicians are in fundamental disagreement, there is one statement about which there can be no legitimate argument. In the words of Rene Descartes, *Cogito, ergo sum*<sup>297</sup>. We are conscious beings. We are aware that we are aware. This says nothing about the ways we choose to exercise our conscious choices or refuse to do so. That, I would argue, is a demonstration of intellect or lack of it. The statement is not intended to be pejorative in the sense that a friend of mine continually asks, "If we're so conscious, why is the world in such a mess?" The real problem has everything to do with how we frame our questions. If we intend to have a cogent conversation about this topic in "scientific" terms, the impasse becomes fundamental. Before we can even have the conversation, we have to decide what language we will use.

**The Problem With Language**

The language of science is mathematics. Science by definition assumes that a direct causal relationship exists between the attributes of Nature and reality-in-itself. Science operates as it does because it is accepted as law that the mathematical expressions employed to describe the attributes of Nature and reality-in-itself can be relied on to describe how Nature works. Science assumes that a one-to-one relationship exists between any phenomenon which can be observed, the physical theories which can be developed to explain the phenomenon, and the mathematical language which is used to describe it. This is held to be implicit in the scientific method. To the extent that mathematical expressions succeed in describing the attributes, relationships and behaviors which occur at progressively larger scales in Nature, math is said to operate as a "privileged" language. This term is meant to infer that mathematics is privileged because it is believed to be less ambiguous than linguistic expressions. This line of reasoning is seriously flawed.

**Complementarity and Mathematical Expressions**

While few would argue about the extraordinary value of the advancements made possible by increasingly sophisticated mathematical expressions, it is

nevertheless true that all mathematical expressions or systems suffer from the same shortcomings which are intrinsic to all forms of linguistic expression. First, mathematics is a linguistic expression which conveys meaning by means of symbols. As with all similar forms of human expression, mathematics is therefore subject to the laws of complementarity.<sup>298</sup> In simple terms, this means that the more precise and abstract mathematical expressions become, the less relevant they are. Nowhere is this phenomenon more apparent than in the mathematical formulations used to construct science's most sophisticated attempt to describe physical reality-as-it-is. This mathematical construction is known as super string (or, more lately, M) theory.<sup>299</sup>

### **Super string (M) Theory**

The current version of super-string (M) theory embraces a number of exceedingly complex mathematical concepts, most of them theoretical and all of them subject to a degree of personal interpretation. These include Lie algebras, Euler numbers, multi-dimensional spatial topologies, differential geometries, Grassmannian variables, Hilbert Space, a number of emergence operators and so on - pretty exotic stuff. Lest you be put off by all these abstruse mathematical expressions, keep in mind that there are very few people on the planet who are sufficiently fluent in the language of higher mathematics to even understand this stuff, much less write it.

One of the problems with string theory is that it has always been impossible to reduce any of its terms to experimentally verifiable components. The theory describes the smallest particles of the space-time continuum, not as geometrical points but as ultra-microscopic loops, vibrating in ten (10) dimensions, six of which are compactified around larger loops, which makes them exceedingly small mathematical objects. If you can visualize this, the stuff you have been smoking is much better than most.

The space the loops are thought to vibrate in can be mathematically described as loop patterns, which are then referred to as *spin networks*. The problem with all this comes with the intrinsic difficulty of accommodating experimental verification. The difficulty arises because of the exceedingly small

*The Stuff Descartes Left Out*

---

diameters of the loops and spaces described in the theory. They are all in the  $10^{-33}$  centimeter range, which is precisely the so-called Planck length. This dimension is twenty magnitudes [multiplied by 10 followed by 19 zeros] smaller than the smallest sub-atomic particles described by quantum mechanics, including sub-quarks. This means that the size of a single string network is to the size of an atom as the size of an atom is to the diameter of the solar system. This means that under conventional protocols, this distance is much too small to be experimentally verified.

The value and shortcomings of super string (M) theory are important when we begin to examine how information becomes physical in the cosmos. Super string (M) theory represents the pinnacle of the mathematical art by describing the origins of matter and the interactions of primary fields. Unfortunately, the language is so abstract and the formulations are so arcane that virtually no one can understand them without the assistance of Brian Greene and Michio Kaku, two of its superstars. This paradox constitutes a quintessential illustration of the way in which any symbolic language is subject to the laws of complementarity. It is as true of linguistic expressions as it is of mathematical ones.

**Goedel's Theorem**

Perhaps more importantly, we have to take into account the finite descriptive limits which apply to all mathematical expressions. This set of limitations is set forth in the wonderful work which has come to be known as "Goedel's Incompleteness Theorem<sup>300</sup>." According to Kafatos and Nadeau, authors of two extraordinary books, ***The Conscious Universe*** and ***The Non-Local Universe***, here's how it works.

*In quantum physics the characteristics of particles and quanta cannot be isolated from each other, given the complementary interchangeability of their particle-wave aspects. This includes field interactions by which other quanta are exchanged [e.g., the sharing of electrons in chemical reactions, etc.]. Matter cannot be dissected*

*from the omnipresent sea of energy, nor can we in theory or in fact observe matter from the "outside."*

This mathematical insight bears a striking resemblance to the ancient Chinese concept of Yin and Yang. As we voyage further into the realm of the unvisualizable, in search of a grand unified theory incorporating all forces, the picture becomes increasingly holistic. The constituents of matter and the basic phenomena involved are unmistakably interconnected, interrelated and inter-dependent. As Werner Heisenberg put it,

*The Cosmos appears as a complicated tissue of events, in which connections of different kinds alternate or overlay or combine and thereby determine the texture of the whole.<sup>301</sup>*

This suggests that a purely reductionist approach to a complete understanding of physical reality, which has always been the goal of physics, is simply not possible. The inability of the reductionist approach to completely comprehend physical reality with an appeal to physical theories, expressed in terms of mathematical formulations, is one of the inescapable implications of Goedel's Incompleteness Theorem. Even though Kurt Goedel as a young mathematician was greatly influenced by the thinking of the Vienna Circle<sup>302</sup>, his work "proved" that the principal aspiration of that group of theorists was unattainable in principle.

Goedel's enormously important but often ignored theorem, which was developed in the summer of 1930, "proves" that mathematics, acting as the language of physical theory, cannot reach closure. Since no algorithm or calculation procedure which uses mathematical proofs can prove its own validity, any mathematical expression which claims to have reached closure [or to have provided an exhaustively complete description of any physical aspect of physical reality] cannot prove itself. As mathematician Rudy Rucker puts it:

*Mathematics is open-ended. There can never be a final best system of mathematics. Every axiom-system for mathematics will eventually run into certain simple problems that it cannot solve at all.* <sup>303</sup>

Kafatos/Nadeau take this insight one step further:

*If no mathematical system, no matter how formal, can reach closure, then it inevitably follows that no physical theory built on mathematical systems [as all modern physical theories must be] can reach closure. This means, in short, that even if we do construct a Grand Unified Theory of Everything, and even if that theory could somehow coordinate within its mathematical framework an explanation of the phenomena of life and/or consciousness, this theory could not in principle claim to be complete or final.<sup>304</sup>*

It is essential that we understand the implications of this notion. The requirement that a physical theory can only be found valid if its predictions can be demonstrated in publicly repeated demonstrations under controlled conditions, is the central pillar of the scientific method. The Incompleteness Theorem simply reveals that the language of physics cannot be relied on to completely disclose physical reality. It cannot be relied on, then, to describe such ineffable quotients as life and consciousness. This in turn means that the universe as a whole, reality-in-itself, Nature, cannot be completely described, discovered or disclosed in terms of a physical or mathematical theory. The fact that this is so is central to the concept of complementarity.

The implications of Goedel's insights are profound. The role of science is and always has been to discover how Nature works. The language of scientific expression is mathematics. Mathematics cannot be expected in any physical theory of how Nature works to provide a complete description of reality-as-it-is. It follows, then, that

(1) because there is a vast part of the human experience which is neither measurable nor quantifiable;

(2) because there is a ponderous body of demonstrable phenomena which do not bear a one-to-one relationship with the material aspects of Nature; and

(3) because the language of science cannot be relied on to bring any scientific description of how Nature works to a point of closure, we are

therefore compelled to discuss the phenomenon called Consciousness in terms which are not scientific. The only tool which remains is the common linguistic set of symbolic and semantic expressions which we call language.

### **Ambiguity**

Armed with only the imprecise tools of spoken and written language, we struggle to find a common ground in order to establish a context for our conversation. If we are to have a cogent discussion about consciousness, we are obliged to define the bounds which will govern our considerations. The following illustrates how maddeningly difficult this can be.

*Forrest died and found himself standing outside the gates of paradise. He was met there by an Angel who told him,*

*"Before you can enter paradise, you must answer three questions correctly. You don't have to answer them now - you can go back to your life and think about them until you are ready to answer. You can return whenever you like."*

*"What are the questions?" asked Forrest. The Angel thought for a moment and then said,*

*"First, you must tell me how many seconds there are in a year. Next, you must tell me how many days of the week begin with the letter 'T'. And finally, you must tell me the name of God."*

*Forrest left the Angel and went back to his life on the planet. Shortly thereafter, he returned, smiling broadly as he approached the Angel at the gates.*

*"Back so soon?" asked the Angel.*

*"Sure am," said Forrest. "I have all those answers you're looking for."*

*"My, my," said the Angel. "Alright, let's see if you're ready to enter paradise." After a short pause, the Angel asked, "How many seconds are there in a year?"*

*"That's easy," said Forrest. "Twelve."*

*"Only twelve?" asked the Angel with a frown on his face. "How did you come up with that number?"*

*"January second, February second..."*

*"I guess I can allow that answer," said the Angel. "It's not the answer I was looking for, but it is allowable. Alright, how many days of the week start with the letter 'T'?"*

*"Two," said Forrest.*

*"That's right," said the Angel. "And what are they?"*

*"Today and tomorrow," Forrest replied.*

*"Well," said the Angel, "That is not what I was looking for either, but I suppose I will have to allow it." After pausing a moment, the Angel said, "This is the hardest question of all, Forrest. If you cannot answer this one, you cannot come into paradise. What is the name of God?"*

*"Oh, that's easy!" said Forrest with a big smile on his face. "My momma told me that when I was just a baby. God's name is Andy."*

*"Andy?" asked the Angel. "What makes you think God's name is Andy?"*

*"Just like the song says. 'Andy walks with me, Andy talks with me...'*

anonymous



**Consciousness – A Definition**

Depending on the context within which we conduct our discussion, the notion of consciousness can take on many shades of meaning. "Consciousness" is customarily defined in terms of "...the quality or state of being aware, especially within oneself...the state or fact of being conscious of an external event, object, state or fact...awareness<sup>305</sup>."

As Nobel laureate Erwin Schroedinger<sup>306</sup> described it,

*Consciousness is that by which this world first becomes manifest, by which indeed, we can quite calmly say, it first becomes present; that the world consists of the elements of consciousness. We know virtually nothing about what consciousness is, or how it works, or even what it is for.*

According to Nobel laureate Eugene Wigner<sup>307</sup>,

*We have at present not even the vaguest idea how to connect the physio-chemical processes with the state of the mind.*

Perhaps physicist Nick Herbert<sup>308</sup> put it best:

*Science's biggest mystery is the nature of consciousness. It is not that we possess bad or imperfect theories of human consciousness; we simply have no such theories at all. About all we know about consciousness is that it has something to do with the head, rather than the foot.*

Even in this simplified expression of the scientific point of view, Herbert appears to be seriously mistaken. Dr. Candace Pert, Ph.D., is a Visiting Professor at the Center for Molecular and Behavioral Neuroscience, Rutgers University, and a consultant in Peptide Research in Rockville, Maryland. She discovered the opiate receptor and many other peptide receptors which operate both in the brain and the body, which led to an understanding of the chemicals which have been shown to equate with emotion in the mind and body. In an interview conducted with journalist Bill Moyers, Dr. Pert makes the following categorical statement:

*The Stuff Descartes Left Out*

---

*You're still thinking it's your brain, but it's the wisdom of the body. Intelligence is in every cell of your body. The mind is not confined to the space above the neck. The mind is throughout the brain and body.*<sup>309</sup>

It is important that we not confuse the concept of consciousness with one of its subsets, sentience, which is the ability to apprehend that we are aware. The biological sciences have relied on this arbitrary and erroneous distinction to elevate the value of human consciousness above all others. It has long been held by scientists that the concepts of consciousness and sentience are fundamentally indistinguishable. It has further been held as a dictum that sentience is the sole province of the human species. In our culture, the legacy spawned by this intellectual arrogance has given rise to our collective, cultural belief that other living organisms are not conscious.

For centuries, we have arbitrarily assumed that no other creatures on our planet are self-aware. By this artifice and as a result of this flawed thinking, we continue to justify the indiscriminate pillaging of Nature to suit human needs, with no apparent regard for the welfare of the other conscious, living beings with whom we share the planet. This is the predictable result of a point of view about our place in the scheme of Nature which is devoid of an accompanying appreciation of the stuff Descartes left out.

When defined as a state of being aware, of being conscious of external events, objects or states, consciousness becomes an attribute demonstrably common to all living things. This includes the most fundamental life forms. In fact, when viewed in the context that everything is information, the arbitrary dividing line which distinguishes living [organic] from non-living [inorganic] material ceases to have any real meaning. To understand why this is so, we have only to journey back nearly one hundred years to re-examine the extraordinary work of Sir Jagadis Chandra Bose.<sup>310</sup>

**Sir Jagadis Chandra Bose**

On the eastern coast of the sub-continent of India, in the old state of Bengal, there stands on four acres of ground off the Acharya Prafullachandra Road, north of the Calcutta University, a complex of buildings made of fine grayish and purple sandstone, in the classical design of pre-Mohammedan India. The main edifice, known as the Indian Temple of Science, bears an inscription:

*"This temple is dedicated to the feet of God for bringing honor to India and happiness to the world."*

Just inside the entrance are glass cases containing a series of intriguing instruments devised nearly 100 years ago to measure growth and behavior in plants, down to the minutest detail, by magnification of these processes up to 10,000 times. The instruments stand in their cases, in mute testimony to the genius of a great Bengali scientist whose work united in one man the fields of physics, physiology and psychology, and who found out more about plants than anyone before and perhaps after him. He remains almost unmentioned in classical theories of the subjects in which he specialized.

The buildings and their gardens are the Institute of Research built by Sir Jagadis Chandra Bose, of whose work in the field of plant physiology the *Encyclopaedia Britannica* could only say, nearly a half century after his death, that it was so much in advance of his time that it could not be precisely evaluated.<sup>311</sup> This assessment is still as correct today as it was more than 50 years ago. Bose is known to have invented the ability to transport electrical signals through space without wires [which we have come to know as radio] fully one year before Tesla, Marconi, Lodge, Muirhead and Popov.<sup>312</sup>

In 1898, Bose published four papers on the behavior of electric waves in the *Proceedings of the Royal Society* and in Great Britain's foremost popular scientific journal *Nature*<sup>313</sup>. Bose noticed the strange fact that his metallic coherer for receiving radio waves became less sensitive if continuously used but returned to normal after a period of rest. This led him to the conclusion that metals, however inconceivably, might exhibit a recovery from fatigue similar to that which took place in tired animals and people. Further work began to

*The Stuff Descartes Left Out*

---

convince him that the boundary line between "non-living" metals and "living" organisms was tenuous indeed. Spontaneously moving from the domain of physics into that of physiology, Bose began a comparative study of the logarithmic curves describing molecular reactions in inorganic substances as compared with those in living animal tissue.

To his awe and surprise, the curves produced by slightly warmed magnetic oxides of iron showed a striking resemblance to those of muscles. In both, response and recovery diminished with exertion, and the consequent fatigue could be removed by gentle massage or by exposure to a bath of warm water. Other metal components reacted in animal-like ways as well. A metal surface etched with acid when polished to remove all trace of the etching exhibited reactions in its acid-treated sections which could not be elicited in those areas which had not been treated.<sup>314</sup>

In a presentation to the International Congress of Physics, held in 1900 at the Paris Exhibition, entitled "De la Generalite des Phenomenes Moleculaires Produits par l'Electricalite sur la Matiere Inorganique et sur la Matiere Vivante," Bose stressed the "fundamental unity among the apparent diversity of nature," concluding that "it is difficult to draw a line and say that here the physical phenomenon ends and here the physiological phenomenon begins<sup>315</sup>."

**The Gaia Concept - The Cosmos as System**

Today, we have been invited to view our world as a unified living organism. Lovelock is credited in the modern era with originating the concept of the earth as a single living system<sup>316</sup>. The Gaia concept has since come to be accepted by increasingly larger segments of both the scientific and sectarian communities.

Fritjof Capra showed with undeniable and compelling logic that all of Nature truly is a single system. In his benchmark book ***The Turning Point***,<sup>317</sup> he describes the systemic relationships which bind all things, organic and inorganic, animate and inanimate, together into one indivisible whole.

Although one could extend and refine Capra's list, the shifts he describes, which provide new terms for the construction of human knowledge, are clearly

congruent with the new situation arising in modern physics. If thoughtful people can be enticed into this kind of understanding, and if they elect to re-examine the character of human knowledge in the terms of this new paradigm, they will draw the same remarkable conclusions Capra did. Capra is quite correct in suggesting that this new understanding will not lead to substantive changes in attitude and behavior unless and until intellectual understanding of the character of physical reality is wedded to a profound religious or spiritual awareness.

*Again, we see complementarity at work. If those who have the capacity for this awareness are to become the poets and philosophers of this new reality, they will obviously require something more than a passing acquaintance with the character of physical reality as we know it in modern physics. This suggests that the study of science is vital to the future of man, not merely because it provides greater levels of mastery and control over his environment or the basis for building new technologies. It could, in fact, play a vital and central role in developing that spiritual pattern for the benefit of the entire global community.*

Fritjof Capra

This awareness is a critical precursor to the evolution of human consciousness into higher and more progressive stages of awareness, as described by author Ken Wilber.

### **Bohm's Implicate Order**

David Bohm's seminal work ***Wholeness and the Implicate Order***<sup>318</sup> takes Capra's insights one step further - he posits the existence of what he describes as "holomovement," which he associates with a set of laws which describe an implicit level of reality operating in an "implicate order" which, in turn, is hidden beneath our experience with the macrocosm, the physical world. He describes this as an "explicate order" of unfoldment. In his view, the dynamics of this holomovement could be very similar to those associated with human thought.

*The Stuff Descartes Left Out*

---

*What happens in our consciousness and what happens in nature are not fundamentally different in form. Therefore thought and matter have a great similarity of order.*

Bohm's conclusion is that undivided wholeness implies that no categorical distinction can be made between the dynamics of human consciousness and those of the entire cosmos. The notion of consciousness implied by Bohm's reasoning is not anthropomorphic in any sense.

*It is fair to say that the universe demonstrates undivided wholeness at the most fundamental level. As a primary principle of cosmic order, it is consistent to say the whole must be seen as manifesting self-referent order at all scales. The cosmos must, in other words, be self-referentially aware of itself as reality-in-itself. Otherwise, it would not manifest orderliness, as evidenced by the fractal record of evolution, which is the prior condition for all manifestations of being.*

Consciousness, as a description of the human condition, can also be defined, then, as a self-referent awareness which is manifest as an expression of internal consistency or order. Accordingly, we can reasonably say that the universe is in this sense conscious. In order to avoid this conclusion, we must also deny the existence of order and consciousness as an implicit attribute of Nature. As Dr. Bak's work has demonstrated, the universe simply could not exist without adherence to the principles of self-organizing complexity, which define the dynamic processes of creation and destruction.<sup>319</sup> To deny that the universe is conscious, based on an appeal to incomplete scientific knowledge, is neither rational nor reasonable.

**Mind-Matter Dynamics**

In the microcosm of the quantum world, Aspect's<sup>320</sup> work has shown that consciousness plays a dramatic role in the act of observation. This quantum aspect of Nature was predicted by Bell's Theorem and proved beyond doubt by experimental processes. It was also mirrored 5,500 years ago in the structure of

the ancient Hindu text known as the Vedas. In the macrocosm, at the level of photons emitted by far distant stars, Wheeler's<sup>321</sup> work is equally conclusive. Does inorganic matter respond to the effects of consciousness, as scenes from **The Matrix** would have us believe? Dr. Dean Radin has made a life's work out of cataloging the substantial body of scientific research which documents repeatable demonstrations of telekinetic effects in real life, which mirror those portrayed in the movies.

*We can draw three strong conclusions from ESP, remote-viewing, hypnosis, ordinary-state, telekinesis and clairvoyance tests. First, these experiments exclude chance, selective reporting and design flaws as alternative explanations. Second, some experiments have been replicated thousands of times by dozens of investigators from the 1880's to the present. And third, the psi effects measured across the various experiments are remarkably similar to one another..<sup>322</sup>*

This third conclusion is particularly important. While the methods, hypotheses and purposes of the studies reviewed in Radin's work were all somewhat different, each study examined the same underlying phenomenon – the ability to perceive objects or affect events at a distance, beyond the reach of the ordinary senses. We've seen that essentially the same effects have been repeatedly observed by dozens of investigators using different methods. This is why the late Carl Sagan agreed that some of the scientific evidence provided by psi experiments is persuasive enough to take these phenomena very seriously.<sup>323</sup>

*The evidence demonstrates that psi perception and interaction operates between minds and through space. This is troubling to many scientists, but not unimaginable. After all, it is possible that tomorrow someone will discover some sort of previously overlooked, supersensitive organ that might account for reports of telepathy and the other psi phenomena. But when we consider psi perception across time, all bets are off. The possibility that we can detect, or*

*The Stuff Descartes Left Out*

---

*worse, be influenced by events from the future or past is so far beyond current scientific concepts that it staggers the imagination.*<sup>324</sup>

That psi-based events occur can no longer be reasonably argued. How such phenomena occur, however, can only be explained in the context of a model which accommodates the fractal nature of the Cosmos, operating holographically and non-locally, subject to the rules of complementarity. Without an understanding of torsion field mechanics and a recognition that the cosmos is a complex, self-organizing system, we cannot provide an adequate explanation for such things.

One thing is clear: if consciousness exists in humans, expressed in terms of sentience in the human condition, then by definition all of Nature must be conscious. The law of complementarity demands it. Fractal geometry expresses its effects locally in the form of recorded evolution. Where consciousness can be shown to exist in one localized aspect of nature, by definition it must therefore exist in all of nature, at all scales. The fractal nature of the cosmos insists that this be so. Unless we have somehow engaged in a serious *non sequitur*, it appears that we do, indeed, live in a conscious universe.

Bohm's conclusions are consistent with experimental verification. The concept of undivided wholeness implies that we can make no unequivocal distinctions between the dynamics of human consciousness and those of the entire cosmos. What is meant by consciousness in this sense is that the whole manifests order in a self-referent manner. If consciousness as we have defined it is intrinsic in the fabric of the cosmos, and if the fact that humans are conscious is what makes it possible to develop theories about how Nature works; if we are able to construct our notions of implicate order and wholeness because we somehow apprehend wholeness as intrinsic to the human condition, this can only mean that human consciousness enfolds within itself the fundamental logical principles which govern the universe.

Instead of viewing the process of cognition, of apprehending the world around us in terms of "... an external event, object, state or fact...awareness,"



we are compelled to conclude that the act of cognition itself, operating in the substrate of the human form, must be considered inextricably connected with the whole. The dynamic neuronal patterns generated by the brain, which are responsible for our apprehension of reality, enfold within themselves the previous stages of the life of the cosmos. What happens in the physiognomy of every living thing is seamlessly interconnected with all other activities which occur in the cosmos.

As the cosmos and everything in it evolve, as constituents of a single, integrated, complex, self-organizing system, there is literally "no thing" that can be presumed to be isolated or discrete. It therefore follows that human consciousness is intrinsic to the fabric of the cosmos. The idea that humanness or human consciousness or any of the functions, attributes, manifestations, expressions or characteristics of consciousness can be considered separate and apart from considerations of the cosmos as a whole, is simply not in accord with scientifically verified facts.

## **SECTION TWO**

### ***The Stuff Descartes Left Out***

## **CHAPTER TWO**

### ***Consciousness: A Matter of Complexity***

#### **A Strategic Approach**

Does consciousness arise from matter, as a manifestation of organization which is sufficiently complex to support the functions of self-referent awareness, or does matter arise and manifest complexity from a causal plane of consciousness, which is already self-referential? Of all the questions we can ask, this one is perhaps the most fundamental. The topic has continued to be the subject of intense philosophical speculation ever since humans could conceive of such things. If we can arrive at a cogent answer to this fundamental question, all our inquiries regarding how Nature works will be focused with considerably greater coherence. A serious problem nevertheless arises. Since we cannot engage in this discussion solely in scientific terms, what are our options?

One way to proceed is to examine the compelling work of such notable researchers as Nobel laureates Sir Francis Crick, Gerald Edelman and their colleagues, whose methodology has been constructed to demonstrate that consciousness arises as a manifestation of increasing complexity in matter. In the words of Sir Francis Crick, co-discoverer of the structure of human DNA,

*...the time is ripe for a concentrated attempt to understand the phenomenon of consciousness. Consciousness is synonymous with awareness, and awareness always involves a combination of attention and short-term memory. Investigators should focus on visual awareness, as the visual system has already been well*

*mapped in animals and in humans. If the neural mechanisms underlying visual awareness could be better understood, more complex and subtle mind-phenomena, such as the uniquely human feature of self-awareness [being conscious of being conscious] may be tracked as well.*<sup>325</sup>

Another tack is to examine the body of information which suggests that consciousness operates outside the boundaries of space and time. These phenomena are classified as *Transpersonal Communication* and constitute a body of research which is summarized in Dr. Dean Radin's book, ***The Conscious Universe: The Scientific Truth of Psychic Phenomena***.<sup>326</sup>

A third alternative is to examine ancient knowledge preserved in manuscripts such as the *Rik Veda*, the *Enuma Elish - The Epic of Creation*, the text of *The Tibetan Book of Living and Dying* and other similar resources, which represent the most compelling collection of ancient metaphysical traditions which still remain available to us.

### **Is Consciousness the Product of Complexity?**

Gerald Edelman, the primary spokesman and proponent of the notion that consciousness arises from matter, was born in New York City in 1929. He studied at Pennsylvania and Rockefeller universities, and became professor of biochemistry at Rockefeller in 1966. His special interest is in the chemical structure and mode of action of the antibodies which form part of a vertebrate animal's defense against infection. He shared the Nobel prize for Physiology and Medicine with Dr. Rodney Porter in 1972. In his book ***Bright Air, Brilliant Fire: on the matter of the mind***, Edelman summarizes his approach to unraveling the mysteries of the mind:

*The notion that we can think about how mental matters occur in the absence of reference to the structure, function, development, and evolution of the brain is intellectually hazardous. The likelihood of guessing how the brain works without looking at its structure seems slim. Certainly, if one agrees with the ethologists that mental*

*The Stuff Descartes Left Out*

---

*states are a product of evolution, we must at least study how the brain evolved. Our obligation is to complete Darwin's program.*

As you read through this next statement, notice the extent to which Edelman's description of the developmental patterns arising in the brain demonstrate the intrinsic rules which govern self-organizing criticality in open, complex systems:

*When we make even our first halting efforts to do so, we come upon a series of intriguing and baffling findings. We see that the development of brains is enormously dynamic and statistical. Developmental analysis suggests that the way genes regulate the intricate anatomy of the brain is through epigenetic interactions – particular developmental events must occur before others can occur. Certain adhesion molecules regulate collectives of cells and their migration, but do not do so cell by cell in a prescribed or prearranged pattern.<sup>327</sup> And to some extent, cell migration and cell death are stochastic – they have unpredictable consequences at the level of individual cells.<sup>328</sup> These statistical processes oblige individual brains, unlike computers, to be individual.<sup>329</sup> The somatic diversity necessarily generated by these means is so large that it cannot be dismissed as "noise," as one would dismiss the noise in an electronic circuit at normal operating temperatures<sup>330</sup>. (The hiss from your hi-fi amplifier is an example.)*

In his description of the architecture of the brain, Edelman makes a stunning discovery. The brain exhibits vast parallelism in its processing functions by evolving structures which are both non-local in their siting and holographic in their functional relationships. He struggles to identify the functional dynamics which operate in this mystifying, exotic and exceedingly complex organization of mechanical relationships.

*Indeed, the circuits of the brain look like no others we have seen before. The neurons have treelike arbors that overlap and ramify in myriad ways. Their signaling is not like that in a computer or a*

*telephone exchange; it is more like the vast aggregate of interactive events in a jungle. And yet despite this, brains give rise to maps and circuits that automatically adapt their boundaries to changing signals. Brains contain multiple maps interacting without any supervisors, yet bring unity and cohesiveness to perceptual scenes. And they let their possessors (pigeons, for example) categorize as similar a large if not endless set of diverse objects, such as pictures of different fish, after seeing only a few such pictures.<sup>331</sup>*

The phenomenon of pattern recognition and the ability to extrapolate meaning from one kind of pattern to another are attributes of intelligence. The field of observation is apprehended in terms of patterns which are pre-programmed, imprinted if you will, in the very fabric of the substrates of the brain. The details associated with such imprints are carried in the encrypted information stored in the vast complexity of DNA. The nature of such imprints appears to vary with speciation, consistent with Edelman's observations regarding consciousness, awareness and the mind.

Dr. Edelman's work in this field has been extraordinary because he has succeeded in demonstrating many of the most intricate dynamics and mechanisms which operate in the brain. The computer models he has developed to test his ideas are quite revolutionary. They rely on a combination of both neural networks [which can be equated in computer jargon with contextual right brain functions] and expert systems [which can be equated with linear, sequential functions demonstrated by the left brain], which operate in a live feed-back loop, much as the brain itself does.

His approach represents the pinnacle of both scientific achievement and the empirical applications of the scientific method. His thesis is clearly focused on the notion that consciousness and the ability of the human mind to recognize patterns and extrapolate meaning from experience are derivative functions arising from the increasing complexity of matter.

### **Conceptual Limitations**

Nevertheless, he is the first to admit that this approach is limited. Edelman recognizes that philosophers have always made much of the role of *intentionality* in human consciousness. In his latest book, he asks,

*...how is it that beings with minds can refer to other beings or things? Things without minds do not refer to beings or other things.*"<sup>332</sup>

Here, Edelman summarizes his own theory of mind, consciousness and self-awareness, as laid out in more technical detail in his earlier works.<sup>333</sup>

*Biological organisms (specifically animals) are the beings that seem to have minds. So it is natural to make the assumption that a particular kind of biological organization gives rise to mental processes.*

When I first read that passage, I felt it was not a natural, logical assumption at all. After all, up until relatively recently, we could just as easily have said

*"Biological organisms (specifically birds, for example) are the beings that seem to have wings. It is natural, therefore, to make the assumption that a particular kind of biological organization gives rise to flight."*

The state of the art in the biological sciences clearly demonstrates that this is not correct. What is correct, however, is the notion that a particular kind of *informational* organization carried in the DNA gives rise to speciation and individuation within a species.

*"Biology" as used by Edelman seems to refer to the sheer, staggering complexity of biological systems such as the brain. This includes a consideration of the historical component of individual development (both in evolution of the species, and the idiosyncratic growth of each individual). It also embraces the concept of embodiment, or how the mind evolves and grows in interaction with an equally staggeringly complex, open-ended environment*

*containing other minds. He does not seem to mean, however, that "wetware is intrinsically different"<sup>334</sup>.*

Edelman and Crick provide extensive detail in their descriptions of the biology of the brain as currently understood. They describe a model of mind and consciousness which appears to be statistically valid for the evolved state of individuals. In this model, the self-conscious mind is described as having various evolutionarily determined value systems, with feedback loops between them, including the categorization of inputs and language processing centers. Both researchers claim that language is necessary for self-consciousness. However, they do not explain why they feel the language component originally had to be a *spoken* one.<sup>335</sup>

The necessity for this condition is anything but self-evident. We have reason to believe, for example, that while we may be the only species with a fully developed language structure, we are not the only sentient species on this planet. Ongoing research strongly suggests that certain orders of cetaceans, dolphins and simians all demonstrate sentience at a far higher level than science has been willing to allow in the past. The question of whether or not their intelligence is dependent on their ability to communicate in terms of a spoken language is still open, however, to considerable debate.

All that is needed for consciousness in Edelman's model is what is or can be known in physics and biology. His position is no different than that of Descartes. By known physics he means

*"...no strange 'conscious particles', no Penrosian quantum gravity, no 'spooks'."*

He asserts that he is not a "carbon chauvinist" either: Edelman admits we might one day be able to build self-conscious artifacts, although not in the near future, because of the difficulty of the task."

*"And so," he argues, "we don't need to worry yet if such a thing would be ethical."<sup>336</sup>*

*The Stuff Descartes Left Out*

---

Thus far, Edelman's approach seems eminently reasonable. But as we have all discovered, the mind is more than a machine.

*The facile analogy [which compares the mind] with digital computers breaks down for several reasons. The tape read by a Turing machine is marked unambiguously with symbols chosen from a finite set. In contrast, the sensory signals available to nervous systems are truly analogue in nature and therefore are neither unambiguous nor finite in number. Turing machines have by definition a finite number of internal states, while there are no apparent limits on the number of states the human nervous system can assume. ... The transitions of Turing machines between states are entirely deterministic, while those in humans give ample appearance of indeterminacy.*

Edelman's conclusions are quite consistent with the rules which govern complex, self-organizing systems. Does he mean to suggest that choosing symbols from a finite set means that there are finite limits to the number of combinations those symbols may express? The answer is found in the structure of the question. Isn't it true that the language of computers, binary notation, uses only two *digits*, but can represent an infinite variety of real and imaginary *numbers*? When examined in the context of the fractal nature of the physical structure of the brain, this seems unlikely. Although Edelman demonstrates a superb understanding of biology, he appears to have developed his model of consciousness and self-awareness in a relative vacuum.

**Sheldrake's Morphic Fields**

Edelman and Crick grapple with some of the fundamental attributes of consciousness but recognize the intrinsic problems associated with building a robust, descriptive model of human consciousness, based on computer simulations. The phenomena which operate in what Rupert Sheldrake has termed "morphic fields"<sup>337</sup> are well beyond the limits of Edelman's model. In his



wonderful book, ***Seven Experiments That Could Change the World***,<sup>338</sup> Sheldrake asks the hard questions which the reductionist model avoids.

*Our perceptions are mental constructions, involving the interpretive activity of our minds. But while they are images in our minds, at the same time they are outside our bodies. If they are both within the mind and outside the body, then the mind must extend beyond the body. Our minds reach out to touch everything we see. If we look at distant stars, then our minds stretch out over astronomical distances to touch those heavenly bodies. Subject and object are indeed confused. Through our perceptions, the environment is brought within us, but we also extend outwards into the environment.*<sup>339</sup>

We have only to examine the work of Aspect, Wheeler and Bose, among others, to realize that this is quite correct. We can concede, without compromising the vitality of our new model, that the architecture of the physical structures of the brain is an essential, inextricable component of consciousness and self-awareness. The law of complementarity demands that this be so. However, the generally held view represented by the work of Crick, Edelman and others who represent the more conventional viewpoint, which holds that consciousness arises from and is a direct, mutually exclusive result of a sufficiently sophisticated increase in the complexity of matter, fails by at least one fundamental benchmark to accommodate a whole world of known phenomena.

The model proposed by Edelman and Crick fails to accommodate the existence of phenomena which constitute an undeniable component of the human experience. Ervin Laszlo has described these phenomena under a single broad category in terms of what he calls *Transpersonal Communication*.<sup>340</sup> Perhaps more importantly, the conventional physical model has been developed without regard to what we now know about the fractal, holographic and quantum attributes of Nature and the time domain attributes of Mind.

*The Stuff Descartes Left Out*

---

This means, in short, that consciousness and self-awareness must be the basis of Nature and not one of its self-organizing, evolutionary consequences. The rule is very simple: whatever dynamics can be shown to operate in any manifestation of any system in Nature must, by definition, operate at all scales in Nature. Consciousness, therefore, must be considered an underlying cause and not a derivative effect of Nature's dynamics.

**Does Matter Arise From Consciousness?**

While our argument is neither complete nor exhaustive, it represents what I believe are the fundamental, salient elements of the argument against "consciousness as an effect<sup>341</sup>." It is significant to note that we have access to an entire lexicon of carefully documented and publicly verifiable experimental evidence which demonstrates that consciousness operates without regard to the constraints of physicality. *Transpersonal communication* takes on many forms, but can, I believe, be summarized in the following categories:

- *Telepathy/ ESP* – The effects exerted by human consciousness on organic matter and other life forms and the related ability to access information non-locally and teleologically.
- *Telekinesis* – The effects of human consciousness on both organic and inorganic matter.
- *The Meditation Effect* – The phenomenon by which the brain waves of physically separated meditators exhibit coherence.
- *Remote Viewing* – The process by which consciousness can be harnessed by intention to acquire access to information regarding locations which are far distant and physically removed. Remote viewing has also been shown to operate forwards and backwards in time.
- *The Near Death Experience* – The process by which those whose bodies have been diagnosed as clinically dead experience or find access to a common "post life" experience, which often includes the acquisition of new information, personal skills and transpersonal abilities.
- *Past Life Regression* – The process by which patients are facilitated to experience other lifetimes while in an altered state of consciousness.
- *Twin Path Phenomenon* - The process by which similar technologies, art forms, linguistic expressions and cultural mores develop simultaneously

in populations far removed from each other, in the absence of any social contact or other conventional forms of communication.

- *Spontaneous Cultural Links* – The process by which behavioral information is transmitted between members of a species not possessing language skills and which are far removed from each other.

Detailed references regarding each of these phenomena, together with numerous references to the original research are contained in the endnotes. This also includes an extensive suggested reading list. At this juncture, suffice it to say that to the extent we can demonstrate that consciousness can be shown to operate independently of physical materiality, we will have succeeded, as Chalmers<sup>342</sup> says, in "...putting the ghost back in the machine."

### **Conclusions & Summary**

In the preceding pages, the individual elements of our new model have been aggregated together. Thus far, the model consists of the following basic elements and assumptions:

- *Everything is Information:* At its most fundamental level, everything is not just comprised of information – it is information. In order to understand how Nature works, we must frame our inquiries in terms of information-based paradigms.
- *Laws of Complementarity:* The physical universe in all its manifestations at all scales is bounded by the rules of complementarity. Duality operates at all levels of reality-as-it-is and cannot be disregarded in any sense, at any scale.
- *Complexity and the Phenomenon of Self-Organizing Criticality:* The Universe is a single, complex, open, self-organizing system which operates according to the basic tenets of self-organizing criticality, punctuated equilibrium, fractal geometry [as a localized expression of evolutionary processes] and  $1/f$  background noise. The dynamics of Self-Organizing Criticality (SOC) operate at all scales in Nature, including those which are expressions of consciousness.
- *Fractal Geometry:* The evolution of Nature's self-organizing systems is manifest in local terms, according to the functions of fractal geometry, which manifests the totality of all such information regarding any SOC system at all scales.

*The Stuff Descartes Left Out*

---

- Holographic Non-locality: The universe is holographic in its self-organizing functions. All information embodied in each localized manifestation of physical reality-as-it-is is available non-locally, at any other locale, regardless of the separation from the original locality in space-time.
- Quantum/Hadronic Mechanics: The universe operates according to the principles of quantum mechanics insofar as current formulations correctly describe field effects to the level of atoms. Sub-atomic functions are more correctly described in terms of hadronic mechanics as set forth by Santilli et al.<sup>343</sup>
- Dynamics of the Torsion Field: Non-locality in the universe operates by group-wave phenomena in the information transport field, which we have called the torsion field. The torsion field is a fifth derivative field, whose attributes and characteristics are described in terms of spin polarity, angular momentum and weighted waveform vector velocities. The formulations describing electromagnetic fields, quantum gravitational effects and the strong and weak nuclear forces can all be expressed in geometricized formats to correspond with torsion field mechanics. Instead of five separate primary fields, we view physical reality in terms of a single unified field, whose quantifiable functions can be expressed in terms of parallel geometries, which all arise from a common, underlying plane of infinite scalar potentials.
- Universal Consciousness The universe is conscious. We define consciousness as a plane of undifferentiated information which operates as a set of infinite scalar potentials. By consciousness we mean, further, that physical reality-as-it-is is self-referential at all scales.

**The Next Step**

The next step in our quest for a unified theory is to examine the architecture of the human condition and other life forms in the context of the attributes of this new model. It is time to ask the question,

*"By what mechanisms does the human architecture support, manifest or express the functions of Consciousness - the stuff Descartes left out?"*

## **SECTION TWO**

### ***The Stuff Descartes Left Out***

## **CHAPTER THREE**

### ***Architecture of the Human Condition***

#### **The Immune System**

Immunology is the field of medical research which focuses on the mechanisms by which living organisms defend themselves against disease and illness. Until just a few years ago, immunologists mistakenly believed that the immune system operates within the human body as a mutually exclusive, distinct and autonomous system. Until 1989, immunology texts did not contain a single reference to the brain or any mention of the inter-relationship between the functions of the brain and the immune system.

Dr. David Felton<sup>344</sup> is credited with the discovery of the neuronal links which tie the human nervous system and the immune system together. How he discovered this fascinating link and how he reacted to his discovery is illustrative.

*I came to psychoneuroimmunology with an M.D. and a Ph.D. directed towards the neurosciences. I had always been interested in the brain and had studied some of the chemical mediators - called "neurotransmitters" - that communicate from cell to cell in the brain. One day I was looking through a microscope at tissue sections of liver in order to identify nerves that travel alongside blood vessels. I was having trouble seeing what the cells really looked like, so I said, "Let's go to the spleen.*

*The Stuff Descartes Left Out*

---

*Everybody knows what the spleen looks like." So I started looking at blood vessels and some of the surrounding areas in the spleen. And there, sitting in the middle of these vast fields of cells of the immune system, was a bunch of nerve fibers. I looked at them and thought, what is this? Nerve fibers aren't supposed to talk to the cells of the immune system. What are they doing here? So we cut some more sections, and looked - and there they were again. We tried other blocks of tissue, and there they were again. They kept showing up again and again. We and others eventually discovered nerve fibers going into every organ of the immune system and forming direct contacts with the immune system cells.<sup>345</sup>*

Today, more than seventeen years later, this may appear to be a mundane issue. But until this discovery was made, immunologists insisted that the immune system is autonomous and operates on its own, without outside controls. The significance of this discovery is that it established beyond doubt that the nervous system plays an integral role in the functioning of the immune system, including many aspects of immunal response.

It is interesting to note that when Dr. Felten and his team of researchers began to search the literature to find clues to help them understand what they had discovered, they found that immunologists had long ago discovered receptors for neurotransmitters sitting on the surface of cells of the immune system, but couldn't quite make sense out of it. If the immune system operates autonomously, why would a lymphocyte have a neuro-transmitter? The question remained unanswered for years because no one understood that the brain exerts a direct influence on the functions of the immune system.

Dr. Felten's insights into the relationship between the nervous system and the immune system was subsequently borne out by experimental testing which showed conclusively that if the nervous connections to the spleen or lymph nodes are severed, immune system responses in those tissues abruptly cease. The practical implication of this discovery was that the many stressors we all face in life, which clearly affect the autonomic nervous system, also have a

demonstrable impact on the immune system. The "mind" controls the body. Felten's discovery was the first important clue about the role the nervous system and the molecules known as neurotransmitters play in directing and monitoring the functions of the body.

The nervous system, the mind and the brain, do not exist in isolation from the immune system. There is overwhelming evidence that hormones and other neurotransmitters influence the activities of the immune system and that the products of the immune system influence the brain. The information conveyed between the brain and the other systems of the body operates in the context of emotions. What was not expected by Dr. Felten and other researchers who were attracted to this area of inquiry was the discovery that some of the signals which leave the brain when we feel certain emotions have a demonstrable effect on the immune system.

*What this means, in part, is that we can no longer afford to ignore the role of emotions, hope, the will to live, the power of human warmth and contact in the process of investigating the dynamics of healing and well-being. The fact that feelings and emotions are difficult to investigate scientifically, coupled with the fact that our ignorance of such things in a scientific context is so overwhelming, has made them easy for scientists and researchers to ignore.*

What is important about this issue is that feelings and emotions exert a direct, unequivocal effect on the way the immune system functions.

*We cannot yet describe in precise scientific terms the mechanisms by which they operate because there currently exists an abysmal lack of understanding about such things in science. We do not understand the chemistry of emotion as it operates in the brain and the rest of the body. We do not understand what measures of our immune response mean about our ability to fight off an infection.*

***The Stuff Descartes Left Out***

---

Dr. Felten's surprising candor about such things is somehow very comforting when he says,

*We have some guesses, but we don't really understand these things yet. Yet we observe individuals with this blazing determination to make it, to survive, to pull through an illness - and they somehow do. We can no longer afford to overlook that...I am not suggesting we abandon the high-tech diagnosis or pharmacology, but that we should add more of a humane and personal touch to medicine. The art is still important.*<sup>346</sup>

**Neuropeptides, Emotions and Information Processing**

Dr. Candace Pert<sup>347</sup> made a discovery which has fundamentally altered our notions about the relationship between the nervous system and the immune system, and the role emotions play in the way humans process information. For the first time ever, she demonstrated the existence, role and functional attributes of the family of long-chain amino-acid bodies which have come to be known as neuropeptides.

It is difficult to understand how modern medical practitioners could have harbored the belief that the immune system operates autonomously, without outside control, for so long. It is even more difficult to understand how so many mainstream practitioners, medical colleges, medical research institutions and government-sponsored research groups justify clinging to this notion. Why is it important? Because the discovery of the role of neuropeptides in the mind-matter connection between the brain and the immune system constitutes a critical key to understanding how consciousness operates within the architecture of the human body.

We begin our investigation into the relationship between the architecture of the human body and consciousness with an examination of the role emotions play in the processes of cognition, memory and the deliberate exercise of the functions of human consciousness. The mechanisms which define the behaviors and roles of the more than 60 different amino-acid-based molecules



known as neuropeptides, which operate in the human [and, more likely, in all organic] systems, are pivotal to the design of our new model of Natural dynamics.

After more than a decade of intensely focused research, we now have reason to believe that neuropeptides are the amino-acid bodies responsible for communicating information non-locally<sup>348</sup> throughout the human body. In Section One we evaluated the phenomenon we have called simultaneity, non-local effects at a distance, as predicted by Bell's Theorem and conclusively demonstrated by Dr. Gisin and his colleagues in Geneva. Now, we observe how this phenomenon operates in the macrocosm, as a fundamental activity of the human architecture.

### **Information Transport Mechanisms**

The latest scientific research into synaptic-gap communication phenomena suggests that nothing happens in the body faster than 1/1000<sup>th</sup> of a second.<sup>349</sup> In some cases, information originating in the brain requires upwards of .3 seconds to reach our extremities. It sometimes takes much longer than that for sensory information originating in the extremities to reach the cognitive centers of the brain.

However, we now have reason to believe that information originating in one part of the body may be communicated instantaneously to all other parts of the body, outside the chemo-synaptic transport mechanisms which comprise the body's neural networks. The instantaneous information transport effect is truly non-local and has been shown to operate at data transport rates which are well in excess of the highest functional rates possible in localized, chemo-synaptic reactions. How this happens and what it means to the structure of our new model is the subject of one of the most viciously fought turf battles in the history of medical research.

*The Stuff Descartes Left Out*

---

**Dr. Candace Pert****The Discovery of Neuropeptides**

Dr. Candace Pert was Visiting Professor at the Center for Molecular and Behavioral Neuroscience at Rutgers University. She currently works as a consultant for Peptide Research and was formerly Chief of the Section on Brain Biochemistry of the Clinical Neuroscience Branch at the National Institute of Mental Health. She discovered what is referred to as the "opiate receptor" (and many other peptide receptors) in the brain and body. Her discoveries have led to a much broader understanding of the behaviors, attributes and characteristics of the chemical signals which travel between the mind and body.

There is a chemical in the brain, structured almost like a keyhole, which interfaces with all of the opiates which operate in the system. This chemical is known as an opiate receptor. Dr. Pert developed ways to measure the functions of these receptors which until that time had been only theoretical. Her research led to the startling discovery that the brain makes its own morphine. It also led to the discovery that emotional states are created in the body by the release of chemicals called endorphins [which is a contraction for "endogenous morphines"].

*In the beginning, like many other neuro scientists, I was secretly interested in consciousness, and thought that by studying the brain I would learn about the mind and consciousness. And so for most of my early research I concentrated from the neck up. But the astounding revelation is that these endorphins and other chemicals like them are found not just in the brain, but in the immune system, the endocrine system, and throughout the body. These molecules are involved in a psychosomatic communication network.<sup>350</sup>*

By "psychosomatic communication network," Dr. Pert means that information flows continuously through the body, carried by neuropeptide molecules, which are produced and released from one place and diffuse throughout the body, where they become attached by the millions to the

receptors which reside on the surface of every cell. The receptor cells operate very much like miniature satellite dishes. Signals sent to the cells via the neuropeptides contain information which instructs the cells to divide or not divide, to make more of one protein or another, turn on one gene or another, and so on. Every function of the body operates via messenger molecules, many of which are neuropeptides.

*A peptide is made up of amino acids, which are the building blocks of proteins. There are known to be twenty-three different amino acids operating in the human body. Peptides are amino acids strung together, very much like pearls strung along a necklace. If you can imagine twenty-three different colored pearls, it becomes clear that the number of combinations which are made possible by the reorganization of these chains is virtually infinite. Some of the peptide chains are quite short. For example, the peptide enkaphalin, which is the morphine equivalent manufactured in the brain, is only five amino acids long. Others, like insulin, for example, are more than two hundred amino acids long.*

Dr. Pert's discovery has had a profound effect on the view taken by researchers in microbiology because she was able to demonstrate that neuropeptides can be found literally everywhere in the body. After the brain's own morphine turned out to be a peptide molecule, many scientists began searching to see what peptides they had known about in other contexts which could be found in the brain. They quickly discovered that virtually all of them are found everywhere in the body. In the 80's, researchers began finding peptides in the cells of the immune system and everywhere else.

*Neuropeptides are important because they appear to mediate intercellular communication throughout the brain and the body. Even more important is the discovery that neuropeptides and their receptors are the biochemical correlates of emotions. This is confusing to scientific researchers because in today's highly compartmentalized scientific research environment, emotions have*

*The Stuff Descartes Left Out*

---

*always been considered the province of psychology. Nevertheless, Dr. Pert and her associates have conclusively demonstrated that the material manifestation of emotions is found in the neuropeptides and their receptors.*

*These receptors floating around on the surface of the cells put out their little antennae and receive what's coming in. There's actually a physical attachment process between the peptide and the receptor. And once that binding process occurs, the receptor, which is a big, complicated molecule, wriggles and changes in such a way that things start to happen. Ions start pouring in, and other changes happen, and eventually the brain's receptors perceive what's happening as emotions.<sup>351</sup>*

Emotions appear to be the bridge between the mental and physical processes which operate in the human architecture. The peptides can be viewed as a sort of radar produced at one site in the body, carrying information which is received by the receptors and processed by the cells in the rest of the body. The mind does not just talk to the body – the body and mind are inextricably interwoven into the fabric of a single, integrated, self-organizing system. The notion that the mind is somehow separate from the rest of the body no longer serves our conversation.

*Well, that [the notion that the mind is somehow separate from the rest of the body] just goes back to a turf deal that Descartes made with the Roman Catholic Church. He got to study science, as we know it, and left the soul, the mind, the emotions, and consciousness to the realm of the church.<sup>352</sup>*

The neuropeptides are the biochemical units of emotion. Through receptors in the parts of the brain long known to be associated with the experience of emotions, neuropeptides regulate and actually "create" the emotions we feel. Early in the 20<sup>th</sup> century, scientists demonstrated that when surgeons electrically stimulated the brains of people undergoing epilepsy surgery, the

patient would laugh or cry or be in ecstasy – in other words, the patients would experience emotions as a direct result of electrical stimulation of certain specific sites in the brain. We now know that those parts of the brain are loaded with virtually all of the peptide information substances and their receptors.

Which brings us to a point of radical departure from what has so long been maintained by mainstream medical researchers and practitioners. Dr. Pert and her colleagues have shown that the messages carried by the neuropeptides don't necessarily travel from the brain into the body. The transference of peptide information appears to occur almost spontaneously throughout the body. What causes this to happen?

*We don't know, but I feel that the person who will figure this out is going to be a physicist, because clearly there's another form of energy that we have not yet understood. For example, there's a form of energy that appears to leave the body when the body dies. If we call that another energy that just hasn't been discovered yet, it sounds much less frightening to me than "spirit." "Soul" is a four letter word in our tradition. The deal was struck with Descartes. We don't invoke that stuff. And yet too many phenomena can't be explained by thinking of the body in a totally reductionist fashion.<sup>353</sup>*

### **Neuropeptides and Non-locality**

This is where our voyage of discovery gets really interesting. Let us agree that what can be observed happening with neuropeptides is essentially a chemical reaction. As chemical messengers, the neuropeptides move from one place in the body to another, creating a variety of physical responses. The fascinating thing about this is that while the functions of the neuropeptides can be quantified and described in terms of molecular weights, chemical discharge gradients and complex formulas, there are aspects of the Mind which demonstrate qualities which are clearly outside the bounds of physical matter.

*The Stuff Descartes Left Out*

---

Here is an example. People with multiple personality disorders sometimes have extremely clear physical symptoms which vary with each personality. One personality can be allergic to cats while another cannot tolerate exposure to certain foods. One can be clearly identifiable as a diabetic while the other is perfectly normal in their pancreatic functions.

*When multiple personalities exist and function in a single body, science has traditionally held that the physical matter of the single body does not change from personality to personality. But it does. We can measure it. We can show that one personality is making as much insulin as it needs, and the next one, who shows up half an hour later, can't produce insulin in the same body at all. One possibility is that the brain is releasing different chemicals when expressing different personalities.*

There is still much about this phenomenon that is not understood. What is clear, however, is that the mind does not exist simply above the neck. It operates simultaneously in every cell of the body, communicating from site to site in the context of emotional messages, which occur spontaneously throughout the body, via a field which has not yet identified in the context of the Standard Model.

*It is also becoming increasingly clear that emotions are stored at local sites everywhere in the body and not just in the brain.*

*Can we tell which emotions are carried by which neuropeptides? Not yet. We can measure the chemical reaction which gives rise to an emotion, but we can't look under the microscope and say, "That's grief." We can say that a particular peptide can create euphoria. We can measure behavior using the laboratory approach, but that is about all we can measure.*

Everything we do operates in the context of an emotional template, which is defined by the reaction which occurs in the receptor when the molecule arrives with the information. The body is a complex, open, self-organizing system in

which literally hundreds of millions of such information transfers occur simultaneously, all over the body. The brain does not need to communicate information in order for the body to act or react - intelligence resides in every single cell of the body. As Dr. Pert so aptly puts it,

*The mind is not confined to the space above the neck. The mind is throughout the brain and body.*<sup>354</sup>

### **Neuropeptides and the Immune System**

Recent discoveries suggest that the surface of every monocyte, which is one of the primary cells comprising the immune system, is covered with receptors for neuropeptides, the biochemical correlates of emotion. The immune system responds to injury by sending monocytes almost immediately from the bone marrow to the site of the injury, where they begin the process of repairing cell and tissue damage. Viruses use the same receptors to enter into a cell. Depending on how much natural peptide for that virus is found in the vicinity, the virus will have an easier or harder time getting into the cell. It is clear, then, that our emotional state has a direct effect on whether we get sick from viral loading or not.

*We are all familiar with the data - people have more heart attacks on Monday mornings. Death peaks in Christians the day after Christmas and in Chinese the day after the Chinese New Year. Likewise, we now know that the AIDS virus uses a receptor that is normally occupied by a neuropeptide. Whether an AIDS virus will be able to enter a cell or not depends to a significant extent on how much of the body's natural peptide is found in the system. This appears to be a function of what state of emotional expression the system is in when the organism is invaded by the virus. Emotional fluctuations and emotional status exert a direct influence on the likelihood that an organism will become ill or well.*

This suggests that if we can develop ways to put our minds and, therefore, our bodies in a certain emotional state, we should be able to deliberately exert a

***The Stuff Descartes Left Out***

---

measured, positive effect on the immune system and the vitality of the cells of the body. Where does all this lead?

*It leads us to think that the chemicals that are operating in our bodies are the same chemicals that are directly involved in emotion. And that says to me that we'd better seriously entertain theories about the role of emotions and emotional suppression of disease, and that we'd better pay more attention to emotions with respect to health.*<sup>355</sup>

We should not make the mistake of deciding that the brain's importance in the scheme of these things can be under-estimated. The brain is not just three pounds of meat. It is of primary importance because it is the window to the outside of the body, through the eyes, ears, nose and mouth. What is more significant, however, is that we have the option to choose our emotional state. The implications which follow this notion are important because they suggest that by learning to consciously alter and control our emotional states, we may one day be able to deliberately exert profound influences on our physical health and overall well-being. The connection between the brain, the neuropeptides and the immune system is the mechanism which makes this possible.

**What is the Mind?**

Which brings us to the final question: We know the human body is capable of acquiring information through other, more subtle processes which have been identified by all sorts of names. The dynamics of the subtle information transport processes is the subject of the next chapter. For the purposes of this discussion, however, we need to ask,

*"...if the neuropeptides are the conveyors of emotional information in the physical body, and if the information carried by these molecules alters demonstrably when operating in the context of a second personality, what is it that makes one personality operating in the same body distinct from another? What we are really asking is, what is the Mind?"*



Before we tackle this question, let's refer again to the underlying context. The Mind directs the functions of the body in the context of emotional states. The biochemical messages which are the material manifestation of emotional information are carried by neuropeptides. The neuropeptide structures are emotion-specific; that is, each peptide molecule communicates information in a context which is specific to a single emotional state. Neuropeptides and their receptors operationalize the emotion-state information by causing each cell to oscillate in a harmonic resonance with the emotion-specific information which each peptide molecule carries and each receptor site receives. How the emotional content is encoded, stored, transported and communicated spontaneously throughout the system is critical to our understanding of the relationship between human consciousness and the physical body in which it operates.

Here is how we think it works.

### **Information Processing Structures of the Brain**

Quantum reality operates in ways which are simply outrageous at the level of the human senses and ordinary experience. Nevertheless, we have become more comfortable with the quantum paradoxes. Things at the micro-scale are bizarre but explainable, quantifiable or at least describable, using tools such as complex numbers, Riemannian geometry, super [M] string theory and other appropriate branches of mathematics. Santilli's recent work in hadronic mechanics has significantly contributed to our understanding of quantum dynamics at the sub-atomic level. Myron Evan's reformulation of Maxwell's electrodynamic field equations enables us to understand how time domain polarization and the scalar potentials operate at the baseline. Finding evidence of such stuff in the innermost workings of the brain should really not surprise us at all.

The original Hebb Hypothesis, first proposed by Donald Hebb in 1949, is still held by mainstream science to be true.<sup>356</sup> It is probably more true than he expected and operates in ways which have not been understood before. This hypothesis says that the learning process changes some physical aspect of the

*The Stuff Descartes Left Out*

---

structure of the brain. It further suggests that the altered feature somehow physically encodes the learning event. This physical feature, called the Engram, was originally believed to occur somewhere on the synaptic level. Since there are known to be hundreds of thousands of synapses for each of ten to fifteen billion neurons contained in the brain, this has erroneously led researchers to the conclusion that the brain might be capable of holding upwards of  $2.8 \times 10^{20}$  data bits in active memory. Until recently, this seemed more than adequate to explain the human attribute referred to as consciousness<sup>357</sup>.

Since it is also within the realm of possibility that computers could be constructed with an equivalent data storage and processing capability, this has led to the now-almost thoroughly discounted notion that it may eventually become possible to create machines with sentient artificial intelligence, a la Arthur C. Clarke's Hal 2000<sup>358</sup>. This notion has since given rise to the machine fallacy, in which the brain can be thought of as nothing more than the most powerful data processing machine of all time. However, in spite of years of intensive, impeccably documented research, no evidence of Engram sites has ever been found. Any number of impeccably designed, conducted and documented experiments have failed to locate these sites, including one in which various parts of rat's brains were removed after they learned a task, with no part of the brain proving essential. Frustrated experimenters have been forced to conclude that memory is "everywhere and nowhere," leading to the recent analogy in New Age circles of the "brain-as-hologram," which is even sillier than all the other brain-as-machine analogies.<sup>359</sup>

More recent experiments have clarified some of the underlying issues related to the question - "what is consciousness and how does it operate in the human form?" It is now obvious that all the actions of consciousness take place on a scale far smaller even than that of neurons. In this finer grained appraisal, scientists are investigating the cyto-skeletons of neuron cells, which Stewart Hammeroff, Karl Pribram, David Bohm and others have discovered to be primarily comprised of carefully ordered internal arrays of tiny microtubules.

The structure of each microtubule consists of a series of hollow chambers, each of which in turn contains thirteen columns of tubulin dimers.<sup>360</sup>

Dimers (meaning two-part items) can be visualized as peanut-shaped globular protein pairs, each measuring in the neighborhood of 8 x 4 x 8 nanometers [a nanometer is 1 billionth of a meter or  $10^{-9}$  meter].

Dimers are known to exist in two distinctly different configurations, depending on their electrical polarization. We believe the peanut-shaped dimers are the on-off switch which Hebb thought of as part of the Engram concept. A major shortcoming of Hebb's original hypothesis is that these components are so small that the electrical state of each dimer is influenced by the polarity of the other dimers which surround it - this is a quantum mechanical function of the Van der Waals interactions between them. In this close proximity and at these minute scales, interactions between the individual dimers demonstrate the primary field effects described in quantum mechanics. This discovery provides a fascinating insight into the quantum level functional mechanisms which support the functions of human consciousness, including those of intelligence and memory.<sup>361</sup>

Messages of all kinds are believed to be propagated along each microtubule column and along the protein ridges which connect them. It has been demonstrated that each dimer is constructed of approximately 450 combinations of the twenty-three basic amino acids, which are the same substances which also form the neuropeptides. The possible number of combinations via which each dimer-based data bit can be encoded is therefore  $450^{23}$  (450 multiplied by itself 23 times). This is an astonishingly large number, with significance which is only now becoming appreciated.

The receptors which operate on the surface of each dimer are believed to retain information by reorganizing the amino acid sequences during the learning process. This plastic accommodation of new information has been shown by Dr. Candace Pert and others to operate spontaneously and non-locally throughout the brain and virtually every other part of the human body.

*The Stuff Descartes Left Out*

---

Researchers in France recently discovered that also contained inside the dimer columns are tiny, monomolecular threads of water, in an ordered state called vicinal water.<sup>362</sup> Vicinal water is thought to be capable of conveying quantum-coherent oscillations for the length of the tubule - in effect, operating as an oscillating transceiver of quantum level frequencies by maintaining a permanent standing wave. In simple terms, this function seems to be precisely the same quantum-level phenomenon which operates with conventional data storage devices in computers.

In a CD-ROM or DVD, for example, the data tracks which are etched into the substrates of computer memory storage materials are punctuated at precisely calculated intervals by laser-produced "virtual energy wells." Into these virtual wells, memory is stored in the form of electrons which demonstrate a quantum effect identical to the standing wave phenomenon observed in vicinal water in the brain. The information contained on a computer disk is simple to read - it is either interpreted as a "1" [meaning the datum is detected in the well] or a "0" [meaning no standing wave is detected at this data point.].

In the case of vicinal water, however, so long as the standing wave continues to operate [that is, as long as the system is "alive"], the quantum effect created by the oscillation of the chain of water molecules makes the data content identifiable. However, unlike computerized data storage technologies, the medium in which the vicinal water operates contains extraordinarily sophisticated encryption routines, represented by the virtually infinite combination of amino acid sequences, which aggregate around the perimeter of the dimer structures, and which exert electromagnetic effects on the attributes of the waveform. This is further complicated by the fact that, in the case of the brain, data is stored in terms of emotional context, as a function of emotional referents, and not just in terms of "on" or "off" data patterns.

The degree of complexity involved in the structure which operates at this scale is staggering. Each dimer appears to contain sufficient amino-acid

complexity to sustain independent life forms, the complexity of which exceeds the known minimum by at least one order of magnitude.<sup>363</sup>

### **Experimental Evidence**

A number of experiments on the brains of living monkeys, using miniaturized instrumentation of many different kinds, have established that while consciousness is engaged in the process called "thinking," the amino acid sequences arrayed on the perimeter of the dimer structures shift, appearing to automatically reorder themselves as the emotional context and data content associated with each event varies. At the same time, the dimers themselves have been observed to actually change shape simultaneously, in many different locations in the brain, as a function of a single thought pattern, image recognition or auditory event.

All of this has been observed to take place in phased pulses. This phenomenon is almost certainly a non-local, holographic effect because it is supported by an information transport mechanism which operates at transfer rates well in excess of those which are possible with any known chemo-synaptic mechanics. It is, therefore, likely that all events in the brain and the body operate contemporaneously as functions of linear, sequential, chemo-synaptic functions as well as fourth order non-local field mechanics.

The most robust model yet developed to describe the incremental levels involved in "thinking" activity suggests that the microtubules actually move during the thinking process, sometimes growing to new quantum-defined states and remaining there, as a sort of permanent storage mechanism. This is a compelling notion. If it can be experimentally verified, at the quantum level in the physical architecture of the brain, this could be interpreted to mean that quantum mechanics operates at the most primary scales of reality-as-it-is in relationship to the processes of Consciousness.

On a much larger scale, dendrite spines have been observed to simultaneously grow and make new connections during the learning process, sometimes changing synapses permanently and sometimes not. This is believed to be the physical mechanism by which the brain's  $10^{24}$  neural connections

*The Stuff Descartes Left Out*

---

develop into new, permanent neural pathways as part of the learning process. This is now believed to be the operative mechanism which supports short and long-term memory.

The best model currently available suggests that memories are encoded as standing patterns of quantum-coherent oscillations, set up by changes in the microtubules and their constituent parts, all working in emotion-defined patterns within the substrates of the individual neurons. There are now researchers whose models suggest that similar, significant action may be taking place at even finer ultramicroscopic levels, which may be permanently beyond our ability to directly investigate.

The results of the most sophisticated analyses suggests, in addition, that the brain's quantum-coherent oscillations may be structured in a kind of spin-network comprised of patterns of nodes and networks, which are clearly consistent with non-local field mechanics. The nature, structure and some of the operative functions demonstrated by these neural networks and the nodes which support them, are described in the current version of super string (M) theory. The descriptions and predictions made by super string (M) theory are buttressed by discoveries also being described in the emerging literature arising from research into other non-local field phenomena..<sup>364</sup>

**Memory**

It is becoming increasingly likely that the ultramicroscopic quantum interactions occurring at the vicinal water level are implicated in the brain's plasticity - they are believed to play a fundamental role in how the brain learns and remembers. Memory, and therefore the functions of consciousness, apparently happen at a far smaller scale and by a different mechanism than has previously been imagined. This would give the brain a much higher computational capacity than previously thought, up to perhaps  $10^{24}$  operations per second - some calculations have this limit set as high as  $10^{43}$  which, if true, suggests that the human brain is, in a sense, more complicated than all the rest of the universe [minus its other consciousnesses, of course] put together.

Recent experimentation suggests that large-scale collective quantum phenomena occur in every brain. There exist in the brain both global quantum coherence and quantum entanglement between the various electrical states of the microtubules. This likely means that all the counterintuitive phenomena and the sheer paradox of quantum reality are an integral part of consciousness itself. This should not surprise us but it does. It has only been recently, by including the quantum effects operating in the cyto-skeletons in their models of pharmacological effects, that a team of French researchers<sup>365</sup> has finally managed to postulate a plausible theory as to why general anesthetics work. In their model, pain is a function of information which operates in terms of non-local effects at a distance. Its primary effect is viewed as a function of the interruption of the harmonic resonance operating at the micro-cellular level. This fascinating work begins to explain such mysterious phenomena as phantom pain originating in missing limbs and so on<sup>366</sup>.

*When we begin to investigate the relationship between the architecture of the human condition and the attributes of consciousness, we are confronted by a bizarre quantum world in which we observe non-local action at a distance, in which decisions not made could effect events that have really happened, and in which certain events in the present seem to be triggered teleologically, that is to say, by events which appear to have occurred in the future. All these observations support our intuitive feeling that the human mind is a deeply mysterious black box which science can scarcely hope to investigate. In order to do so, we must be willing to crash hard against the great unexplainables of reality-in-itself.<sup>367</sup>*

At an extremely fine scale of structure in the brain, much of one's past is recorded, encoded in a uniquely complex network of synapses, microtubules, dimers containing vicinal water and amino-acid chains, all small enough and near enough together to exert quantum effects on each other. The structures of the brain demonstrate patterns of quantum fluctuation, diverging and

*The Stuff Descartes Left Out*

---

collapsing spontaneously in concert with the body: Is this consciousness? The patterns we observe are clearly held or generated in specific parts of the brain; they are the result of a physical structure articulated in what can only be described as manifestations of fractal geometry, where all information in the local structure is accessible non-locally, spontaneously and holographically on many levels.

What this means about the fundamental nature of the human condition is profound. If we can understand how our physicality and consciousness are woven into the same fabric and operate in both local/linear and non-local/non-linear aspects, we will have made a fundamental breakthrough. This new insight will enable us to re-integrate linear-local research methods [represented by the current model of empirical physical science] with non-linear/ non-local research methods [as embodied in the disciplined practice of metaphysical techniques], to access information in a manner not considered before.



## **SECTION TWO**

### ***The Stuff Descartes Left Out***

## **CHAPTER FOUR**

### ***The Mind-Matter Connection***

#### **Extra-Low Frequency Phenomena**

In the late 80's and early 90's, scientists working under contract for the US Defense Department worked with a team of neurologists at the University of Michigan to develop a device to propagate a radio wave signal through an individual's brain, which could then be "read" afterwards by a remote sensor. The idea was to develop a device by which a person's emotional state could be detected from a distance without his knowledge.<sup>368</sup>

In a related project, technicians at the University of Michigan developed a set of earphones which could be surreptitiously supplied, for example, to an important diplomat who decided to watch an in-flight movie. The earphones would later be recovered by intelligence agents. The information contained in the memory circuits of the earphones would contain a complete time-based record of the man's cardiovascular functions, as complete as that which could be provided by the best electrocardiogram devices.

This same team of engineers produced a device which, when placed inside a television tube, could monitor heartbeat, blood pressure, pulse rate and other potential indicators of the emotional state of someone viewing the program from across the room. This same device could also transmit an undetectable electromagnetic wave which could effect the emotional state of the viewer by altering his/her heartbeat. By speeding up the heart rate, a state of stress and anxiety could be introduced. By slowing it down, the viewer could be put into a state of lethargy and eventually, sleep.

***The Stuff Descartes Left Out***

---

Unfortunately, the ultimate goal of the intelligence teams who had been tasked with developing this tool was to find a way to kill someone from across a room by stopping his heart altogether, using a finely tuned microwave burst. The strategy was not to use a device which relied on massive amounts of power but, rather, to emit a signal which could be tuned to extremely fine frequency tolerances. Their demented thinking was that if their device could be perfected, enemies could be killed from some remote point and nothing would indicate that the victim had died of anything more than a heart attack.

**The Demented Dr. Delgado**

By extension, after a number of promising field trials, a top secret project file was set up to study the theoretical possibilities of the offensive use of artificially generated, extremely low frequency [ELF] electromagnetic fields for three categories of potential applications. These included hostage situations, terrorist situations and control of hostile crowds.<sup>369</sup> In the paradigm of the intelligence agencies, this research represented the doorway to the 21<sup>st</sup> century. The basic research supporting the project was conducted by Dr. Jose' Delgado, a professor of physiology at Yale University. Delgado studied the behavior of cats, monkeys, chimpanzees, and later, fighting bulls in Spain, to find the areas in the brain which could either increase or decrease aggressiveness in a species.

*In Spain, Delgado anesthetized bulls and implanted an electrode in the depths of the animal's brains. The terminal sockets were anchored to the skull and connected to micro-miniaturized stimulators which Delgado could activate with a radio signal. After the bull was allowed entry to the arena and became enraged at the bull fighter, Delgado sent a radio frequency signal which stimulated the area of the bull's brain which inhibits aggression. In an instant, the bull became so docile that the matador could walk over to the animal and caress it without fear of being injured. When the signal was turned off, the bull immediately became enraged again and attacked.<sup>370</sup>*

*The Mind-Matter Connection*

Delgado became convinced that he could produce the same effects without implanting an electrode in the brain. He believed the same result could be obtained by irradiating a subject with very precisely pulsed electromagnetic waves. He eventually succeeded in refining his technique to the point at which he was able to put monkeys to sleep or send them flying off into a rage with a series of carefully pulsed waves.

For the purposes of our discussion, Delgado's work is extremely important. He demonstrated that in the brains of humans, primates and other high-order living creatures, at the very back of the brain where the spinal cord opens, in an area called the postramus, there exist millions of "mast" cells, which are the cells which contain and secrete histamine. He concluded that if he could find a way to excite the mast cells electromagnetically from a distance, he could induce a wide variety of emotional [and therefore behavioral] responses. He also discovered that there is no human organ better shielded against electromagnetic radiation than the brain. Whether by accident or design, the bone of the skull serves as a remarkably effective barrier against most of the electromagnetic emanations to which we are exposed every day.

Delgado deduced that electromagnetic fields are most likely to penetrate the skull if they are carried on wave forms in the extremely low frequency [ELF] range because such waves have such high penetrating power. He also knew that the mast cells in rats are located in essentially the same area of the brain as in humans. With Delgado's research work in hand, intelligence agency scientists reasoned that if they could elicit histaminic responses in rats using his devices and techniques, they could also exploit this strategy for use in humans.

*The researchers exposed a group of laboratory mice in a cage to an electromagnetic field of an intensity varying from 0.5 to 3.0 tesla, at a frequency of 0.5 hertz [that means one half wave-cycle per second]. For a few minutes nothing happened. Then, almost as if on command, the rats began to tumble to the floor of the cage. Some just lay there, inert. Others writhed in agony. Within seconds, all of the rats were obviously in extreme discomfort.*

*The Stuff Descartes Left Out*

---

Why this happened and what it means to our understanding of how to complete our new model is significant.

**Extra Low Frequency Experiments**

Research conducted by agencies of the United States and former Soviet Union into Extra Low Frequency (ELF) phenomena was heightened by early successes in the newly emerging field referred to by scientist Hal Puthoff as remote viewing.<sup>371</sup> It was mistakenly believed at the time that ELF waves are somehow involved in the remote viewing process. One of the test results which drove this mistaken notion was the result of evidence produced in 1976 studies done on Soviet sailors at the Soviet Communications Center in Gomel.<sup>372</sup> Personnel exposed to ELF radiation during the tests demonstrated increased tension, irritability and a variety of nervous disorders. The studies proved conclusively that ELF waves affect human organisms, especially the nervous system.

Soviet scientists then undertook a major research initiative to study the possibility that ELF fields might be used to explain a variety of seemingly unrelated psychic phenomena. They demonstrated that the thought processes of the brain can directly produce an effect on ELF waves generated by an outside source. They also discovered that the inverse is true – ELF waves can and do influence the inner workings of the human brain and can be used to induce specific emotional effects. By employing an ELF modulation of a high-frequency radio signal, Soviet researchers discovered that it is possible to bypass the normal sensory mechanisms of certain brain organs and to influence brain functions directly.

The implications of these findings are genuinely staggering. It suggests that the long sought after goal of being able to influence human behavior at a distance, by remote means, may be at hand. What is tragic about this discovery is that it occurred as a result of research being conducted by the governments of the world's two most powerful nations, with the specific intention of reducing the discovery to assassination, population control and related military applications.

**MagnetoEncephaloGram (MEG)**

Everything we experience from happiness to aggression, including speech and motion, is related to a pattern of electrical and chemical events in the brain. Every time we raise a finger, have a thought or a feeling, listen to a note of music or sense the cold, an electrochemical action occurs. For three quarters of a century, the only tool available to researchers to study and measure the electrical current associated with each of these reactions was the EEG, or electroencephalograph. Even with a multiplicity of sensing points, the EEG is a very unsatisfactory tool.

It cannot detect electrical activity in the brain more than a few centimeters beneath the skull. This means that one of the most important areas of the brain, the limbic system, which is the area within which all emotions are thought to originate, has until recently been a vast, unexplored waste land. The EEG simply cannot pick up an electrical impulse originating in this deeply embedded region. By the time an impulse originating in the limbic system reaches the skull, it is so weak it cannot penetrate the bone. As a result, we are unable to detect a signal. This is the area where all our most fundamental emotions are centered – love, hate, fear, lust and aggression. To try to understand how the brain works without being able to study how this area functions is like trying to understand how a car's engine works without lifting the hood.

Every electrical impulse occurring in the brain creates both an electrical field and a magnetic field. Unlike the electrical field, however, the magnetic field is not diminished in strength by the bone of the skull. It emanates intact from the center of the brain mass with a field strength that is extremely weak, less than 1 billionth of the earth's natural magnetic field. Trying to detect a signal this weak has been compared to standing in the middle of a modern baseball stadium and trying to pick out the words being whispered by someone on the top row while everyone else is yelling.

Today, we can measure electromagnetic signals originating in any portion of the brain with the aid of a device known as a magneto-encephalograph. The device is shaped like a helmet which resembles the bulbous head gear used by

*The Stuff Descartes Left Out*

---

hair dressers to dry their customer's hair. Inside the helmet are hundreds of small coils of Indium wire the size of a shirt-collar button, distributed over a surface area sixty centimeters square. The tube to which the helmet is linked contains a reservoir of liquid helium, which cools the indium coils so they become super-conductive. The device enables researchers to study the entire brain simultaneously by reading the magnetic fields operating in the brain pan all at once. Instead of providing a series of snapshots, the MEG device provides a motion picture of the brain in action.

The beads of light which comprise the computer-enhanced portrait of what happens in the brain show which groups of cells are reacting to a particular kind of stimulus from moment to moment. The system's operator can freeze-frame the movements to match each note of a musical suite, for example, so that the notes can be precisely matched with the cell groups which are registering the sounds. An Australian research scientist named Ady in California<sup>373</sup> discovered that each brain cell's outer membranes are covered with strands of proteins tipped with calcium ions. Each protein strand is negatively charged. Viewed under a powerful microscope, the protein strands eerily resemble fields of corn.

When effected by an electromagnetic field, these protein strands serve as exquisitely sensitive antennas which sense the electromagnetic "breeze" as it ripples across the field. The calcium ions cause a message to be sent to the interior of the cell, which in turn responds by doing whatever it is that the cell is supposed to do. This phenomenon is referred to as "harmonic resonance." Its roll in the functions described by our new model will become increasingly important as we shall see.

What is important about Ady's discovery is that the protein strands resonate in ways which are extremely frequency specific. These are the same cellular structures discovered by Dr. Candace Pert which act as the receptor sites for neuropeptides which, when activated, create specific emotional states. This means that each signal communicated by the peptides to the strands demonstrate a precise electromagnetic signature. The attributes of the signal are known to be unique to each individual because the cells of every person are

*The Mind-Matter Connection*

unique. Soviet researchers reasoned that if they could discover one of those frequency and individual-specific signal patterns, they might be able to send it back into the brain from outside the nervous system and induce a specific emotional state.

**The Amygdala – Seat of Rage**

The hippocampus, for instance, is critically important, especially the dentate gyrus region and the perforant pathway nerves which lead to it. The hippocampus is extremely sensitive to action in the limbic system, which is situated directly underneath it in the brain. The limbic system is in many ways the seat of the emotions, what the ancients would have called the heart. Thus, the emotional charge of an event has much to do with how it is laid out in the memory.

Another important key to understanding how the architecture of the physical structure of the human body is related to the operations of the mind is to be found in the structure and functions of a substructure of the limbic system, known as the Amygdala. Research related to electrodes implanted in the brain demonstrates that the critical order to send noradrenaline and peptides into the system is initiated and controlled by a series of synchronized electrical discharges given off by a group of neurons contained in an organ known as the Amygdala.

The Amygdala is a small rust-colored orb located at the base of the brain<sup>374</sup>. Everyone has two, one for each brain hemisphere, which are shaped roughly like almonds. The word Amygdala, in fact, means "almond" in Greek. The white area which surrounds it is the temporal lobe, the seat of most human emotions and behaviors. The grayish area above it is the cerebral cortex. This is the area where memories are stored, where learning patterns and behavioral patterns are centered.<sup>375</sup>

The neural systems which connect the Amygdala to the cortex carry information back and forth between the organs of the temporal lobe and the memory storage banks of the cortex. Memory, information, the responses we've been patterned to make in response to specific stimuli such as a bar of music, a

*The Stuff Descartes Left Out*

---

threatening figure, a sexually arousing sight – all these things are stored in the cortex and can only be accessed by a code. It seems that these codes, which again are unique and specific to each individual, are also exceedingly complex. The codes are relayed into and out of the cerebral cortices by another organ of the temporal lobe, the hippocampus. In a sense, the hippocampus acts like the card index in a huge library. The information stored in the cerebral cortex can be compared to the books themselves. With the index, you can find the book you're looking for almost instantly. Without it, you become hopelessly lost.

A rage response begins with an outside stimulus which is interpreted as threatening by the brain. A signal flashes in the Amygdala and a massive neuronal discharge takes place in a group of neurons in the Amygdala which are associated with the rage response. The signal is the trigger on which an individual's anger, i.e., his rage response, depends. If the attributes of such a signal could be detected in an individual, encoded in a computer and carried by a wave of extreme low frequency with the proper waveform attributes, it could be possible, reasoned researchers, to elicit a rage response in an individual from a remote point without his knowing what was causing his emotional condition. What this research represented for the military scientists who conducted it was a means by which an essential part of an individual's being could be artificially controlled at will, from a distance, without his knowing it.

The strategy employed by the researchers was diabolical. They deliberately removed one of the two Amygdala bodies from a “psychiatric” patient, knowing that it would remain viable under carefully controlled conditions for a period of approximately twelve hours. After employing the magnetoencephalogram to detect and create a record of an artificially induced rage response in their subject, the MEG data was subjected to a computer analysis.

A fast Fourier transform was conducted on the thousands of electromagnetic signals recorded by the MEG, which broke them down into specific frequencies, amplitudes, waveforms, phase-states, and so on. Using this strategy, they then programmed a computer and a specially designed transmitter to aim each of those frequencies and frequency combinations at the removed Amygdala. Their hope was that their computer would find a suitable combination to elicit the



*The Mind-Matter Connection*

precise chemical secretion which causes a rage reaction, before the removed organ became useless.

The precise electromagnetic signal emanating from the removed organ was measured by a high-density, highly focused laser device, focused on the area of the removed Amygdala known to contain the neurons associated with the rage discharge. At the same time, the entire organ was scanned by an etched silicon multi-channel array [similar to the CCD elements used in today's more sophisticated digital camcorders] to detect the slightest variation in the organ's electromagnetic field. This strategy was adopted because the researchers knew that there are more than a billion neurons in every cubic centimeter of brain tissue. While one neuron firing by itself will not produce much of an electromagnetic signal, the simultaneous firing of a hundred million or so would almost certainly register on their sensors.

After many failed attempts and the death of an unknown number of patients, they discovered the correct formulation. It was comprised of three specific frequencies. A signal of 2.651 cycles per second was embedded in two extremely low frequency carrier waves, one of which oscillated at 9.417 hertz with a high amplitude and another operating at 6.623 hertz with a low amplitude. They discovered that if the profile of a single pulse of the compound signal were altered by as little as 1/100<sup>th</sup> of a cycle, the effect disappeared. The results of this diabolical experiment were confirmed when the patient from whom the Amygdala had been removed was subjected to irradiation by the ELF signal which caused the removed organ to secrete rage-emitted neuropeptides. Within seconds, the patient evidenced all the physical behaviors associated with an uncontrollable state of rage.

The implications arising from the fact that researchers demonstrated their ability to trigger an emotion-specific event in the brain with a signal originating outside the central nervous system are extraordinary. This suggests, on a more affirmative note, that with a variation of this technique, defective brain cells could conceivably be triggered artificially to release dopamine on signal to internally cure Parkinson's disease.

*The Stuff Descartes Left Out*

---

Amino-sugar cells could be stimulated to release insulin and cure diabetes. A severed nerve in the spinal column could be triggered to signal movement. What the Russian team succeeded in demonstrating is that there is a precise signal which triggers specific emotional responses in humans and that a precisely engineered correlate of that signal can be artificially produced and propagated from outside the body, and trained on an individual in the form of an ELF waveform, to produce the desired effect.

Things happen. Consciousness witnesses or experiences them. This experience has been shown to result in physical changes in the brain which become hard-wired for as long as life remains. This is particularly true with respect to any event heightened by emotional content. This seems right – what is felt most profoundly is remembered best and most easily, or forgotten most assiduously, as certain experiments have suggested, with an unconscious constant effort that is not true forgetting at all but rather, repression.

## **SECTION TWO**

### ***The Stuff Descartes Left Out***

## **CHAPTER FIVE**

### ***The Corona Discharge Effect***

#### **The Schumann Resonance**

Is the rage response discovered by Soviet researchers an isolated phenomenon, or is the human physiognomy naturally attuned to respond to subtle waveforms, vibrations and resonances? To illustrate just how powerfully we are connected to each other and the planet by subtle Extra Low Frequency (ELF) phenomena, we have only to examine the phenomenon known as the Schumann resonance.<sup>376</sup> The entire Earth, operating as a single coherent system, behaves like an enormous electric circuit. The atmosphere is actually a weak conductor of electrical charge. If there were no sources of constant electrical charge and discharge, its existing electric charge would diffuse completely in about 10 minutes. The plenum defined by the surface of the Earth and the inner edge of the ionosphere extends above the planet at an altitude of 55 kilometers.<sup>377</sup>

At any moment, the total charge resonating in this plenum is approximately 500,000 coulombs.<sup>378</sup> There are about 1000 lightning storms occurring at any given moment worldwide, each of which produces 0.5 to 1 ampere. These collectively account for the measured current flow in the Earth's electromagnetic plenum. I prefer the word plenum to the word cavity in this example because in a very real sense, the electromagnetic waves created by the activity of electrical storms literally reverberate between the bottom of the ionosphere and the surface of the Earth.

*The Stuff Descartes Left Out*

---

The Schumann resonances are quasi-standing electromagnetic waves which resonate continuously in this plenum. Like waves on a spring, they are present all the time, but have to be excited in order for their attributes to be observed. They are not caused by anything internal to the Earth, its crust or its core. They seem to be related to electrical activity in the atmosphere, particularly during times of intense lightning activity. They occur at several frequencies between 6 and 50 cycles per second; specifically 7.83, 14, 20, 26, 33, 39 and 45 hertz, with a daily variation of about +/- 0.5 hertz. So long as the properties of Earth's electromagnetic cavity remain about the same, these frequencies remain relatively constant. Presumably, there is some change due to the solar sunspot cycle as the Earth's ionosphere changes in response to the 11-year cycle of solar activity.

Given that the Earth's atmosphere carries an electrical charge, which is accompanied by both current and voltage, it should not surprise anyone that such electromagnetic waves should resonate continuously above the surface of the planet. The resonant properties of this terrestrial plenum were first predicted by the German physicist W. O. Schumann between 1952 and 1957, and first detected by Schumann and König in 1954. The first spectral representation of this phenomenon was prepared by Balser and Wagner in 1960<sup>379</sup>. Much of the research about this phenomenon during the last 30 years has been conducted by the US Department of the Navy, which has expended considerable sums to develop a variety of devices designed to harness extremely low frequency waves to support real-time communication with submarines.

In the years which followed the discovery, verification and initial investigation of the field effects exerted by the Schumann resonances, a number of research studies have been conducted to investigate what effects, if any, the resonances exert on human physiology.<sup>380</sup> These studies, which are not generally referred to in serious cosmologies, provide a fascinating clue to the relationship between the architecture of the human condition and the operations of consciousness. Humans as a species are deeply and constantly effected by the Schumann resonances, as a function of their ELF characteristics.

***The Corona Discharge Effect***

Variations in the cycles of the moon, the occurrence of solar flares, ELF waves emanating from the surface of the Earth as precursors to earthquakes, volcanic eruptions and other catastrophic geologic events; the local effects created by oscillations of barometric pressure preceding tornadoes, hurricanes, lightning storms and other meteorological events, all have been shown to exert demonstrable effects on humans and other life forms. All of these phenomena affect the periodicity, amplitude and other waveform characteristics carried in the form of Schumann resonances in ELF waves.

ELF waves have been shown to exert a measurable, demonstrable effect which is individuated within human and other species. The amygdala experiments and other investigations discussed earlier constitute a small fraction of the experimental data which tells us that human emotions, behaviors and health can be deeply, irremediably effected by the propagation of finely-tuned ELF waveforms. The fact that such effects are specific to both individuals and groups of humans, as well as other life forms, suggests that the architecture of living creatures on Earth has evolved in a way which is inextricably interconnected with one of the fundamental energetic phenomena which characterize the planet itself. The implications of this notion are quite stunning. In light of this information, we are compelled to re-examine Lovelock's Gaia hypothesis. We examine the Schumann resonance effects in the next chapter as a function of the group of phenomena referred to as *transpersonal communication*.

**The Mind - Matter Connection**

There are a number of phenomena evident in the human experience which cannot be accommodated by the ELF phenomenon. It is safe to say that the human body does not propagate ELF waves. While it is true that the human architecture is receptive to and resonates in harmony with certain ELF waves, it is also true that the human physiognomy is not a transmitter of such waves. Evidence for this conclusion is found in the long term work supported by the Soviet Academy of Sciences and by Drexel University.<sup>381</sup>

*The Stuff Descartes Left Out*

---

One interesting experimental observation of “a non-local biological field” referenced to the human body was made public in 1978 by a team of scientists at Drexel University who were investigating some of the Russian work which spoke of “bioplasma” and “energy envelopes” surrounding the body.

In 1975, Drexel researchers became involved in the investigation of the Kirlian Effect. It was referred to in the popular press as Kirlian photography, a process that was designed by Russian scientists to reveal the presence of an “energetic body”, “energy envelope” or “aura” around a living organism. The Drexel project began in 1974 with a multi-disciplinary team. Significant funding over several years was provided by the Defense Advanced Research Project Agency (DARPA), through a defense contractor in Camden NJ. In a paper published in 1978 (IEEE paper, *Kirlian Photography: Myth, Fact and Applications*) the group concluded:

*“ The most interesting aspect of the process appears to be its ability to image electrical parameters of a specimen (e.g. charge or impedance) in real time or with single fast samples.*

*An interesting speculation arises when one considers this capability in the context of the very area that first claimed and then later rejected the technique. A survey of the parapsychology literature would seem to suggest that a property of the “human energy field” may well be its ability to modulate “space impedance.” If this is true then Kirlian photography may ironically be the field mapping tool it was first publicized to be.”*

During the summer of 1978, Dr. William Edison, Chairman of the Department of Physics and Atmospheric Science, together with David Faust, a biophysics research staff scientist, hosted an experimental effort with documentary film producer Allen Newman. Newman had asked Drexel’s team to lend its expertise to set up a demonstration of a “biological field effect” which could be filmed and rebroadcast at a later time. The effect was demonstrated by a female experimental subject, Karen Getsla, who had been “interacting with a

***The Corona Discharge Effect***

light beam” during experiments conducted at Duke University the previous year.

The Drexel team was complemented by two research associates affiliated with a New York-based investigation team which had been studying “human energy field” effects for several years.<sup>382</sup> The New York team had been collaborating with the Drexel researchers to identify “anomalies” in their photomultiplier tube-based measurements with human subjects.

The Drexel team participated in three filming segments. One was focused on the basics of the technique known as Kirlian photography, using low-light-level TV cameras. The other two dealt with a demonstration of the non-local field effects which were referenced to the human subject. Their research was demonstrated in a number of film segments aired by NBC Television on Halloween night, under the title, “Psychic Phenomena – Exploring the Unknown.” The researcher team had not been informed that their work would be presented under this title.

This body of research has been focused on examining the nature, characteristics and attributes of what has come to be known as the *corona discharge* phenomenon. The seminal work in this area was conducted by scientist David Faust, Dr. John Pehek and Dr. Harry Kyler, Chairman of the Department of Physics and Atmospheric Science at Drexel University, under contract with Defense Advanced Research Projects Agency. What follows is a brief excerpt of the transcribed description of the experiment which caused a national sensation on the night of October 30<sup>th</sup>, 1978.

**The Getsla Effect**

*As the video film begins to roll, we see Karen Getsla standing perfectly still in a blackened, curtained cubicle with her hands at her sides. Situated directly in front of her is a polarized helium-neon laser producing five milliwatts of radiant energy. Although it has been turned on continuously for almost a week, its ruby-red beam – which runs perpendicular across Karen's line of vision – is*

***The Stuff Descartes Left Out***

---

*practically invisible because the air around it contains too few minute dust particles to reflect the light in random directions.*

*The narrow-focus laser beam emerges from the cubicle through a tiny hole in the wall, but first it goes through an adjustable polarizer that keeps all but a tiny fraction of the light from its otherwise predestined straight-as-an-arrow course. What feeble light remains is then projected through a monochromometer, which filters out almost all the light that is not on the helium-neon spectral wavelength.*

*The almost invisible amount of light left is then fed directly into a highly sensitive silver cylindrical photomultiplier tube. The energy that is detected from the remaining laser light striking the photomultiplier tube is then measured and marked on a laboratory chart recorder. Also attached to the chart recorder is a device which will record any changes of the laser surface temperature as small as 1/10<sup>th</sup> of a degree.*

*The laser, the polarizer, the monochromometer and the photomultiplier tube are all known values, so accurate and sensitive that the slightest variation in light intensity will be instantly and permanently recorded. Moreover, a second "dummy" photomultiplier tube is in operation as a control to ensure a standard baseline of performance against which any variations in the primary tube may be measured. In addition, all the power lines are double-regulated to prevent a sudden surge in the city-wide power grid from affecting laboratory voltage in even the most minute amounts.*

*Karen's 4 x 6 foot cubicle is littered with an impressive array of ultra-sensitive electronic monitoring devices which detect and record any variations in temperature, moisture content, barometric pressure and air motion. The laser assembly is locked onto a bench*



***The Corona Discharge Effect***

*12 feet long, suspended in mid-air by an I-beam to virtually eliminate vibrational effects.*

*The bench area which surrounds the laser itself is wired with super-sophisticated sensors which will warn whenever there is the slightest touch or near approach to the apparatus. Karen literally cannot move, breathe or even blink her eyes without some sensitive piece of electronic equipment recording it. Everything inside the cubicle is monitored and video taped by an exotic low light-level surveillance camera equipped with an ultra wide-angle lens, which shows every cubic centimeter of the cubicle as if it were flooded with daylight.*

*Three scientists monitor the experiment from the next room. When the equipment is shown to be in perfect working order and they are certain that nothing has been overlooked, Dr. Jordan McClay asks Karen to move slightly. She begins to move her body, almost imperceptibly at first, followed by a clearly discernible back-and-forth rocking motion. The monitoring instruments come alive, and while the air flow indicator shows precisely in what way and how far Karen is swaying, the motion does not effect the laser. Once the scientists are satisfied and ready, Karen is allowed to rest and focus inward. The rest period lasts approximately one minute.*

*"I can feel it coming!" Karen exclaims over the intercom, as she begins rocking back and forth again. This time, however, she has her hands extended over her head like the victim of a holdup. With encouragement from Dr. McClay, Karen sways more violently, slightly edging towards the laser on each oscillation. "Okay, I can feel it!" she says excitedly. What she "feels," she says, is the air around the laser growing thick and heavy and opaque. Karen does not at any time touch the laser beam.*

*In another room, Barbara Conway and Dr. William Eidson carefully watch as the chart recorder automatically records the*

*The Stuff Descartes Left Out*

---

*electrical output of the photomultiplier tube and the laser surface temperature, while McClay keeps his eyes on the television monitor. By all the known laws of physics, by all known scientific principles and procedures, both chart recorder needles should remain absolutely constant. As far as the scientists can determine, there is absolutely nothing in the cubicle which could conceivably alter the laser's intensity without triggering a battery of sensors.*

As the scientists simultaneously watched the television monitor and chart recorder, Karen suddenly yelled, "Now!" and a phenomenal thing began to happen: the needles recorded an unexpected, impossible, but clearly discernible spasm.

*"Now!" she yells, and again "Now!"*

Each time, in a regular, predictable pattern which coincided with Karen's swaying motion, according to the chart recorder, the electrical output of the laser beam flowing through the cubicle changed. Something or someone must somehow have managed to interfere with either the laser beam, the polarizer, the photomultiplier tube or the chart recorder, without tripping any of the sensors or monitors. Which is, according to the best scientific criteria currently available, patently impossible.<sup>383</sup>

To paraphrase the great fictional detective Sherlock Holmes,

*...once you have eliminated the impossible, whatever remains,  
however improbable, must be the truth.*

In this instance, 32 year old Karen Getsla managed to manipulate a laser beam, actually interfered with a beam of coherent light, using only her mind. This demonstration of the mind's ability to control energy did not occur during a scientifically questionable parapsychology experiment but right on the sixth floor of Disque Hall, on the Drexel University campus at 32<sup>nd</sup> and Chestnut Streets. Instead of being conducted by believers in psychic phenomena, with questionable or compromised credentials, the whole project was set up and monitored by the Chairman of the Physics Department, Dr. William Eidson.

***The Corona Discharge Effect***

The effect Karen Getsla exerted on the laser beam was not an ELF waveform phenomenon. It is likely that the dynamics which caused the result measured at Drexel University are the same as those which operate in Qi Gung medicine, the meditation effect, extra-sensory perception and other field effects we have identified as non-local effects at a distance.

In the preceding section, we demonstrated that simultaneity is a non-local “torsion” field information transport phenomenon. We have reason to believe that the effect demonstrated by the Drexel experiments operates in compliance with precisely the same rules as other biologically related non-local phenomena. The challenge now is to describe how the physical architecture of the human condition accommodates this notion, in terms which are observable, measurable and publicly verifiable.

**Alpha Waves and Schumann Resonances**

One of the important findings reported in the follow-on studies shows that the nominal wave form associated with the Schumann resonance at 7.83 cycles per second is virtually identical to the alpha brain wave pattern exhibited by Tibetan monks and practiced meditators of other disciplines who have achieved a deep meditative state.<sup>384</sup> The group effect, evidenced by exceedingly congruent alpha waves demonstrated by groups of meditators, described in ***The Whispering Pond***, is known as the *Meditation Effect*. This phenomenon suggests, among other things, that while the human physiognomy does not propagate ELF waves, it does transmit information via a non-local energy field, which exerts a direct effect in correlation with the alpha and theta waves operating in other humans nearby.

In his watershed book, ***Sleeping, Dreaming and Dying: An Exploration of Consciousness with the Dalai Lama***, scientist Francisco Varela discusses the ability of highly disciplined Tibetan monks to enter a state of meditative communion with the field of Consciousness. In this state, monks are able to perform feats of physical strength, endurance and cognition which are usually described by the uninitiated as paranormal. The meditative practices which constitute the regimen of the Tibetan orders are designed, according to Varela

*The Stuff Descartes Left Out*

---

and His Holiness, to bring the resonating energy of the body and mind [the alpha wave state] into complete coherence. The waveforms identified by Varela's meditators are identical to those described by Laszlo<sup>385</sup>, who showed that the alpha states exhibited by meditators are most effective when congruent with the ambient waveforms which operate optimally at 7.83 hertz, which is the baseline frequency of the Schumann resonances<sup>386</sup>.

What relevance does this have to the formation of our model of how Nature works? Simply this: some of the most subtle functions of the human mind can be modified with appropriate learning methods. The mind can be conditioned to manufacture and supply both chemical substances and information to the immune system and other systems of the body, which exert the same effect as doses of externally administered pharmaceuticals.<sup>387</sup> The brain can be taught to deliberately control heart rate, blood pressure and other functions previously believed to be the sole province of the autonomic nervous system.

If the work of our colleagues, who are investigating non-local field effects and developing devices to harness their power, is clearly understood, it also seems likely that the constant, periodic, group-phased reversal of polarization states attributed to the behavior of the dimers, creates tiny torsion fields at the quantum level of the brain. The standing wave, quantum-coherent oscillations which operate in the vicinal water, accompanied by the reordering of the polypeptide protein chains which surround them, suggest that a dynamic information storage and transport mechanism is at work at this scale. It also suggests that each peanut-shaped bi-polar dimer structure, by itself and in concert with its neighbors, comprises a powerful information propagation transceiver, oscillating as a complex liquid crystal within all the tissues of the brain and body.

The physical dimensions of the torsion fields generated by this mechanism are not directly measurable with existing technology. Nevertheless, it should be possible to calculate the field strength, vortex attributes and other characteristics of these fields by extrapolating from calculations of the spin-polarity, angular momentum and vector velocities of the wave forms associated with them. When the combined effect of the individual torsion fields created by

*The Corona Discharge Effect*

$10^{24}$  dimers, all operating within an enclosed volume of less than 3 liters, is calculated, it becomes easier to describe the dynamics associated with some of the brain's most mysterious functions.

It is interesting to note that a patent has just been approved and released by the US Patent and Trademark Office to David L. Strom, the inventor of an antenna device which operates with the same dynamics as those believed to be demonstrated by the dimer structures.<sup>388</sup> The development, patenting and engineering of such a device goes a long way toward validating our hypothesis. It establishes (1) that such a phenomenon is based on sound scientific principles, (2) that the dynamics associated with super-luminal wave form propagation can be reduced to experimentally demonstrable and, therefore, verifiable instruments and devices, and, most importantly, (3) that the notions described here cannot be dismissed as fanciful fabrications.

Accordingly, if we view the torsion field as a non-local, non-linear field which holographically interpenetrates space-time at finer scales than the sub-quark level, operating instantaneously throughout the Universe and conveying information at least  $10^9$  times faster than the speed of light, we begin to sense how the physical storage locations Hebb erroneously referred to as *Engrams* may actually operate. This suggests something genuinely profound about the nature of the brain - while it certainly cannot be referred to as a hologram in and of itself, it seems more likely than ever that the brain relies on holographic information transference for even the simplest of its functions.

More importantly, the quantum level behaviors of the tubulin dimers and the constant rearrangement of the amino-acid chains which bind them together can be shown to operate with a clearly definable set of frequency resonant values. The quantum-coherent oscillations of these structures seem to operate in synchrony with a fixed set of harmonic resonances. It is of more than passing interest to note that the entire spectrum of these resonances has been described in mystical literature more than 5,500 years old. The verses of the Vedas have been shown to be the lyrical representations of the manifold harmonic resonances which define the structure, behavior and attributes of the material world<sup>389</sup>.

*The Stuff Descartes Left Out*

---

If the inferences contained in these two widely disparate bodies of information can be cogently integrated into our model of the Universe, this will provide us with a way to describe not only the mechanisms by which Consciousness operates in the human condition, but the attributes of the relationship between human consciousness and all things, living or inert, as well. This is the next step in our search for greater understanding, beyond the Edge.

## SECTION TWO

### *The Stuff Descartes Left Out*

## CHAPTER SIX

### *Transpersonal Communication: Consciousness and Non-Local Field Effects*

#### **Non-Local Field Effects**

There are two notions about physical reality which are fundamental to our understanding of non-local field effects. The first is known as Complementarity. This idea, which first arose out of the interpretation of quantum mechanics developed by the Copenhagen School in the early '70's, suggests that where we find sub-atomic particles demonstrating properties of mass, we will also find that they simultaneously possess attributes which can be measured as quanta of energy with waveform attributes. This has been borne out by so many experimental trials that it is accepted among particle physicists the world over.<sup>390</sup>

The second notion, which we refer to as Non-locality, is equally compelling. What is not understood or universally accepted is the accompanying notion that the principles of complementarity operate at all scales in our material world.<sup>391</sup> What this means in practical applications is that where we find manifestations of local/linear effects, we must also invariably find manifestations of non-linear/non-local effects. This is a fascinating notion. Our research shows that this is as true in the biological sciences as it is in the physical sciences. New discoveries recently made by Russian researchers sponsored by the Russian Academy of Sciences illustrate how fundamental this aspect of physical reality is to our considerations.

**Phantom DNA Effect**

A report of an extraordinary experimental procedure developed in Moscow by a group of Russian scientists was recently released via the World Wide Web and the Internet. Dr. Vladimir Poponin and a team of scientists and technicians sponsored by the Russian Academy of Sciences discovered an anomaly which cannot be accommodated by the model which is being challenged here nor by the model described by Kafatos and Nadeau in their most recent effort entitled ***The Non-Local Universe***<sup>392</sup>. Poponin's revolutionary discovery demonstrates that nature at all scales is non-local in its characteristics and behaviors. Non-locality is not, as Kafatos' detractors assert, an artificial or rare phenomenon.

It is of more than passing interest that the results described in Dr. Poponin's study of a previously undiscovered attribute of human DNA were discovered while Russian scientists were examining the behavior of finely particulated sand. This new phenomenon, dubbed the *DNA Phantom Effect* by researchers, was first observed as an unexpected effect which occurred during a series of experiments designed to measure the electromagnetic waveform propagation attributes of complete molecules of DNA.

The Russian research initiative approached the task of unraveling the mysteries of DNA as an information controller by recognizing that the structure of the double helix is very similar to the most efficient man-made antennas ever designed. Their model recognized that the twin strands of the double helix are separated by the biological equivalents of tuned resistor circuits, molecules of the four basic building blocks of DNA, along the entire length of each chromosome. In addition, they recognized that because the environment in which DNA functions is characterized by chemo-electrical potentials, the periodic oscillations of voltage differentials between the two strands should produce measurable electromagnetic waveforms just like any other antenna.

Instead of dismembering the chromosomes into specific genome addresses, Russian researchers elected to measure the behaviors and attributes of the DNA molecule as a complete system. What they discovered was so unexpected that the research team disassembled their apparatus several times in order to



*Transpersonal Communication:*  
**Consciousness and Non-Local Field Effects**

---

verify that the results were not accidental or the result of an unexpected flaw in their methodology. Here is what they did.

**Poponin's Methodology**

An extremely expensive and sophisticated light sensing device known as a MALVERN laser photon correlation spectrometer was used to measure the light scattering effect produced by a carefully controlled cascade of free-falling, very finely particulated dust particles. In the experiments, finely particulated dust particles were allowed to fall freely in measured quantities from the top of a light scattering chamber from which all other particulates had been removed. The laboratory building, the laboratory room and the interior of the light scattering chamber were all shielded from electromagnetic field effects.<sup>393</sup> The chamber itself was irradiated with diffused, extremely low level laser light.

The purpose of the MALVERN device was to trace the patterns created by the falling of each particle by three dimensionally mapping the cascading trails over a series of precisely similar trials. Once a baseline of randomness had been developed – that is, when it became clear that the same amount of particulate could be reliably predicted to behave in precisely the same random manner with each release in this carefully controlled environment – a new factor was added to the experiment. According to the report, it took the team nearly three years of careful calibration to create the desired, pristine environment.

At the base of the chamber, Dr. Poponin and his colleagues introduced a petri dish [a small, shallow glass dish which looks much like the bottom inch of a water glass] to the light scattering chamber. The dish had been sterilized prior to being introduced to the light scattering chamber in order to eliminate the possibility of introducing any unintended variables into the controlled environment. As expected, the introduction of the petri dish exerted no measurable effect on the light scattering behavior of the free falling dust particles.

*The Stuff Descartes Left Out*

---

Next, the petri dish was filled with distilled water. Again, as with the empty petri dish, the distilled water was shown by repeated measurements to exert no measurable effect on the randomness of the light scattering pattern.

In subsequent trials, ultra-pure granules of NaCl were added to the distilled water in concentrations which approximate the salinity of human blood. Again, the addition of the ionic salts to distilled water were demonstrated to exert no measurable effect on the falling particulate.

Finally, Poponin introduced a petri dish containing a controlled volume of live human DNA in the slightly saline solution. When the light scattering behavior of the free falling particulate was measured in the presence of living DNA and the same low level, highly diffused laser light as had been used on each prior trial, an extraordinary, utterly unexpected thing occurred. The light scattering pattern produced by the cascading cloud of dust particles suddenly became no longer random, but demonstrated patterns which were "distinctly different from the one obtained before the DNA was placed in the chamber." In the words of Dr. Poponin,

*After duplicating this result many times and checking the equipment in every conceivable way, we were forced to accept the working hypothesis that some new field structure is being excited from the physical vacuum. We termed this the DNA phantom effect in order to emphasize that its origin is related to physical DNA.*

Following the accidental discovery of this effect, Dr. Poponin's group conducted a more rigorous and continuous study of the phenomenon. They discovered that as long as the space in the scattering chamber was not disturbed, they were able to continue to measure the DNA Phantom Effect for long periods of time after the petri dish containing the DNA sample had been removed.

*In several cases, we have observed it for up to a month. It is important to emphasize that two conditions are necessary in order to observe the DNA Phantom Effect. The first is the presence of the DNA molecule and the second is the exposure of the DNA to weak*

***Transpersonal Communication:  
Consciousness and Non-Local Field Effects***

---

*coherent laser radiation. This last condition has been shown to work with two different frequencies of laser radiation.*

Perhaps the most important finding of these experiments is that they provide an opportunity to study non-local field effects on strictly scientific and quantitative grounds. This is made possible because of the phantom field's intrinsic ability to couple with conventional electromagnetic fields. The value of the coupling constant between the DNA phantom field and the EM field propagated by the laser's radiation can be estimated from the intensity of the scattered light.<sup>394</sup> The importance of this discovery and the means by which it is being measured and evaluated simply cannot be overstated.

In simple, unadorned language, what Dr. Poponin and his team have verified is the existence at the DNA level of the mysterious field referred to by Dr. Candace Pert. The non-local field effects described in Dr. Poponin's research files correspond precisely to the torsion field attributes identified in the last chapter of Section One. Perhaps most importantly, Poponin's work provides an unexpected and therefore important independent verification that all living DNA produces a non-local field effect as an attribute of its basic, natural architecture.

The DNA Phantom Field operates non-locally. It demonstrates a quantifiable and measurable residual field effect at distances of up to at least one meter, under experimentally verified conditions. The mathematical formulation which describes what the DNA Phantom Field is and how it may operate at this level is more fully described in the exotic mathematical formulation known as the Fermi-Pasta-Ulam lattice (FPU), which describes a new class of localized solutions to anharmonic, nonlinear excitations (NLE).<sup>395</sup>

In Dr. Poponin's words,

*It is fortunate that the experimental data provides us with qualitative and quantitative information about the nonlinear dynamical properties of the phantom DNA fields. Namely, these experimental data suggest that localized excitations of DNA*

*The Stuff Descartes Left Out*

---

*phantom fields are long living and can exist in non-moving and slowly propagating states. This type of behavior is distinctly different from the behavior demonstrated by other well known nonlinear localized excitations such as solitons which are currently considered to be the best explanation of how vibrational energy propagates through the DNA.*

**Modifying the Paradigm**

Why is this experiment important? The results of Poponin's research in biological environments mirrors the results of other equally competent and dedicated researchers who have discovered other non-local field effects in inorganic environments. The serendipitous discovery of a light coupling constant, which makes it possible to detect the field and measure its effects and attributes, also enables us to arbitrarily, selectively amplify the field effects and extract empirical data from the materials or devices which propagate and detect the fields. The implications of this discovery could not be more important. This is precisely the effect which was measured and reported by the Drexel Team in their report entitled, ***Kirlian Photography: Myth, Fact and Applications***.<sup>396</sup>

Even more to the point, however, is the realization that our notions regarding the propagation of non-local field effects by the tubulin dimers, which comprise the neuronal bodies present in all living things, are right on target. It is not a stretch of reason to suggest that in every biological system where linear/local chemo-synaptic processes operate, non-local and non-linear field effects are also in operation. Accordingly, I believe we can move seamlessly to the following general conclusions:

Consciousness, in the context of human emotional states, exerts a direct, demonstrable, non-local effect on all parts of the body, including the immune system. The effects exerted by consciousness on the immune system and on external phenomena are non-local and operate via the same set of dynamic mechanisms.<sup>397</sup> The field effect exerted by consciousness on the immune system is typical of the non-local field phenomena demonstrated by the DNA

***Transpersonal Communication:***  
**Consciousness and Non-Local Field Effects**

---

Phantom Effect. Such effects are shown to be non-local, persistent, instantaneous at all scales and holographic in nature.

**The Non-Local Conundrum**

When we ask the question,

*"What evidence demonstrates that human consciousness operates outside physicality in ways which can be measured, repeated and verified?"*

we are really asking for a way to describe in non-linear, quantum mechanical terms, the field effects which support the anomalous phenomena we have already observed in the exercise of human consciousness. It appears that Kafatos and Nadeau are more correct in their assumption that the universe is non-local and holographic at all scales than they knew<sup>398</sup>.

The task set represented by this set of observable phenomena is prodigious. For one thing, in order to describe the field effects with scientific precision, an entirely new variety of non-linear mathematics will have to be developed. As of this writing, there is no such thing as a truly non-linear, non-local mathematical formulation. So unless we are willing to discuss these effects in linguistic terms, at the moment we cannot discuss them at all. This phenomenon and all its non-linear and non-local sub-sets constitute the basis of the problem. Our search for a means by which to describe such imponderables as the interaction of consciousness with matter, with an acceptable degree of consistency and precision, is hampered by a variety of formidable conceptual and therefore linguistic barriers.

In this class of unresolved challenges we find

- (1) an institutional unwillingness in the scientific community at large to dignify the notions of non-linearity and non-locality as constituent elements of the Standard Model except in carefully controlled, arbitrary cases, as exceptions to the rules,

*The Stuff Descartes Left Out*

---

- (2) a cultural heritage which mandates that all things physical are linear, local and valid only to the extent that they can be measured and publicly verified;
- (3) a linguistic heritage which is so imprecise as to render the task of discussing such things virtually impossible;
- (4) a mathematical language which has no genuinely non-linear/non-local components or means of expression; and
- (5) a religious heritage which insists that all such considerations are the sole province of those who have been entrusted with matters of the spirit by one sort of Deity or another. This is not a promising environment in which to conduct an amicable discussion.

Nevertheless, we can make some meaningful assumptions and observations about this subject. If we are careful and prudent, we should be able to evaluate a number of impeccably documented phenomena in the context of the new model we are developing without too much hand waving. If our analysis is carefully and reasonably conducted, we should be able to not only explain how certain of these previously inexplicable phenomena work, we should also be able to make predictions about other phenomena which have not been documented or discovered yet. This is the real litmus test.

As we examine this information, it is essential to keep in mind that the benchmark of a sound, working hypothesis is that it not only reasonably accommodates observable data but also facilitates predictions regarding related phenomena which were not known or relied on to formulate the hypothesis itself. Based on the data which is currently available, it is altogether reasonable to suggest that the field effects exerted by the deliberate exercise of consciousness in humans operates according to the same set of dynamics as similar field effects observed in studies of other living creatures. It is also reasonable to suggest, if our presumption is correct, that the universe is both fractal at the local level and holographic [non-local] at all scales, then the effects exerted by consciousness must also operate fractally and holographically at all scales.

Before we jump to any unwarranted conclusions, let's examine a variety of non-local effects exerted by the exercise of human consciousness on the

***Transpersonal Communication:***  
**Consciousness and Non-Local Field Effects**

---

material world *outside* the human physiognomy. Since we have been able to demonstrate that such effects can be deliberately exerted by conscious effort within one's own body, and that measurable effects can be exerted on carefully instrumented laser light, it is not unreasonable to suggest that the non-local field effects discovered by Poponin and his team may also operate outside the human body at a distance. If our assumptions are correct, the deliberate, conscious exercise of the field effects discovered by Poponin et al must, if they are truly non-local, extend beyond a single individual body in time and space.

Finally, if we are on the right track, we should be able to demonstrate that the exercise of consciousness-related field effects should become more sophisticated, reliable and effective with practice, training, feedback and persistence. If this component of our working hypothesis can be supported by the data, this will mean [among other things] that we may be able to create a working model by which the disciplined exercise of intuitive, introspective skills can be married to the practices of empirical science, to obtain information about how Nature works in a way which has seldom been possible before.

First, let's examine a broad sample of the evidence that all bodily functions can be arbitrarily controlled by deliberate acts of consciousness. When we have finished this evaluation, we will then proceed to examine documentation which establishes that human consciousness can be used to not only exert a demonstrable influence on external events, but can actually be trained to search out, find and retrieve information outside the body's own physicality. In the interest of economy, each of the phenomena examined here is presented in summary form only – additional information regarding detailed accounts is provided in the endnotes and suggested reading which follow this chapter.

**Paramahansa Yogananda**

The essence of the highest level of discipline demonstrated by practitioners of the ancient Hindu arts of meditation and yoga is described in the masterful book ***Autobiography of a Yogi***.<sup>399</sup> First published in the United States in 1947, and reprinted at least three times in twelve editions and many languages since

*The Stuff Descartes Left Out*

---

then, this book describes a number of instances in which human consciousness can be exercised to control human physiognomy in ways which have, until recently, been utterly inconceivable to the Western mind. Paramahansa Yogananda, founder of the Self-realization Fellowship and author of the book, was trained at the hands of yoga masters who were able to repeatedly demonstrate feats of mind/body control which are still considered impossible and inconceivable in our culture.

The hard sciences dismiss accounts of this sort by referring to them as "anecdotal," that is, they are interesting stories but cannot be considered valid or reliable since they cannot be measured, quantified or described in "scientific" terms. Practitioners of mainstream science in the West are unwilling to concede that since the printing of this book in 1947, all of the phenomena recounted in the book have not only been impeccably documented, but many of them have been repeated daily, for more than 50 years, to literally millions of people. At some level of publicly verifiable repeatability, any phenomenon must be given reasonable credence, regardless of how improbable it may seem, regardless of our inability to understand or describe how it happens.

The mind/body control accounts contained in this and other similar works include references to such things as levitation<sup>400</sup>, perpetual states of awakened consciousness without sleep<sup>401</sup>, bi-location<sup>402</sup>, bringing the dead back to life<sup>403</sup>, materialization of physical matter [flowers, food, ashes, objects, etc.] at will<sup>404</sup>, sustaining life without eating<sup>405</sup> and instantaneous healing of a wide variety of physical afflictions<sup>406</sup>. To the Western mind, episodes such as these are simply fanciful exaggerations by the story teller or the work of clever charlatans. They are not so easy to dismiss, however, when the events have been observed, recorded, documented, evaluated, repeated and validated in accordance with strict scientific protocols. Thanks to the wonder of the World Wide Web and the Internet, we have access to thousands of documents which describe such events. Perhaps this one, which occurred at the Meninger Clinic<sup>407</sup>, will suffice to illustrate the point.



*Transpersonal Communication:*  
**Consciousness and Non-Local Field Effects**

---

**Swami Rama and the Meninger Clinic**

In the summer of 1970, Dr. Elmer Green sat in his office in the Meninger Foundation in Topeka, Kansas. Dr. Green was the Director of the Voluntary Controls Program at the Meninger Foundation's Research Department. He, his wife and Dr. Dale Walters were responsible for pursuing an intensive research program tasked with investigating voluntary controls of internal states. They were investigating the dynamics of mind-body relationships, particularly the mind's capacity to regulate physiological processes, including those bodily functions ordinarily labeled autonomic or involuntary. The scientific rigors applied to their investigations are legendary.

During more than a year of intensive daily sessions, Swami Rama, an adept from northern India<sup>408</sup>, worked with Dr. Green and his team of researchers to demonstrate that he could, indeed, control his heart rate, skin temperature, brain wave patterns and exert a repeated, demonstrable effect on external devices, using nothing but consciousness. Doug Boyd's carefully documented account describes the experimental protocols which were observed during Swami Rama's testing sessions.

Among other things, Swami Rama demonstrated that he could speed his heart rate up to 300 beats per minute on demand or stop it completely for prolonged periods. He demonstrated active control over alpha, beta, delta and theta waves and demonstrated repeatedly that he could produce wave forms never before measured on an EEG machine. He also demonstrated the ability to rotate a series of needles by varying degrees using nothing more than his consciousness.

While the story of Swami Rama is certainly sensational, it is by no means unique. There are many equally well documented accounts of such things available from a wide variety of sources, many of which are referred to in the endnotes.

**Consciousness Field Effects at a Distance**

What all these episodes demonstrate, among other things, is that human consciousness by itself, with no other means than the disciplined exercise of will and intention, has been shown to exert a measurable, verifiable, publicly repeatable effect on the body of the practitioner and upon other aspects of physicality. To some, this sort of thing is terribly threatening. In the recent history of our fledgling culture, people were executed in the cruelest manner imaginable for even talking about such things, much less making them happen.

Today, the witch hunt continues at all levels of the academic and scientific establishment, in spite of the fact that phenomena such as the ones recounted by Yogananda Paramahansa, Swami Rama, Sri Aurobindo, Sai Baba, Rabindranath Tagore, Krishnamurti and many others have been part of the recorded history of the second largest nation [by population] on earth, for more than 5,500 years. The professional ostracism and punishment meted out by mainstream colleges, universities and research centers to those in our culture who dare to engage in concerted scientific investigation of such things is the stuff of legend and film, in spite of our vaunted claims to enlightenment and civility.

Nevertheless, the data speaks eloquently for itself. The principles by which such feats are made possible are the stuff which is described in the ancient Hindu text known as the Vedas.<sup>409</sup> As we will see, the structure of the Vedas is consonant with the fundamental fabric and forces of Nature. The fact that its structural elements are precisely the same as those described by Brian Greene in most recent book ***The Elegant Universe***,<sup>410</sup> which is a wonderful articulation of the latest versions of super string (M) theory, should cause no end of concentrated scientific investigation.

The fact that this discovery was made and announced more than ten years ago, and the story which describes the lengths to which some of the leading physicists of our time have gone to discredit and ruin the careers of the men and women who made this earth-shattering discovery<sup>411</sup>, is indicative of the extent to which the pursuits of mainstream science have become both perverted

***Transpersonal Communication:  
Consciousness and Non-Local Field Effects***

---

and incestuous. Instead of plunging headlong into the investigation of this apparent paradox, which lies at the heart of one of Nature's most intriguing mysteries, science has chosen instead to execute the messenger. I see nothing very enlightened about this attitude.<sup>412</sup>

### **Deforming Metals**

At the beginning of Section Two, in the first paragraphs of Chapter One, a casual reference was made to the spoon bending scene portrayed by Keannu Reeves in the motion picture ***The Matrix***. Also mentioned was the Israeli adept known as Uri Geller, of whom much has been said and upon whom much undue ridicule has been heaped. What was not mentioned was the substantial body of research conducted by intelligence agencies of the United States during the Cold War to determine if such things could actually be documented in repeated scientific trials. An obscure translation of a French research report containing the details of just one of the many carefully documented studies conducted during the early 70's has recently been made available for public consumption.

The report was prepared and released by no less venerable a scientific institution than the Eyring Research Institute.<sup>413</sup> From the introduction,

*"...Thus, the selection which we are presenting is the result of a lengthy and rigorous screening process. In only 20 of 150 test samples which [were] deformed or transformed in front of us or our collaborators, could we positively confirm the "abnormal" nature of the effects observed. In this report, we will describe eight of the most important cases. It must be pointed out that a majority of the tests which were eliminated were most certainly valid. We used a very strict screening process in eliminating the demonstrations which did not follow a pre-defined protocol. Other tests with extensometric gauges will be published later.*

*Thus, our concern for rigor led us to eliminate some rather remarkable observations concerning deformations at a distance,*

*The Stuff Descartes Left Out*

---

*deformations of objects or test samples in the hands of observers who were above any suspicion, or those held on one side by J.P. Girard and on the other by an observer. The tests which will be described were conducted under our responsibility with the authorization of Pechiney-Ugine-Kuhlmann."*

This foreword to the definitive report, translated and edited by the Eyring Research Institute, was accompanied by extensive film footage taken under rigorously controlled conditions. The report describes the use of human consciousness alone to deform, transform and exert other measurable effects on both metallic and non-metallic substances, at a distance. Our thanks to David Faust for providing this seminal information. What Keannu Reeves and the makers of the motion picture toyed with, experts from Drexel University and other highly competent scientists repeatedly filmed and verified, under the strictest of laboratory conditions.

Among other things, the report establishes that the ability to cause deformations in metallic and non-metallic materials by the deliberate exercise of human consciousness and nothing else, is a trait common to a wide variety of people. This ability is apparently not determined by gender, age or race<sup>414</sup>. In fact, the capacity to exercise this latent talent seems to be strongest in children, especially when they are provided with a suitably positive environment<sup>415</sup>. Since it can no longer be claimed that such things are delusional, the result of chicanery or simply nonsense, we are obligated to discover a means by which to explain how such things occur.

## SECTION TWO

### *The Stuff Descartes Left Out*

## CHAPTER SEVEN

### *Consciousness: Biological Effects at a Distance*

#### **The Qi Gung Effect**

For thousands of years, the Chinese have practiced a kind of medical art form which is so fundamentally different from the Western approach that it might as well have originated on another planet. The fact that these practices persist after more than five thousand years in the largest nation [by population count] on the planet, in spite of Western claims to medical superiority, should give us pause. The fact that these arts are still being practiced in the traditional manner means, among other things, that they are effective. A billion Chinese cannot all be mistaken about what works and doesn't work for them.

What makes the Chinese way of considering health, disease, healing and well-being so fundamentally different from our way of thinking is simply that the Chinese look at the human equation as an inextricably interwoven fabric of matter, energy and life force. And unlike the practice of medicine in the West, Chinese physicians, particularly those who practice the arts of Qi Gung medicine, are paid while their patients are well and cease to be paid so long as their patients are ill.

Bill Moyers, in his much heralded and highly acclaimed PBS series entitled *Healing and the Mind*,<sup>416</sup> explores the role of human consciousness in the practice of Chinese medicine. His findings are spectacular. Dr. David Eisenberg is an instructor at the Harvard Medical School and a staff internist at Boston's Beth Israel Hospital. Shortly after relations between the US and China were normalized in 1979, Dr. Eisenberg became the first American medical exchange

*The Stuff Descartes Left Out*

---

student sent to China. For eleven years, working beside his teachers in traditional Chinese clinics, he studied acupuncture, massage, herbal techniques and Qi Gung medicine.

His book ***Encounters With Chi***<sup>417</sup> asks questions which loom large in the Western mind. Dr. Eisenberg explains that to the Chinese, as with their physicians, the body is a series of non-local energy conduits. Chi, the name for the energy which flows through this circuit, flows along systematic meridians, which do not coincide with any known physiological structures. When a patient is ill, Western doctors look for physical or chemical abnormalities. Chinese doctors search instead for hidden forces which cause energetic imbalances in the system.

*Their task is to restore unseen harmonies. Sticking needles into the body is obviously a physical intervention to Westerners, but not to the Chinese. They see it as intervening in an energy system. The same is true for herbs. For the Chinese, herbs are not just a concoction of chemicals that influence other chemicals in the body. Herbs help to "unstick" the Chi - to get the energy flowing again. By passing needles into specific points in the body, using herbs, and massaging pressure points, Chinese doctors control the flow of the life force.*

*They also teach their patients to master the flow of energy in their own bodies through combined mental and physical practice. Chinese sages have taught for more than 3,500 years that treating someone who is already ill is like beginning to dig a well after you have become thirsty.*

The classical Chinese physician received a fee only as long as the patient remained in good health. Payments stopped when sickness began. The physician's task was to teach his patients how to stay healthy by living correctly.

*Temperament, diet, thoughts, emotions and physical exercise were all important in a system in which the patient took primary*

*Consciousness: Biological Effects at a Distance*

---

*responsibility for his own sickness or health. The physician was a role model.*

When Dr. Eisenberg went to China, he was not prepared for anything quite like this. Everywhere he went after his arrival, he encountered Chi.

*Walk through a hospital in any city or countryside and you will see an herbal unit, an acupuncture unit and a Qi Gung unit. You go to the physiology laboratory of the best colleges of traditional medicine in China, and you see a computer built by top Chinese biophysicists stimulating twenty different human pulses as a teaching tool for medical students learning pulse diagnosis. In another room there is a wall of IBM computers with colorimeters that measure the color of the tongue. They are a teaching aid for students learning to differentiate between hundreds of tongue-based diagnoses. A helium-neon laser is used to stimulate acupuncture points, and precise physiologic responses are compared with stimulation from a needle or an electrical current.*

*Go into the huge lecture hall and you will find a twelve foot high human statue with hundreds of clearly marked acupuncture points, surrounded by students learning where to place acupuncture needles to intervene in a variety of medical, surgical or psychiatric conditions. What kind of vision of the body is this? None of this has any overlap with anything I ever learned in medical school.*

To American doctors, the existence of Chi or life force is unproven. As a physical reality, Chi makes no sense at all to the Western mind. Out of respect for Western skepticism, and for their own intellectual satisfaction, researchers at the Shanghai Institute of Traditional Chinese Medicine, the Beijing Institute of Traditional Chinese Medicine, and the State Administration of Traditional Chinese Medicine are looking into the bio-physical mechanisms of ancient medicine. One Chinese physician has told Dr. Eisenberg,

*Qi Gung is an old practice, part of the national treasure house of traditional Chinese medicine. We have tried these past few years to*

*The Stuff Descartes Left Out*

---

*understand it by means of modern scientific principles and techniques. We do not yet understand it from this point of view and would like your help in defining the nature of Qi."*

Qi Gung, the most perplexing of all Chinese healing techniques, literally means "manipulation of vital energy." Chinese physicians use it to treat a variety of illnesses, typically chronic neurological and muscular diseases, including multiple sclerosis. People learn to direct the "vital energy" in their body through special breathing and physical exercises. Qi Gung is in effect a discipline whose practitioners are instructed in the art of "centering," of achieving a particular state of physical balance while meditating.

*Estimates of the number of people who daily perform Qi Gung and T'ai Chi exercises seen daily in China's parks range in the tens of millions. But no well-designed, controlled studies have shown whether these millions of practitioners have changed their health status through daily Qi Gung exercises. As Dr. Eisenberg says,*

*The mere fact that tens of millions of people get up every day of their lives at dawn to practice an ancient art does not prove that the practice can alter susceptibility to disease or its natural course. The fact that the exercise is thousands of years old and is a hallmark of Taoist, Buddhist and imperial Chinese scholarship, does not necessarily mean that human beings hold within themselves rivers, streams or pools of vital energy. Nonetheless, the mystery is challenging..."*

What is most challenging is the verification provided by rigorous Western scientific methods that Qi Gung medicine, the art of using human consciousness and a well developed, highly disciplined state of intentionality to manipulate Chi, produces a demonstrable effect on a wide variety of common human illnesses. This is astonishing to the Western mind, but it is a way of life for hundreds of millions of Chinese. That Qi Gung medicine works is no longer the subject of reasonable challenge: *how* and *why* it works are, however, questions which cannot be answered in the context of Western inquiry, so long



as the model being used to establish the context of the analysis is restricted to linear, local, reductionist terms.

### **Brain Waves – Non-local Effects at a Distance**

Ervin Laszlo has been called a treasure of Western insight. His many books articulate emerging insights arising from current research into the mysteries of life on Earth in ways which make such things both interesting and understandable to millions of readers. In his most recent work, ***The Whispering Pond***,<sup>418</sup> Laszlo describes an intriguing experiment, conducted by a group of Italian scientists, in which the brain waves of individual meditators were evaluated first independently and then in conjunction with the brain waves of other meditators who were physically close by but completely separated from each other. Laszlo says in his research notes that he personally witnessed this demonstration repeatedly, so the source could not be more reliable.

The experiment in question investigated the degree of harmonization which occurs between left and right hemispheres of a meditating subject's neocortex. In ordinary waking consciousness, the two hemispheres – our language-oriented, linear thinking, rational "left brain" and our gestalt-perceiving, intuitive "right brain" – exhibit uncoordinated, randomly diverging wave patterns when measured by EEG devices. When the subject enters a meditative state of consciousness, these patterns become synchronized, and in deep meditation the two hemispheres generate nearly identical brainwave patterns.

Even more remarkably, in deep meditation not only the left and right brains of one and the same subject, but also the left and right brain hemispheres of up to 12 different subjects, all simultaneously manifest identical patterns. Experiments conducted in Italy with up to 12 subjects simultaneously displayed an astonishing synchronization of the brain waves of the entire group.

*A personal computer was hooked up with an EEG and a specially designed program analyzed the level of synchronization of the brain's two hemispheres. Tests with this "brain holotester"*

***The Stuff Descartes Left Out***

---

*showed that when two or more subjects meditate simultaneously, the same synchronization effect is produced not only between their individual left and right hemispheres, but also between their respective brains. In deeply meditating subjects a quasi-identical fourfold synchronization emerged [left and right brain synchronization within, as well as between, subjects], even though they themselves did not see, hear or otherwise sense each other.*<sup>419</sup>

There is no known limit to the size of group that could thus be brain-synchronized. Nitamo Montecucco, an Italian scientist who has worked extensively in India, speaks of vast "Buddha fields," resulting from the simultaneous meditation of large numbers of people.

*Could it be that as well as single individuals being able to spontaneously affect the brain and mind of another, many people meditating together could develop some kind of collective consciousness?*<sup>2420</sup>

**Sheldrakes' Morphic Fields**

One additional consideration deserves our attention. In his watershed work, Rupert Sheldrake explores the notion of what he has called "morphic fields." The fields he described comprise the basis of the model he developed to describe a variety of phenomena which occur between members of a species, which could not have occurred as the result of language or physical contact.

His recent works deal with a number of experiments which have produced results which cannot be explained using the current model of quantum mechanics or any generally accepted field effects. It is instructive to evaluate them in summary:

- Experiment 1: In the 1920's, Harvard University psychologist William McDougall did experiments for 15 years in which rats learned to escape from a tank. The first generation of rats averaged 200 mistakes before they learned the right way out; the last generation 20 mistakes. McDougall concluded that, contrary to accepted genetic science, such acquired knowledge could be inherited.

- Experiment 2: In later efforts to duplicate McDougall's experiments in Australia, similar rats made fewer mistakes right from the start. Later generations of rats did better even when they were not descendents of the earlier rats. This wasn't genetics at work. It was something else. Nobody tested it further.
- Experiment 3: In the 1920's, in Southampton, England, a bird called the blue tit discovered it could tear the tops of milk bottles on doorsteps and drink the cream. Soon this skill showed up in blue tits over a hundred miles away, which is odd in that they seldom fly further than 15 miles. Amateur bird-watchers caught on and traced the expansion of the habit. It spread faster and faster until by 1947 it was universal throughout Britain. In a parallel development, the habit had spread to blue tits in Holland, Sweden and Denmark. German occupation cut off milk deliveries in Holland for eight years -- five years longer than the life of a blue tit. Then, in 1948 the milk started to be delivered. Within months blue tits all over Holland were drinking cream, a habit that had taken decades to take hold before the war. Where did they get this knowledge?
- Experiment 4: In the early sixties, psychiatrists Dr. Milan Ryzl of Prague and Dr. Vladimir L. Raikov of Moscow hypnotized subjects into believing they were living incarnations of historical personages. Such subjects would develop talents associated with their alter egos. A subject with no demonstrable artistic ability or skill, who was told she was the artist Raphael, took only a month to develop drawing skills up to the standard of a good graphic designer.
- Experiment 5: In 1983, Sheldrake showed two difficult-to-discern patterns to a group of test subjects to establish a base line for how easily the hidden picture in each could be recognized. Next he showed 2 million viewers of British TV what one of the hidden pictures was. He then tested thousands of people all over the world. By significant percentages, they recognized the image shown on television; the percentage recognizing the control picture didn't change.
- Experiment 6: Psychologist Dr. Arden Mahlberg of Madison, Wisconsin, created a variation of Morse code that should have been no harder to learn than the standard variety. Subjects learned the real code much faster than his invented one, not knowing which was which.
- Experiment 7: Gary Schwartz, Yale professor of psychology, selected 24 common 3-letter words in Hebrew and 24 rare ones, all from the Old Testament, all in Hebrew script. For each word, he created a scrambled version (as, in English, one might do by scrambling "dog" to spell "odg"). Then he rearranged all 96 3-letter Hebrew words (half real, half fake) in a random order and showed them, one at a time, to subjects who didn't know Hebrew. The subjects were just told these were Hebrew words and were asked to guess the meaning of the word in English by writing down

*The Stuff Descartes Left Out*

---

the first English word that came into their head. After guessing each word, they were asked to estimate, on a zero-to-four scale, how confident they felt in their guess.

Professor Schwartz then discounted all subjects who got any guesses right (since that meant they may have known some Hebrew). Then he analyzed the confidence ratings from subjects who'd gotten every answer wrong. Not only was the confidence significantly higher with the real words than with the false words (regardless of subjects, words, or experiments), but the common words got higher confidence scores than the rarer words. Finally Schwartz repeated the experiment telling the subjects that half the words were real and half were false and asked them to guess which was which; the results of that were purely random. The patterns the subjects had recognized unconsciously could not be recognized consciously.

Sheldrake has hypothesized a field of morphic ("pattern-related") resonance in which patterns of knowledge, structure or behavior of a certain kind of thing (whether a salt crystal or a human mind) become increasingly embedded as a "habit," an ingrained pattern of information which influences and is accessible to other members of that category of thing. In commenting on the rat experiments, Sheldrake said:

*"If rats are taught a new trick in Manchester, then rats of the same breed all over the world should show a tendency to learn the same trick more rapidly, even in the absence of any known type of physical connection or communication. The greater the number of rats that learn it, the easier it should become for their successors."*

A minority of biologists have been suggesting the possibility of morphogenetic (form-generating) fields for decades. Sheldrake's unique contribution has been to create a testable hypothesis regarding such fields. Despite the fact that it seems to violate all broadly-accepted principles of science, the experimental evidence is rapidly mounting that, indeed, something of this kind is at work.<sup>421</sup>

### **Measurable Effects of Consciousness**

Thus far we have developed an extensive list of phenomena which have been anecdotally identified and rigorously tested, using the most sophisticated

analytical tools available to science. The original questions regarding whether or not such things can actually be proven to happen have been replaced by even more difficult ones. Can we explain *how* such things as diffracting laser light, bending metallic objects, spinning pointer wheels, controlling autonomic and involuntary nervous system functions and tapping into morphic fields, using nothing more than the deliberate exercise of will or intention, actually operate?

### **Simple, Elegant Rules**

The model we have been developing provides a fundamentally new way of evaluating such things. If our approach to this task set has been consistent, by applying the rules we have identified we should be able to create a meaningful explanation for how such things happen. Before we go on, let's recheck how far we have come. In Section One we established the following baseline:

- Complementarity: The single most important and universal underlying principle of all is that the Universe operates in terms of complementarity at all scales. Where we find linear/local effects we must also find non-linear and non-local effects.
- Information: Everything is information. Every aspect of the Cosmos can be described as one sort of information or another. When we understand how information can be aggregated to constitute each aspect of the material and non-material world, we will understand how nature works at its core.
- Self Organizing Criticality: The laws which govern the behavior of complex open systems operate consistently at all scales. Dissipative structures and catastrophic events operate simultaneously with autopoiesis [self-organizing criticality], in compliance with logarithmic power laws,  $1/f$  background noise thresholds and fractal geometries.
- Fractal Geometry: Fractal geometry is the local/linear means by which nature records the evolutionary history of self-organizing systems. The Universe is fractal at all scales, which means that all the local/linear information regarding any complex, open, self-organizing system can be accessed by properly decrypting the information displayed at any scale of such a system.
- Non-Locality: The Universe is non-local and therefore holographic at all scales. This means that where non-local field effects can be identified, all information contained in any part of a local variation of a homogenous

*The Stuff Descartes Left Out*

---

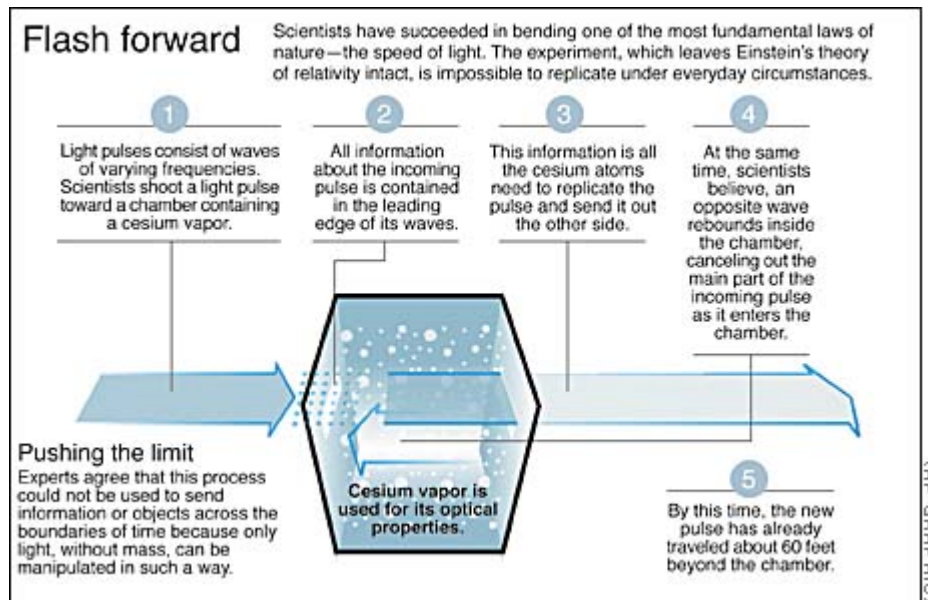
population can be accessed non-locally if the proper decoding tools are used.

- Quantum Universality: The Universe is quantum in its functions. This means that the information set which drives the processes of creation and information transport comply with a clearly definable set of universally applicable rules, beginning at the most finite scales and operating universally throughout the cosmos.
- Unified Fields: Local and non-local field effects, including gravity, electromagnetics, strong and weak nuclear forces, and torsion field effects, all operate according to variations on a single set of scalar potential parameters. These are defined as spin polarity, angular momentum and weighted waveform vector velocities. There are not five separate, distinct fields but rather five manifestations of the complementary aspects of a single unified field operating simultaneously at all scales in the cosmos.

These rules are universal and consistent at all scales. Together, they form the foundation upon which a reliable descriptive model of the Cosmos can be constructed. If we find that our model violates or ignores any of these particulars, we will be compelled to re-tool our notions until we have brought our model into full compliance. This is the essence of good science.

**Unsupportable Notions**

Another set of "rules," notions long held by mainstream science to be unalterable and immutable, are being proven unsound as we write this book. Chief among them is the notion that the speed of light is the upper limit to the rate at which information can be transported. Dr. Wang and his colleagues at no less a venerable institution than Princeton have again verified that under properly engineered conditions, information can be transported in a local/linear way at least 300 times faster than C.<sup>422</sup>

*Consciousness: Biological Effects at a Distance*

Copyright 2000 The [Associated Press](#). All rights reserved.

Moreover, it has also been shown that information can be transported non-locally  $10^9$  times faster than light speed using properly engineered devices.<sup>423</sup> Perhaps most important, scientists have now been able to not only accelerate information transport well beyond light speed, but they have also been able to slow the speed of light *down* to less than 40 miles per hour, under carefully controlled conditions.<sup>424</sup> None of the long held notions about the fundamental nature of light have survived the onslaught of recent advanced scientific investigation.

Accordingly, the model developed by mainstream physicists to explain how nature works must be re-tooled.<sup>425</sup> This is as it should be. The world is not flat or hollow. The Universe does not revolve around our tiny insignificant planet. The speed of light is not the upper limit to information transport, non-local field effects are not a rare occurrence, and  $E$  does not equal  $MC^2$ . It's time to move on to another iteration of model making.

*The Stuff Descartes Left Out*

---

**A New Set of Guidelines**

Thus far in Section Two, we have established the following fundamental guidelines:

- Consciousness: The Universe is conscious. Consciousness is defined as the self-referential causal plane of undifferentiated information from which all manifestations in the Universe arise. The universe is, by definition, self-referent and self-aware at all scales. Consciousness and its attributes cannot be separated from any aspect of observation or analysis.
- Mind-Matter Connection – Neurons: Biological structures of neurons contain within their architecture a combination of local/linear components [which are characterized by chemo-synaptic interactions] and non-local/non-linear components [which are characterized by the tubulin dimers and standing wave functions of vicinal water]. These components operate simultaneously, in compliance with the laws of complementarity.
- Mind-Matter Connection – Neuropeptides: In humans, learning, memory and information processing operate in the context of emotional states. Emotion is controlled and defined by 60 known neuropeptides which operate both locally in linear, chemo-synaptic channels and non-locally via the millions of neuropeptide receivers attached to the surface of every cell in the body. With proper training and discipline, neuropeptides can be produced voluntarily, on demand, to induce, amplify, alter or modify emotional states.
- DNA Phantom Effect: Each strand of DNA in each living organism is known to operate in both linear/local and non-linear/non-local states, simultaneously, by design. The morphogenetic processes associated with DNA replication are known to be linear and local. DNA propagates a non-local/non-linear field effect as part of its architecture. The non-local field effects produced by DNA demonstrate a coupling constant with carefully selected frequencies of low level laser light. This is one mechanism by which information can be deliberately pumped into and retrieved from a non-local biological field.
- Morphic Fields: Information can be propagated and retrieved non-locally. The morphogenetic field effect operates within species and without regard to normal attenuation factors including time, distance and the interposition of dense materials.
- ELF Fields: The human condition, indeed the condition of all living things, demonstrates a coupling constant with certain frequencies and wavelengths of ELF waves. Human alpha and theta brainwaves are



known to facilitate access to non-local fields of consciousness and information when synchronized with the Schumann resonances.

### **Conclusions**

This, then, is the framework within which our model must operate. In the following chapters, we examine the final, most fundamental aspect of the exercise of human consciousness, the ability to access information non-locally without respect to physicality. Is it possible? Can information obtained in this way be verified, validated, repeated and relied upon? What evidence do we have to suggest that such a thing is even possible? Before we answer that question, please consider that we have already demonstrated the following conclusions:

The ability to exert a non-local field effect with the concerted, disciplined exercise of consciousness is intrinsic to the human condition.

Human consciousness can be trained to exert measurable, repeatable and verifiable effects on the material world, outside the confines of human physiognomy, on demand and according to pre-defined and carefully monitored protocols.

Emotional states and the deliberate exercise of intention are known to be control factors in the process of information comprehension, archiving, storage and retrieval in humans.

The process is repeatable and can be learned, refined and mastered in a controlled, methodical context in the same way and to the same extent as any other latent human talent.

From this vantage point, we have only to establish one, final point of reference. If it can be shown that human consciousness can be directed, trained or harnessed to access information outside and independent of human physiognomy, we will then have brought the framework of our new model to closure.

## **SECTION TWO**

### ***The Stuff Descartes Left Out***

## **CHAPTER EIGHT**

### ***Accessing Information With Consciousness***

#### **The Story of Tom Sawyer**

On a warm summer's day in 1970, a young man in the prime of his life lay down on a mechanic's creeper and rolled himself underneath the front end of an old pickup truck. The front of the truck had been raised on jack stands and the oil pan had been removed so Tom could work on the crankshaft and journal bearings of the engine. As he levered himself into position with his heels, his foot slipped, kicking one of the jack stands out of place. In an instant, the truck wobbled off the remaining stand and came crashing down on his chest.

Four bolts, each more than an inch long, which protruded from the bottom of the engine block, pierced his chest. The weight of the truck collapsed his lungs and prevented him from breathing. The next door neighbor who witnessed all this came running to Tom's rescue. In his panic, the neighbor forgot how to work the bumper jack which Tom had used to raise the truck in the first place. The neighbor cried out for help and succeeded in getting Tom's wife's attention. While she called for an ambulance, other neighbors began trying a variety of strategies to get the truck off Tom's chest. They watched in horrified fascination as he slowly lost consciousness and died by asphyxiation.

By the time the ambulance arrived, Tom had been crushed under the full weight of the truck and stopped breathing for at least seven and a half minutes. By the time the paramedics had raised the truck, extricated Tom and placed him in the back of the ambulance, more than 11 minutes had passed. By the time he had been delivered to the emergency room at the local hospital, 22

minutes had elapsed. By the time he was declared clinically dead by the emergency room physician, 30 full minutes had elapsed. Tom's EEG and EKG were completely flat - as nearly as modern medicine could detect, Tom's body had ceased to function and he was dead.

As the doctor was pulling off his surgical gloves and walking away, Tom came back to life. In a flurry of frantic manipulations, the ER team eventually succeeded in stabilizing Tom and transported him to the hospital's intensive care unit. Three days later, Tom was released from the hospital at his own insistence - he simply told the doctors who were caring for him that he wanted to go home, got up and put his clothes on and walked out of the hospital.

At the time of this incident, Tom was in the peak of health. At 30 years of age, he was a superb athlete and strong as an ox. He was not an educated man. In fact, before the accident, he had never read a book from cover to cover in his life. His skills at mathematics were so limited that he could not add and subtract well enough to balance his own check book, so he relied on his wife to take care of it. He listened to only one kind of music - country and western - and got mad as hell if anyone changed the station on the radio in his truck or workshop.

He earned a living by driving heavy earth-moving equipment in the local landfill. He was tough, short-tempered with most people, especially those who irritated him, and had a reputation for being very opinionated about such things as race, religion, politics and especially sports. In short, Tom was the sort of "red neck" man, a hard working, functionally illiterate blue collar worker, who believed his home was his castle and who would not hesitate a heartbeat to use his fists to make a point if he thought it was necessary.

Tom recuperated on the large sofa in his living room for all of two weeks. His ribs had not been broken but the collapse of both lungs caused sensational discomfort for the first ten days. He refused to take pain medication and relied, instead, on the help of his friend Jack Daniels to numb his senses when the pain became unbearable. He spoke little, moved little, ate little and slept most of the time during this period. And then his life began to change.

*The Stuff Descartes Left Out*

---

Four days after he got up off the sofa, Tom went to the local department store and purchased half a dozen ringed notebooks of college ruled paper. He went out to the back porch, where he had a table with an umbrella and some comfortable chairs, opened a cold beer and began to write. After nearly three days of constant writing, Tom had filled three hundred pages on both sides with what can only be described as the most exotic high order mathematical equations. He didn't know what the symbols meant, nor did he know whether he had even written them correctly. What he did know, however, was that the formulas were particularly important and that he had to get them written and delivered to someone who could understand them, as quickly as possible.

Within just weeks after his near death experience, Tom began to have "visions" which were extremely disconcerting. In one episode, which he also recorded in a ringed notebook and sealed in an envelope which he then mailed to himself, Tom recorded the contents of a truly horrifying vision. During this uninvited episode, he witnessed the crash of an airliner with exactly 181 persons on board, which was about to happen two weeks in the future. He knew the names of the people on the plane and wrote them down. He knew the date, time and place the plane was going to crash and wrote it down. He knew why the plane was going to crash and what the pilot and crew would do to try to prevent it, and wrote it down.

What was so disturbing to him about this and a number of similar experiences which occurred during the years which followed, was that he experienced the crash holographically – that is, he "saw" the plane from the outside, in the context of its course, altitude and location, while at the same time "seeing" the events which transpired during the crash from within the personal experience of each and every person on board, simultaneously. By itself, the vision was so horrifying that Tom was compelled to seek professional help to sort it out. The fact that this event occurred precisely as Tom had predicted it would was sufficient to render him nearly suicidal with grief.

After talking with his wife about it, he consulted with a local family physician, a small-town country doctor who still made house calls. The doctor referred him to Dr. Raymond Moody, the researcher who coined the term "near

death experience" (NDE) and who brought NDE research to international attention. When Tom contacted Dr. Moody, he was told that the doctor was no longer taking on such cases personally. Dr. Moody referred Tom to Dr. Kenneth Ring, a Philadelphia psychologist, whose methodology regarding the documentation of those who have survived a near death experience has been accepted universally as the protocol of choice for research purposes.

During the two years which followed Tom's death, he began to remember things which had occurred to him during the 30 full minutes that his body had been dead or dying. His account of that experience is perhaps one of the most spectacular ever recorded. After his NDE, Tom's behaviors and attitudes changed so dramatically that he and his wife nearly divorced several times. She simply did not know the man Tom had become – he was certainly not the man she had married. His tastes in music changed – he recognized classical music of a wide variety of types and could name pieces his wife has sworn he never heard before. Tom told researchers, his wife and others what the composer of the music had intended to convey to the listener.

Eventually, he recounted the circumstances during the NDE under which he had met and conversed at length with many of the world's most famous deceased composers, artists, scientists and leaders. He knew them by name, knew what they had done and could recount stories about events which had occurred during their lives, which were not known to historians at the time but which were later confirmed by historical research. In other significant ways, Tom's brush with death fundamentally altered his attitudes and behaviors.

### **The Notebooks**

What happened to Tom is spectacular because it constitutes perhaps the most thoroughly and carefully documented NDE ever recorded by Dr. Ring or anyone else. What is important about this event is that Tom returned to life after having acquired a body of knowledge to which he had never before been exposed. The validity of the newly acquired information was categorically verified by others as being both accurate and privileged. The notebooks he filled with mathematical formulas are the clincher. After reviewing the notebooks, Dr.

*The Stuff Descartes Left Out*

---

Ring contacted a scientist friend of his whom he knew to be competent to evaluate high order mathematical expressions.

Dr. Ring's friend not only reviewed the material in the notebooks, he took the notebooks to his colleagues at the Brookhaven National Laboratories, who were at the time attempting to sort out the mathematical constructs needed to design a laser-powered device which could accelerate sub-atomic particles at the speed of light. When the other team members examined the notebooks, they realized something exceptional had happened. Only six people on the planet knew the formulas which had been developed to construct the laser particle accelerator, and Tom was certainly not one of them. What astonished them was that the formulas contained in the notebooks solved the three most ineluctible problems which had stalled completion of the project from the very beginning.

As far as the scientists were concerned, there were only two ways such a thing could have happened: either Tom was a mathematical genius of unparalleled skill and competence or he had somehow penetrated the prodigious security systems used to protect privileged research at the laboratories and stolen the formulas from the computer files. Dr. Ring was contacted immediately by agents of the United States Secret Service, who demanded that he identify and deliver the man who had produced the notebooks. They weren't polite about this – it was, they believed, a matter of the utmost importance, perhaps the worst breach of national secrecy in history.

Dr. Ring delivered Tom to the agents of the Secret Service under the condition that he be allowed to be present at every stage of Tom's interrogation. His claim of physician-patient privilege was grudgingly allowed. After three days of grueling non-stop interrogation, the Secret Service agents reluctantly admitted that there was no way Tom could have breached security at the labs, nor was he competent to have crafted the formulas by himself. As far fetched as it must have seemed to them at the time, Dr. Ring's contention that Tom had acquired this and other equally spectacular information during a near death experience seemed to be the only plausible explanation.<sup>426</sup>

**Near Death Experiences**

During the past 30 years, beginning with the seminal work of Elizabeth Kubler-Ross<sup>427</sup>, Dr. Raymond Moody<sup>428</sup>, Dr. Kenneth Ring<sup>429</sup>, Dr. Melvin Morse<sup>430</sup>, Robert Sullivan<sup>431</sup>, Dr. Michael Grosso<sup>432</sup> and other researchers have conducted extensive investigation into the phenomenon which Raymond Moody so aptly named the Near Death Experience or NDE. Today, nearly 1,000 titles are available through conventional and online booksellers which discuss one or more of the aspects of such an experience. The International Association of Near Death Studies<sup>433</sup> operates more than a thousand local chapters all around the globe. The book which describes Tom Sawyer's NDE [yes, that is his real name] is just one of hundreds like it, which describe the events of a near death experience from one point of view or another.

NDE research is still extremely controversial. One of the reasons it is controversial is that this area of investigation takes us well beyond the Edge of current understanding and defies the proscriptions imposed by the Standard Model. While this is not the place to discuss all the relevant issues regarding this subject, I have provided a number of references in the endnotes and suggested readings at the end of the chapter for those who wish to explore this subject further.

The reason this subject is so important to our considerations is simply this: the NDE described by Tom Sawyer, documented by Dr. Kenneth Ring and verified by scores of independent investigators, constitutes a *prima facie* case for the notion that consciousness operates locally in the context of our physicality and non-locally without regard to the material constraints of our bodies. What happened to Tom Sawyer, and what happens with virtually all who survive the NDE [now estimated to be more than 8,000,000<sup>434</sup> people in North America alone], demonstrates that human consciousness, operating outside material physicality, during a period when the physical mechanisms of the body are no longer functional, accesses, retrieves, retains and recouples with a localized physical environment after acquiring new, often astonishing information.

***The Stuff Descartes Left Out***

---

The information acquired during an NDE is spectacular because it constitutes a body of information which, in most if not all cases, has never been available to those who have died, during their lifetime. Following an NDE, people have variously reported the ability to play musical instruments<sup>435</sup>, speak foreign languages<sup>436</sup>, write and understand high order mathematics<sup>437</sup>, demonstrate profound and precise knowledge of a scientific nature<sup>438</sup>, produce art<sup>439</sup> and display metaphysical prowess<sup>440</sup> in ways which were simply not possible beforehand. That these things happen is no longer questionable. As with the other considerations we have examined, the real question is not *whether* such things really happen, but rather *how* and *why* they happen. The following examples are both fascinating and instructive.

**The Sylvian Fissure**

Modern medical science has determined *where* in the brain many of the body's activities occur. We know, for instance, where the functions associated with hearing, seeing, long and short term memory, emotions, motor controls, autonomic and involuntary nervous processes, and the production of neuropeptides operate in the physical structures of the brain. Wilder Penfield, considered by many to be the father of modern neurosurgery, discovered that the functions associated with the NDE are located in an area of the right temporal lobe known as the Sylvian Fissure. The story associated with this discovery is illustrative.<sup>441</sup>

Dr. Melvin Morse, whose research into the peculiar nature of NDE's in children is recounted in his book ***Closer to the Light***,<sup>442</sup> was convinced that a physical correlation between the functions of the human brain and the NDE phenomenon must exist. After months of concentrated research, however, he was "stumped."

*I was not alone in my inability to find drug or psychological causes for NDE's. A number of researchers, including Raymond Moody, psychologist Kenneth Ring, and even astronomer Carl Sagan, could find no common pathway to explain the near death experience – except near death, that is. Moody, the first medical*



doctor to study the near death experience, concluded in a 1988 article in ***Psychology Today*** that "for years I have been trying to come up with a physiological explanation for NDE's, and for years I have come up empty handed."

*My first hint of a solution to this problem came when I was casually discussing NDE's with Art Ward, former chairman of neurosurgery at the University of Washington. Ward is a great thinker, a surgical artist, and a crusty old man whose shoot-from-the-hip style causes many junior residents to cower in fear. He is not given to metaphysical thinking. "Hard science" and just the facts are his domain.*

Ward remembered one patient who had experienced every trait of the near death experience while Wilder Penfield stimulated different locales in an isolated area of his brain with an electric probe. As one part of the patient's brain was stimulated, he had the sensation of leaving his body. When another area close by was stimulated, he had the sensation of zooming up a dark tunnel, and so forth. Ward thought that the area Penfield had been probing was the temporal lobe. He felt that some very interesting experiments could have been conducted had anyone had the presence of mind to think of them at the time.

*For instance, they might have devised ways to see if these people were really leaving their bodies. Unfortunately, no one thought of it at the time.*

When Dr. Morse's research team began reviewing Penfield's work, they found the clue which unlocked this part of the mystery in a forty year old textbook. According to that book, when Penfield electrically stimulated specific locations in the Sylvian Fissure, located in the temporal lobe, just above the right ear, the patients described all the elements of the NDE, one area of the brain at a time. When he electrically stimulated the areas surrounding the fissure, patients frequently had the experience of leaving their body, "seeing God," hearing heavenly music, seeing dead friends and relatives, zooming

*The Stuff Descartes Left Out*

---

through a dark tunnel and watching a panoramic life review – all of which have been conclusively documented to comprise the essence of the near death experience.

Dr. Morse was not alone in this discovery. When Morse's research report was published<sup>443</sup>, it identified the anatomical components associated with the NDE. He was soon thereafter contacted by a group of neurologists in Chile who had been studying the same thing. They had arrived at the same conclusions as Morse's group, that NDE's were generated by neuron activity in the Sylvian Fissure. By examining the effects of a wide variety of psychoactive drugs, lack of oxygen, epileptic seizures and a variety of altered states of consciousness, the Chilean researchers had independently pinpointed the same area in the brain as Morse's group<sup>444</sup>.

What was not so easy to establish, however, was what the discovery really meant. Sixty years ago, when he was conducting his original explorations into the functions of the brain, Penfield had no inkling of quantum mechanics, non-local field effects and the role or even the existence of neuropeptides. Nevertheless, in one of his most famous lectures, Penfield provided an answer to the question Morse and the Chileans had been asking. He readily admitted that the energy source that powers the mind was a total mystery to him.

*It fills us with the fire of life, and in the end, the wind of death blows it out like a candle. Then what happens? It is clear that, in order to survive after death, the mind must establish a connection with a source of energy other than that of the brain. If during life (as some people claim) direct communication is sometimes established with the minds of other men or with the mind of God, then it is clear that energy from without can reach a man's mind. In that case, it is not unreasonable for him to hope that after death the mind may awaken to another source of energy.*<sup>445</sup>

Penfield was closer to the truth than he knew. Many who have survived the NDE are deeply troubled by the fact that science has now identified *where* in the brain the experience occurs and is processed. The fact that the experience

is so extraordinary and touches those who survive it so deeply, suggests to some that identifying a specific location at which the NDE is processed constitutes some sort of sacrilege. For our part, I can assure you that no sacrilege is intended. Indeed, it is essential that we understand not only *where* the NDE occurs in the physical equipment but *how* it operates, both by itself and as a component of the other functions which occur in the brain. It is important because the NDE provides access to information in a way which is essential to our striving to understand how nature works, beyond the Edge.

If surviving an NDE were the only way by which the human mind could access information non-locally, we would be faced with a fundamental conundrum. As Dr. Morse and other NDE researchers will tell you, this is highly problematical, since it is clear that the NDE is not facilitated by drugs<sup>446</sup>, mental illness, schizophrenia-related psychoses (i.e., hallucinations, delusions, loose associations, etc.), organic mental disorders, autoscopic hallucinations, altered states of consciousness or any known metaphysical pursuits. In short, in order to have an NDE, you must die and return to life. And that is a very risky business at least for scientists, if not their patients. It is not likely that even the loosest interpretation of current medical ethics could be stretched to render the scientific inducement of death an acceptable way of conducting consciousness research.

Fortunately, we have a number of other examples of mechanisms by which information can be retrieved non-locally, deliberately and at will, using only the extraordinary properties of the human mind. How these phenomena operate and what they mean to our model is of fundamental importance.

## SECTION TWO

### *The Stuff Descartes Left Out*

## CHAPTER NINE

### *The Discovery of Quarks By ESP*

#### **What Nature is Made Of**

To date, more than 250 subatomic particles have been discovered which are generally recognized by particle physicists. Many of them have been observed experimentally by means of the sophisticated technologies employed by high-energy physics. Most recently, this includes such esoteric particles as sub-quarks and the WIMP<sup>447</sup>. As we have shown, the state of the art in physics is embodied by the so-called "Standard Model." This model is science's attempt to describe all matter and all forces in terms of an astonishingly few types of particles.<sup>448</sup>

Six quarks and six leptons are believed to make up all possible forms of matter. In practice, just two of the quarks (the "up" and "down") and one lepton (the electron) account for everything in the world except for a few exotic cases which are only of interest to particle physicists. The 12 particles of matter and their 12 corresponding particles of anti-matter, are said to be acted upon by "messenger particles," which physicists believe transport the information associated with all the known forces<sup>449</sup>.

In the Standard Model, there are four primary field forces. In the first, the *photon* mediates the electromagnetic force, including all the familiar chemical and structural forces<sup>450</sup>. In the second, the members of the *gluon* family carry the strong force which binds neutrons and protons together to form atomic nuclei.<sup>451</sup> In the third, the  $W^+$ ,  $W^-$  and  $Z_0$  messengers mediate the weak nuclear force, and in the fourth, gravitational force, the as-yet-undiscovered *graviton* is believed to carry the force of gravity.

*The Discovery of Quarks with ESP****The Extra Sensory Perception of Quarks***

Dr. Stephen Phillips' book ***The Extra Sensory Perception of Quarks***<sup>452</sup> is more than a little difficult for today's brand of physicist to accept. What his book describes is the process by which extraordinary observations in this field were made 100 years ago by investigators who relied on techniques which are not at all similar to those used to conduct research in high energy particle accelerators. The form of extra-sensory perception described as *magnifying clairvoyance* or *micro-psi* used in those early experiments has been known to oriental yogis, monks and avatars for thousands of years. The technique does not consist of actually magnifying the small object so it can be seen by the naked eye but, conversely, amounts to "making oneself infinitesimally small at will," as it has been so picturesquely described in the yoga Sutras of Patanjali (book 3, Sutra 26)<sup>453</sup>:

*Knowledge of the small, hidden or the distant by directing the light of superphysical faculty (Taimni's translation).*

At the turn of the 19<sup>th</sup> century, early members of the Theosophical Society<sup>454</sup> undertook intensive yoga training under the expert guidance of no less a leading light than the legendary J. Krishnamurti. In due course, many of them acquired a working proficiency in this discipline. In 1895, it was suggested to C. W. Leadbeater<sup>455</sup> that he might use this newly developed skill to examine the atoms of various chemical elements. Annie Besant<sup>456</sup> soon joined in what was to become a long series of investigations which lasted on and off for more than 38 years. Starting with the light elements hydrogen, oxygen and nitrogen, their research was gradually extended to cover all elements which were known at the time, plus a few then undiscovered elements and isotopes.

During the observational process, the objects as "seen" in this manner were described to an assistant, sketches were made and copious notes were taken. To Leadbeater and Besant, the atoms appeared as

*...highly structured bodies, giving the impression of definite external shapes, with the interior subdivided into compartments of spherical, ovoid, conical and other geometrical shapes.*

*The Stuff Descartes Left Out*

These bodies in turn were observed to contain or be comprised of very much smaller particles. These were perceived to be the ultimate units of physical matter and were called "ultimate physical atoms" in their notebooks. All the elements consisted of these baseline particles, which were observed to be of two types only, one the mirror image of the other. These mirrored states constitute what we now refer to as matter and anti-matter states.

Because the atoms were in vigorous motion in all conceivable states, the observers found it necessary to "slow them down by a special, strenuous physical effort of will power" before accurate observation and counting of components were possible. The external and internal shapes were delineated by the volume of space swept out, so to speak, by the energetic movements of the sub-atomic particles, which appeared to "create tenuous walls" of a nature that could not at that time be determined.

The observers found that they could facilitate the examination process by applying psycho-kinesis to dismember the atoms, in a stepwise order, into smaller groupings of ultimate particles. At each step or deeper level of penetration into this highly ordered structure, a considerably "higher power of magnification" was needed. A great deal of this work was brought together in the first and second editions of the extraordinary book entitled ***Occult Chemistry*** (1908 & 1919)<sup>457</sup>, and the remainder was included in a rewritten third edition which was published in 1951.<sup>458</sup> The fourth edition was published in 1980.<sup>459</sup>

The extraordinary difficulty Dr. Phillips encountered when he tried to evaluate this body of work in terms of the Standard Model is illustrated by considering their notations regarding their observations of hydrogen. The hydrogen atom was "seen" by ESP to contain 18 of the "ultimate physical atoms," grouped into six spheres of three apiece. These spheres are described in the notes and illustrations which accompany them as being arranged at the corners of interlacing triangles. No subatomic particles were known then which would require 18 units to comprise an entire hydrogen atom, including its nucleus. As our understanding of the structure of the nucleus and nuclear

*The Discovery of Quarks with ESP*

particles matured, at least during the middle years between 1951 and 1980, it seemed less and less likely that Leadbeater and Besant had got it right.

Those few scientists who bothered to take the time to examine their book felt reasonably justified in dismissing its claims as fanciful, after only a cursory inspection. Those who were convinced about the value and utility of the micro-psi discipline were simply baffled. The investigators were known to be sound of mind and had long been held in the highest esteem by scientists of all stripes.

Then, in the wake of the findings of the Copenhagen School, the existence of quarks was postulated. This hypothetical form of sub-subatomic particle was shown mathematically to operate as the basis for the proton by being bound together in groups of three quarks to each proton. Nevertheless, the credibility gap between what was seen as three quarks to a single proton and the need to accommodate a total of 18 sub-subatomic particles as suggested by Leadbeater and Besant remained unabridged. Dr. Phillips is largely credited with originating the hypothesis that each quark is comprised of two sub-quarks, bound together to form a single quark, of one of six varieties.<sup>460</sup> Dr. Phillip's theory provided for six "omegons" per proton. The book describes how Dr. Phillips was able to bridge the remaining factor of two by reinterpreting the ESP data.

Leadbeater and Besant claimed to see the hydrogen atom "exactly as it was." At the time, they could not have known that the very act of focusing their attention on it and controlling its "wild gyrations" psycho-kinetically probably caused it to act in ways which were altogether unknown until 1982, when Alain Aspect and his team at the University of Paris conducted their watershed experimental verification of the inextricable connection between the conscious observations of an observer and that which is being observed.

Phillips carefully analyzes the nature of the perturbation caused by the act of observation and has concluded that it would induce the fusion of two atoms of an element into a plasma of free omegons and quarks, which would then interact to form stable, quasi-nuclear systems of bound particles.<sup>461</sup> The new patterns derived by application of the rules attendant to the Standard Model tally perfectly with the diagrams contained in *Occult Chemistry*<sup>462</sup>.

*The Stuff Descartes Left Out*

While it stretches the imagination to conclude that Leadbeater and Besant had "seen" quarks and sub-quarks more than 100 years ago using only the disciplined practice of ESP, the document prepared by Dr. Phillips speaks for itself. He has succeeded in unifying the two schemes, both the Standard Model and the Leadbeater/Besant Model, not merely in outline form but in the most precise and convincing detail. This book makes fascinating reading for anyone who is interested in pursuing this line of inquiry.

**The Nobel Prize**

What does this mean to us? Among other things, it means that the Nobel Prize for the discovery of quarks may have been awarded to the wrong researchers. Murray Gell-Mann and his team of researchers at Fermilabs in outlying Chicago verified 80 years later, using a macro-device called a cyclotron, what Leadbeter and Besant had already discovered and illustrated, using an entirely different method 80 years earlier. More importantly, as far as Dr. Phillips' analysis is concerned, the model of physical structure of the atoms of hydrogen and other elements and isotopes illustrated by Leadbeter and Besant comports perfectly with what is now accepted by particle physicists everywhere.

For those who wish to go through the exercise, I highly recommend comparing the drawings, descriptions and illustrations contained in Dr. Phillip's book with those contained in the scientific papers published by Dr. Gell-Mann. What is remarkable about this whole area of research is the ultimate realization that Dr. Gell-Mann's claim to have discovered the ultimate, indivisible particle of matter was preceded by more than 80 years by Leadbeter and Besant. Their claim to have "seen" twice as many particles as can be accommodated by Gell-Mann's model was unexpectedly vindicated in the late 90's by the discovery of sub-quark pairs [called Preons] by some of Gell-Mann's students at Fermilabs.<sup>463</sup> After a full century of apparently unresolved conflict, we now have an unequivocal example of the extent to which the disciplined exercise of metaphysical skills can be relied on to validate and anticipate collateral discoveries facilitated by the use of empirical scientific methods.



*The Discovery of Quarks with ESP*

To this set of observations must be added an additional comment. The award of a Nobel Prize in Physics constitutes the scientific political equivalent of casting such research in concrete. In order to compel the mainstream community of physicists to reconsider a view that the quark is the ultimately indivisible particle of matter, research which announced the discovery of the sub-quark was subjected to the most rigorous protocols imaginable. More than 450 physicists peer reviewed, analyzed, evaluated and repeated the experimental, theoretical and mathematical disciplines used to predict, quantify and validate the discovery of sub-quark pairs. Notwithstanding this unprecedented level of scrutiny and verification, physicists at the American Physical Society, MIT, Princeton and Columbia University succeeded in suppressing the publication of the research data in such mainstream publications as Scientific American, Physics Letters, Physics Review and Nature.<sup>464</sup>

**Remote Viewing**

Remote viewing is the term coined by Hal Puthoff and Russell Targ to describe a process first developed by Russian scientists in the early 1960's. In their attempts to weaponize various attributes of consciousness, Soviet scientists discovered by accident that it is possible to harness conscious sensory awareness to access information at virtually any remote site by projecting one's consciousness into virtual space. The focus of their original tests was to develop a means by which totally secure real time communications could be facilitated with submarines of the Soviet Fleet at remote sites deep under the surface of the world's oceans.<sup>465</sup> American intelligence agencies became aware of the research being conducted by the Soviet military in this area and contracted with Stanford Research Institute and pre-eminent scientists Hal Puthoff and Russell Targ to develop a parallel research program to probe the depths of this intriguing new discovery.

Puthoff and Targ spent several years drumming up funding sources to support their independent research before the Defense Intelligence Agency contracted with Dale Graff to head up a new group to conduct top secret research into the phenomenon. Their project was code named Operation

*The Stuff Descartes Left Out*

Stargate.<sup>466</sup> For nearly 20 years, under the sponsorship and control of a variety of governmental agencies, US research into the phenomenon of remote viewing demonstrated that it is possible for "naturally gifted" individuals to be trained to perform the functions associated with remote viewing with increasing dexterity and reliability.

Graff's most recent book on the subject, ***River Dreams***,<sup>467</sup> recounts a number of exercises conducted during the officially sponsored program which until just recently were classified as Top Secret by the Defense Department. It makes fascinating reading, not only because it illustrates with unequivocal clarity that human consciousness can be used to access information at remote sites, but also because Graff makes it clear that one cannot become involved in such research without being deeply and personally effected by the experience.

In the wake of projects with such exotic names as Operation Stargate, Grill Flame, Center Lane and Sun Streak, others who have been involved in the ground breaking research into the dynamics of this phenomenon have also published compelling accounts of their experiences. Unfortunately, one of the original participants, David Morehouse,<sup>468</sup> published an account which has been largely discredited insofar as his personal exploits are concerned. Motion pictures, television programs, comic books and a burgeoning number of fictional accounts based on the concept of remote viewing have all followed in the wake of his sensationalized accounts of his remote viewing experiences.

Perhaps the most thorough-going of all accounts of the US government's work in this area was written by science writer James Schnabel.<sup>469</sup> After three years of research, with access to numerous sources from within the intelligence community, including direct contact with the remote viewers themselves, Schnabel's book ***Remote Viewers*** reveals for the first time many of the secret details of what is perhaps the strangest chapter in the history of international espionage.

Another interesting work in progress, which is directly related to this area of research, is posted on the world wide web by artist Ingo Swann<sup>470</sup>, who was one of the earliest practitioners of the discipline called remote viewing. His account is interesting because unlike the others, he dwells extensively on

*The Discovery of Quarks with ESP*

methodology.<sup>471</sup> Like Graff, Puthoff, MacMoneagle and other serious and dedicated practitioners of this exotic metaphysical art, Swann suggests that the ability to perform the functions associated with remote viewing is a basic, latent human talent present to one degree or another in everyone, just as are the basic talents for mathematics, languages, rote learning, artistic expression and so on.<sup>472</sup> More importantly, he takes great pains to describe the role and importance of feedback, diligent practice under consistent and carefully controlled conditions, and coaching to developing progressively proficient skill levels.

The fact that remote viewing works at all seems magical to most of us. It seems like magic because (1) we do not have a context in our culture by which to accommodate the notion that consciousness exists separate and distinct from physicality, and (2) Western science has altogether eliminated a fundamental element of the mathematical expressions which describe how consciousness couples with time, light and material physicality, from our concept of physics and physical science. Once this piece is added back into the equation, the mechanisms by which remote viewing operates can be both understood and harnessed to facilitate the completion of our new model.

**Time-Like Character of Mind**

Tom Bearden is the quintessential scientist's scientist.<sup>473</sup> His leading edge work recognizes, employs and integrates the attributes of non-local field mechanics with human consciousness. What he has to say about the mechanism by which human consciousness – mind, if you will – couples with our physicality to operate non-locally, cannot be ignored.<sup>474</sup> Because his writing is intended for other physicists and mathematicians, it is a little esoteric. Nevertheless, it is still fundamentally understandable by any dedicated reader who wishes to take the time to work through it.

**A Severely Self-Crippled Physics**

Let's take this one step at a time. For the purposes of this discussion, we will assume that photons, both real and virtual, are the fundamental conceptual building blocks of the Cosmos. In mathematical terms, photons

*The Stuff Descartes Left Out*

serve as theoretical carriers of the most basic kinds of information. In quantum field theory, the formulas which describe the interactions of photons suggest that they demonstrate four different polarization states.<sup>475</sup> Briefly stated, according to the Standard Model, photon polarization states operate in both three and four dimensional space. Three dimensional space can be visualized in terms of height, width and depth, which is described in the language of mathematics and physics as the  $x$ ,  $y$  and  $z$  axes. Time, the fourth dimensional attribute, is denominated by the italicized letter  $t$ . In both 3- and 4-dimensional space, the  $z$  axis is used to define the direction in which the photons are energetically polarized.

A word before we go further. Physicists prefer to be as precise as possible when words such as “polarized” and “oscillate” are used. In the strictest sense, a particle is said to be polarized in a particular direction without actually moving in that direction. Polarization is an attribute of a particle and not an action it performs. When “oscillation” is used to describe the direction of polarization, it means that the energetic polarity swings back forth in a prescribed direction, but it does not mean that the particle itself moves.

Accordingly, in the first two polarization states, the  $x$  and  $y$  polarizations operate in 2-dimensional space, as lateral oscillations (left/right on the  $x$  axis and up/down on the  $y$  axis). These are considered to be *transverse polarized* photons in any of the two possible combinations. The third polarization state occurs along the  $z$  axis, which is described as a *longitudinal* polarization.

[Illustration]

By definition, the 3-dimensional spatial energy of the longitudinal  $z$ -axis photon cannot oscillate in the  $x$  or  $y$  direction, so it is compelled to oscillate along the line of motion we have labeled  $z$ . Remember, we are not describing an oscillation of the *photon* itself, but rather the oscillation of its polarized energy state.

The fourth polarization state occurs when the energy represented by the photon is frozen in all three spatial axes,  $x$ ,  $y$  and  $z$ . This means that the

*The Discovery of Quarks with ESP*

photon cannot oscillate energetically in any of those directions. In that case, the photon's energy state oscillates in the  $t$  direction, which is described in terms of oscillations in time.

The 4-dimensional model of space relied on by physicists in the West is referred to as Minkowski 4-space.<sup>476</sup> In the Minkowski 4-space model, all the elements of the 3D-space ( $x$ ,  $y$  and  $z$  axes) operate in conjunction with  $t$ , the component we call time. In Minkowski 4-space, the operations of all physical bodies are space-like. That is, the behaviors and attributes of the material world are measured in terms of movements through physical space during measured increments of time. Think of this in terms of the movement of an automobile down a highway - the notion of velocity is described in terms of miles -units of distance - traversed by a mass (the automobile) over discreet increments of time (e.g., an hour).

However, Mind and mind-like functions are not space-like, even though many of their functions can be described in electromagnetic terms. Instead, they are time-like. Paradoxically, all observations in materialistic physics are defined in terms of conventional 3-space attributes, which do not include a component which recognizes the time-like attributes associated with the time-polarized photons of which all things are comprised.

*Mass itself is a 3-spatial concept, and we detect changes to mass (as, e.g., in the shift of electrons in the circuits of electrical instruments). So one may model the common physical observation mechanism as a time-differentiating process which a priori discards time-change and retains measurements of 3-spatial energy change.<sup>477</sup>*

In other words, reality as defined in Minkowski 4-space is modeled in three fundamental units of length. This is the crux of the matter. In mathematical terms, this is connoted by aggregating the expressions  $L_1$  ( $x$  axis),  $L_2$  ( $y$  axis) and  $L_3$  ( $z$  axis), together to form the single expression  $L^3(x, y \text{ and } z \text{ axis all together})$ . This single compound expression is then coupled with the expression for time,  $t$ . When scientists make physical observations, they are really observing what is called the *transverse photon interaction*, which is just a way of saying they are watching the result of the energetic oscillations of photons in 3-space over a period of elapsed time [e.g., feet per second].

*The Stuff Descartes Left Out*

The mathematical expression for changes in any polarization state is the Greek letter  $\delta$ , which denotes the *change* from one energy state or position to another. So the *transverse photon interaction* is described as a measurable change per unit of time or  $\delta/\delta t$  (as in "change in feet per second"). When this function is used to modify calculations in Minkowski 4-space, a simple algebraic operation creates the following result:  $\delta/\delta t$  (change in feet per second) times  $L^3t$  (feet<sup>3</sup>-seconds) produces the result =  $\delta L^3$ (feet<sup>3</sup> ) or, simply stated, a measurable change in one of the three axes which define 3-space.

**Sum Zero Results**

The result of this seemingly simple mathematical operation is stunning in its implications. This way of observing the material world suggests that Mind and Mind-like operations are deliberately, specifically excluded by the instruments used to perform observational functions in physics laboratories. This occurs because the Standard Model altogether excludes the functions of the time domain in its calculations. Scientists simply do not bother to "measure" oscillations in the time domain at all. We have no context for it and therefore no instruments to measure it.

Is this the way Nature really works? Probably not. How do we know that Time is a separate dimension with energy density of its own? We have only to examine the prodigious work of James Clerk Maxwell, who originally formulate the laws of electrodynamics. The current failure of material physics to accommodate the true nature of the time domain arises directly from the over simplification of the original quaternion equations developed by J.C. Maxwell to describe the mechanics of electromagnetism.

Maxwell's original equations, now reconstituted in the seminal work of the AIAS and the team assembled by Tom Bearden and Myron Evans, described the landscape of the material world in terms which were totally inclusive of time-domain polarization functions. Unfortunately, in order to simplify the rigorous mathematics involved in quaternion expressions, transforms [mathematical simplifications] developed by mathematician Cedric Lorentz were adopted

*The Discovery of Quarks with ESP*

instead. Why this is so fundamentally important is the subject of the next chapter.

Suffice it to say that as a direct result of the modification of Maxwell's formulations by Lorentz's vector mathematics, scientists in the West have not developed instruments which measure oscillations in the time-domain (this is not the same as simply measuring the passage of time). By definition, from the very beginning of the 20<sup>th</sup> Century, such considerations have been considered irrelevant. For this reason, physicists in the West erroneously consider *Mind* to be "metaphysical," non-measurable and, therefore, non-real.

As far as conventional physics is concerned, *Mind* is synonymous with *brain*, and *brain* is considered to be nothing more than three pounds of meat which performs computational functions with data. Accordingly, Gerald Edelman and his colleagues assert that as the "meat computer" becomes more organizationally sophisticated by evolution, it also becomes increasingly self-referent. According to this model, the consciousness functions of *Mind* are only allowed to impinge on the considerations of the Standard Model when defined as the effect produced by the increasingly sophisticated organization of matter, in terms of  $L^3$ .<sup>478</sup>

Nevertheless, in the realm of Descartes' "spirit stuff," which operates in the state of polarity known as  $t$ , time is absolutely real. According to Bearden, time is completely electrodynamic in nature.

*There is no metaphysics involved...the temporal domain - along with Mind and Mind operations - is simply an erroneously neglected area of physics. In present physics, the notion of mind and mind operations is comfortably disposed of by imposing the use of the "observer" concept, without ever specifying that the observer has a consciousness and a mind. Obviously, one has a severely crippled physics if one eliminates that non-observable called "time." Similarly, one also has a dramatically crippled physics when one eliminates the mechanisms and physics ongoing in those time-like and dynamic "things" such as Mind, which occupy time and function in it.*

From this viewpoint, Western physics has been driven by our collective cultural legacy to adhere to its conventional 3-space paradigm, in spite of the overwhelming body of accumulating evidence which cannot be accommodated

*The Stuff Descartes Left Out*

by this fractured way of looking at the world. This position can only be justified in terms of a very limited context, in which physicists deliberately choose to ignore what is known as the *transduction* (alteration, conversion or transmutation of one state of energetic polarity into another state) of time-polarized electromagnetic changes ( $\delta t$ ) into detectable longitudinal (propagated along the  $z$  axis) and transverse (propagated along the  $x$  and  $y$  axes) electromagnetic wave changes.<sup>479</sup>

In this respect, Western physics is severely self-crippled. And it is because Russian scientists have managed to circumvent this pitfall and incorporate all four phase-polarized states of photons into a single integrated model, that they are able to deliberately engineer systems which enable them to focus the exercise of human consciousness on non-local targets with measurable, repeatable and often very dramatic results.<sup>480</sup>

Here is the important part: time as described by Maxwell and Whittaker<sup>481</sup> is totally electromagnetic and energetic in nature.

*The flow of time is not a separate external river on which a mass floats along like a boat drifting down the current of a great flowing river. Instead, the flow of time is generated directly on every mass by its total set of photon interactions, both in virtual and observable space. The exact mechanism which describes the physics of the flow of time is presented in the following diagram.*<sup>482</sup>

[DIAGRAM]

The photon, which is the basic unit of information from which all things are constructed, also demonstrates the property we have referred to as *angular momentum*. This is described in mathematical terms as a function of Energy *times* Time. Notwithstanding the limitations which have been artificially imposed on the Standard Model, the photon transports both energy *and* time, not just energy alone. When absorbed or in other ways incorporated into a mass, not only does the photon charge the mass by *energy-excitation*, but it also charges the mass with *time-excitation*. This converts all mass from simply being space-like (only  $L^3$  in Minkowski space) as *energetic mass*, to something much more robust. All mass then becomes an expression of *mass-time* ( $L^3t$ , as in the



*The Discovery of Quarks with ESP*

original expression). If we want to be precise about this, we have to say that in all cases, it is *mass-time* which emits photons and not just *mass*.

*So a mass moves through time in little spurts, by the continual macroscopic addition and subtraction of little  $\delta T$  components. As it is driven through time, mass is continually altered to mass-time, to mass, to mass-time, to mass, and so on..*<sup>483</sup>

Recall the discussion which described the dash-space-dash-space characteristics of the sub-quark. The behavior of the sub-quark is a palpable, measurable demonstration of this concept. Therefore, in order to engineer the Mind and its operations directly, one must perform electrodynamic engineering in the *time* domain, not just in the 3-space electromagnetic,  $L^3$  physical energy density domain. The direct engineering of time-like mind and mind operations - in all levels and all aspects - requires the use of *time polarized photons and time-polarized EM waves*.<sup>484</sup> While time-polarized photons are described in Western scientific literature, the creation and use of time-polarized EM waves does not appear in the physics literature of the West at all.<sup>485</sup>

*So most probably Western mind ... researchers have not recognized the methodology and mechanisms for transducing<sup>486</sup> one type of EM wave polarization directly into another.<sup>487</sup> They continue to seek the "mind" in 3-space and hence in the brain, rather than in the time domain. On the other hand, it appears that the Russian KGB energetics<sup>488</sup> weapons scientists - particularly those in psychoenergetics<sup>489</sup>- have known and used methods for transducing one wave polarization into another, for at least two decades. It follows that those same scientists have very probably developed mind engineering and mind control via novel time polarized EM wave means and a dramatically extended electrodynamics of the time-like mind operations.*

Dr. Bearden's research into this exceedingly arcane area has enabled him to develop a model which describes the processes associated with waveform *transduction*. This insight establishes a basis for understanding Russian research into various aspects of mind control and mind engineering, including the specialized use of ordinary transverse wave (TW) EM spectra to force internal EM wave transductions and time-domain operations inside those whose bodies have been irradiated. By harnessing the dynamics associated with

***The Stuff Descartes Left Out***

mind-body coupling mechanisms, the transductions of transverse EM waves can be propagated in a way which exerts a powerful non-local effect on the mind and its deepest operations, as well as upon the body, every cell and every part of every cell.

**The New Frontier**

If a thorough understanding of the dynamics and mechanisms involved in these processes can be harnessed for military uses, they can also be used to develop tools which can be employed to accelerate, widen and enhance the functions associated with *micro-psi*, remote viewing and other transpersonal means of communications between humans. The tools developed as a result of our insight into this way of coupling time domain functions with human consciousness can also theoretically be harnessed to fundamentally improve the human condition by accelerating learning, promoting health and healing, and in other fundamental ways facilitating an exponential improvement in our ability to understand how nature works. This is not the realm of magic or metaphysics. It is simply a matter of understanding how such things work.

## SECTION TWO

### *The Stuff Descartes Left Out*

## CHAPTER TEN

### *The Seething Sea of Infinite Potential*

#### **Seething Sea of Infinite Potential**

Imagine a raging tempest at sea. The wind howls at gale force nine, screaming across the wave tops at velocities in excess of 100 knots. Thundering waves of churning green foam tower to more than forty feet, roiling, frothing, spewing foam and crashing with unabated fury against each other. In this chaotic, catastrophic state, the sea resembles in material form what we imagine the scalar potentials at the fundament of creation to be. In a very real sense, this image is depictive of the way the scalar potentials referred to by Maxwell<sup>490</sup>, Faraday and E.T. Whittaker<sup>491</sup> may be like in reality.

The seething sea of undifferentiated potential operates beneath [meaning infolded within] the dimension we refer to as Time. In this mathematical construct, time is described as a distinct dimension characterized by significant energy density, calculated to be equal to Einstein's famous expression  $C^2$  by Dr. Lawrence Crowell, in his recent reformulation of Maxwell's Electromagnetic Field Equations<sup>492</sup>. Dr. Crowell's derivatives of the quaternion expressions employed by Maxwell, Faraday and Whittaker, mathematically describe a landscape which exhibits all the attributes which make physical materiality possible. The potentials which operate at this fundamental level are primary. They are causative, not derivative. And herein lies the rub – in the Standard Model employed by physicists in the West, the four field forces are considered to be primary and causative, rather than derivative effects arising from the scalar potentials which operate at the underlying causal plane.

At the level of the physical vacuum, which operates at dimensions equivalent to Planck's Constant ( $10^{-33}$  centimeters), the potentials operate as a field of pure, undifferentiated information. At this level, attributes such as

*The Stuff Descartes Left Out*

---

polarity, duality and oppositeness simply do not exist. This is the causal plane from which undifferentiated information emerges from scalar potentials to create matter and energy at the primary physical [Minkowski 4-space] level. In the language of science, it is at this level that the paired data bits which form the Quarks become operative.

The rules which govern the behavior of each undifferentiated datum at this level are the same rules described by Maxwell, Faraday and Whittaker. From the seething sea of infinite, undifferentiated potential, “data” arise to form the material world, one quantum level at a time.

This is heady, exotic stuff. Physicists ask the fundamental question,

*“If the physical vacuum is the interface between a seething sea of infinitely variable scalar potentials and the primary level of material physicality, what causes the primary, essential bits of undifferentiated information to join together to create materiality in the first place?”*

The answer to the question is found in its framing. We have two essentially apposite models available which describe how and why this works as it does.

### **Super string (M) Theory**

In super string (M) theory<sup>493</sup>, now more commonly referred to as M Theory, it is postulated that minute strings vibrate at light speed in a dimension described as “Hilbert Space.” In this “quantum foam” [read: undifferentiated, non-polarized] environment, string theory suggests that individual, undifferentiated data bits aggregate together to form new kinds of information. The initial aggregations of information exhibit for the first time the attributes of polarity and duality, which are manifest as opposites in the world of materiality.

The data bits described in the theory orient themselves to match spin [left and right] and polarity [plus and minus] to form paired data bits which begin to spin in proximity to each other. This dance is described in mathematical expressions called “tensors,” which define the vectors [directions, angles,

velocities, etc.] of movement. The results of these expressions are referred to as spin polarity, angular momentum and weighted waveform vector velocities.

Physics utilizes a complex form of differential calculus to describe what happens as these new polarized data bits emerge from eight different operators, each driven by three sets of axes [x, y and z], energetically oscillating in as many as ten physical dimensions. The theory attempts to define the ways by which these polarized aggregations of primary data dance around and join with each others in time and space to create sub-quarks, quarks, leptons [ i.e., electrons], hadrons [i.e., neutrons and protons], atoms, molecules and so on.

These “Lagrange Points” represent a set of formulations in differential calculus which are sufficiently arcane to bludgeon the most dedicated mathematician into a stupor. Taken as a whole, though, super string theory has broken new theoretical ground, creating a context within which the mechanics of materiality and the primary forces of creation can at least be considered.

### **Erroneous Assumptions**

Unfortunately, super string (M) theory is predicated on three fundamentally erroneous assumptions. First, according to the Standard Model, the linear, sequential field forces we call electromagnetic, gravitational, strong and weak nuclear forces, are considered to be primary. That is, according to the vector mathematics generally accepted by physicists in the West, nothing operates at a more primary level than the four primary field forces themselves. This erroneous notion arose, as we have shown, as a result of the over-simplification of Maxwell’s quaternions by Lorentz at the turn of the 20<sup>th</sup> Century, which resulted in the arbitrary elimination of the scalar potentials, time domain polarity and non-local/non-linear forces.

The Lorentz transforms have become so universally accepted and generally applied that nowhere in today’s texts do the original quaternion expressions which describe the underlying scalar potentials appear. Not a single one of the original Maxwellian equations is found any physics texts in circulation in the world and, perhaps even more importantly, not a single one of the mathematical

*The Stuff Descartes Left Out*

---

expressions currently used to describe electromagnetism ever appeared in Maxwell's original work.

**The Lorentz Transforms**

While this is tragic, it is also understandable. In 1905, when Lorentz released his electrodynamic transforms, the engineering and scientific communities readily embraced them. They were simpler, easier to understand and much faster to calculate than the more demanding quaternions. Because of the nature of quaternion expressions, it was difficult to apply an empirical result to a practical solution. Naturally enough, electrodynamicists and engineers who were learning to produce, distribute and harness electricity for practical applications welcomed the Lorentz transforms as a genuine breakthrough and were much relieved to abandon the more arcane quaternion form.

More importantly, no one of Lorentz's day had any notion about the importance or dynamics associated with spinning nuclear particles in the fabric of materiality. Cartan, Albert Einstein's brilliant collaborator, described the "torsion" which results from such spinning behaviors in his seminal theoretical work involving a mathematical formulation for gravitational forces. Unfortunately, because the equipment did not exist in his day to examine and verify his notions about such things, the concepts of time-domain polarization, angular momentum, spin polarity and the decompensation of torsion fields exerted by spinors were simply disregarded as mathematical oddities. This resulted in the development of a General Theory of Relativity, a model of quantum mechanics and a formulation of electrodynamics which are bereft of any capacity for describing or accommodating the causative nature of the primary, underlying scalar potentials.

**Reformulation of Maxwell's Field Equations**

Today, a 100 years later, we enjoy the rare and unanticipated luxury of being able to re-examine Maxwell's formulations without the leveling effect inflicted on their topology by Lorentz's transforms, and without having to be

*The Seething Sea of Infinite Potential*

---

fluent in quaternion expressions. The Association of Distinguished American Scientists and the American Institute for Advanced Studies under the direction of Tom Bearden, Myron Evans and Lawrence Crowell have recently released the product of more than 11 years work by a team of 22 talented mathematicians and theoretical physicists, in a monograph published under the title ***Reformulation of Maxwell's Electrodynamical Field Equations***.<sup>494</sup> Using current mathematical expressions, this seminal work corrects 22 fundamental errors contained in the current formulation of electrodynamical theory by re-incorporating the equivalents of the original quaternion expressions, which describe the landscape of the scalar potentials which operate in the physical vacuum.

**The Sea of Scalar Potential**

Here's how this works. In your mind's eye, go back to the seething sea of the physical vacuum. While no linguistic or mathematical expression has yet been developed to suitably describe this "place," we can nevertheless employ a metaphor which is instructive. The torrent which represents this conceptual place flows as an infinite sea of undifferentiated potential, operating in all-where/all-time without dimension, polarity or duality. This is in every sense a sea of potential, where anything and everything is possible. The rules which operate here to cause physicality to arise from undifferentiated information are the same rules which operate at every scale in the Cosmos, which have been described in elegant simplicity by Ilya Prigogine, Isabell Stengers<sup>495</sup> and Per Bak<sup>496</sup>.

If we can imagine the materialization of physical reality as a sheet of ice which forms from the sea, covering it entirely and masking the sea's underlying attributes, we begin to approximate in a linguistic sense what the Lorentz transforms did to the original Maxwellian quaternion expressions. After all, what mathematics does is describe a conceptual landscape – the robust vitality expressed by the quaternions was simply covered over and substantially leveled by the application of Lorentz's derivative transforms.

*The Stuff Descartes Left Out*

---

Today, all that conventional science concerns itself with is its examination of the “ice” which covers the underlying sea of potential. Indeed, the very notion that there is a sea of potential which flows beneath the gross rigidity of the material world is so unnerving that physicists of the conventional stripe have risen up in outraged indignation at the very suggestion of it. This is precisely what Galileo and Copernicus encountered in their day. While science may have progressed to relatively profound insights, human nature and our resistance to change apparently have not.

**The Myth of Primary Field Forces**

What the Lorentz transforms describe, interestingly enough, is a range of attributes which characterize four linear, sequential field forces. Today, physicists who rely on the Standard Model subscribe to a mathematical description of a physical landscape which is erroneously considered by its very nature to be primary. Gravity is described as a primary field force characterized by waveforms with vector velocities which are longitudinal, whose field strength varies inversely with the square of the distance between physical bodies, and whose operative mechanisms are not at all clearly understood. No one has yet succeeded in reconciling the attributes of gravitational force with those of any of the other “primary” field forces to create a unified field theory. Science is still looking for the mysterious “graviton” in the same sand box as dark matter.

Likewise, electromagnetic fields have been described in great detail by hundreds of thousands of physicists whose measurements, calculations and experimental evidence tell us that electromagnetic waves operate in circularly polarized patterns with waveforms which are transverse rather than longitudinal. The behavior of such waves is described in terms of weighted waveform vectors, whose velocities and behaviors are calculated with increasing uncertainty as the scales of measurement become increasingly smaller.

What seems to work in the macrocosm does not work at all in the microcosm, at scales smaller than the size of a single atom. This is troubling to theoretical physicists because this failure of consistency suggests that something beyond understanding is really amiss with the fundamental



assumptions which support the model. Notwithstanding a mounting accumulation of disturbing evidence that the Model is fundamentally flawed, great pains are being taken even as we write this book to “tweak” quantum mechanics to accommodate this growing body of anomalous data.

### **Failures of the Standard Model**

At the sub-atomic scale, quantum mechanics and the laws of thermodynamics cease to provide an adequate means of describing or predicting how things ought to work. Until February 2001, physicists seemed to be correct in their assertion that “every single feature of the Standard Model had been confirmed by experimental science.” This assertion was dealt a fatal blow, however, when scientists at FermiLabs and the Brookhaven National Laboratories failed to correctly predict or explain what happened when the fundamental sub-atomic particle known as the muon was subjected to intensive magnetic fields, while traveling at 98% light speed in a linear particle accelerator. The muon did not behave as it was supposed to – in fact, its behavior was so starkly at variance with the predictions based on the standard model, that even the most ardent supporters of the Standard Model have begun to question its validity.

What the supporters of the Standard Model cannot say is that the Standard Model in its current formulation adequately accommodates the huge volume of impeccably documented anomalies which do not conform to its tenets. The list of such things is long and growing longer. What this means for the purposes of this discussion is simply this: we cannot rely on the Standard Model, or any hypothetical derivative which is colored by its shortcomings, to adequately describe how nature works.

To the extent that super string (M) theory relies on the limitations imposed by the Standard Model, the theory must also be considered invalid. What does this mean? It means, among other things, that super string (M) theory's reliance on the notion that there are only four primary field forces and that they are themselves causative, is fundamentally erroneous and essentially self-crippling. Maxwell, Faraday, Whittaker, along with Bearden, Evans and Crowell have

*The Stuff Descartes Left Out*

---

described a topology which is causal and from which all manifestations of physicality emerge as derivatives, according to a set of simple, elegant, clearly understandable rules. These findings need to be incorporated into M Theory before it can become suitably robust as a descriptive tool.

**Complementarity**

The second fatal flaw in super string (M) theory is that it fails to adequately accommodate the principle of complementarity. The single most important, most fundamental overriding governing principle described by Maxwell's quaternion expressions is the role of complementarity – the contemporaneous existence and operation of all aspects of duality at all scales. Indeed, it is because of the operative nature of complementarity that single, undifferentiated data bits combine to form the primary, indivisible sub-atomic particles which exhibit the first polarized attributes of physicality.

The importance of this singular distinction simply cannot be overstated. It means, among other things, that the four linear sequential field forces are not primary at all. Moreover, they are not the only field forces which operate in the Cosmos. Indeed, it is now abundantly clear that complementarity operates universally at all scales, from the interstitial fabric of the physical vacuum to the entirety of the Cosmos itself.

The four primary forces represent the four fundamental differentiations of the linear and sequential scalar potentials which are ignored by the mathematical tensors substituted by the Lorentz transforms. While the linear sequential functions operate at all scales, so too do the non-linear, non-local field forces we have described as torsion fields. Because of this, the Standard Model does not describe and therefore cannot accommodate the effects of time-domain polarization on transverse EM waves, longitudinal gravitational waves or the strong/weak nuclear forces.

The Lorentz transforms altogether eliminate any expression of the dynamic mechanisms by which real and virtual photons exert both energy and time excitation on mass. Neither does the Standard Model recognize the operation of a non-linear, non-local field effect at all scales. And this is precisely why

modern science cannot produce a mathematical expression which describes the way Mind operates in the time domain and couples with physicality in Minkowski 4-space to constitute living organisms. This is so fundamental that I believe it constitutes one of the most important unresolved breakthroughs in all of science.

When we attempt to describe how the Cosmos works with a model which is so severely crippled that it cannot accommodate either the operations of Mind in the time domain nor the functions of non-linear, non-local field effects at any scale, there is no likelihood that we will be able to develop a model of creation which is cogent or predictive in any meaningful respect.

### **Superluminal Velocities**

The third major shortcoming of super string (M) theory is that it relies on the discredited notion that  $C$ , the speed of light, is the upper limit at which data can be transported through physical space. This assumption is now invalidated by the work of Gisin at CERN, Nimtz at Cologne University and Wang at Princeton University. As a practical matter of fact, Soviet scientists realized the error of this notion more than 30 years ago. Scientists in the former Soviet states have inherited a culturally unique version of their own Standard Model which is not bound by this incorrect notion. Why is this fundamental distinction important?

In order to describe a Cosmos in which information can be transported instantaneously over infinite distances, which is also bound by the limitations imposed by the speed of light, super string theorists have been forced to resort to a clever ruse to avoid confronting this dragon directly. The current model relies on an artificially contrived multi-dimensional dynamic which communicates information over finite distances in spite of an upper limit equal to the velocity of light.

Because it is clear that some mechanism not understood by physicists and not accommodated by the standard model supports non-local, instantaneous effects at a distance, under certain experimentally verified circumstances, the mathematical expressions used to support the theory have been modified to

*The Stuff Descartes Left Out*

---

describe ten contiguous, overlapping dimensions, which all operate simultaneously in the same time-space coordinates [referred to as Lagrangians in Hilbert Space]. This results in the creation of a model which is so cumbersome that it simply cannot be applied to anything practical.

What doesn't work about super string (M) theory in its current expression is that it irrationally seeks to defend a set of principles which are not consistent with observed phenomena, at the expense of clarity and reason.

However, when the theory is corrected by operationalizing the Langrangian time-space points in terms of non-local, non-linear, holographic field effects – which is precisely what the torsion field is believed to provide – the ten dimensions infolded in M Theory's arcane equations suddenly become reduced to four. These are the four dimensions we have been describing all along. What results is our discovery that physicality in three dimensions and the time domain (operating as a distinct dimension with significant energy density) are all that is needed to accommodate our model, if it is not crippled by a self inflicted conceptual myopia.

The new model, the one we are developing here, describes a set of processes which operate in concert with the principles of complementarity and in accordance with the dynamics of the scalar potentials which produce the five field forces. It incorporates the operations of Mind as a function of consciousness, which operates in the time domain, in compliance with Maxwell's quaternions. And it incorporates the simple, elegant expressions developed by Prigogine, Stengers and Bak to describe how the undifferentiated causal plane of information, which we have called Consciousness, operates to create a physical universe which is both self-organizing and catastrophically chaotic at the same time. These are the mechanisms which create Bohm's Implicate Order and support Sheldrake's morphogenetic fields.

**The Vedas - Issues of Coherence and Harmonic Resonance**

There is another model which describes the creation and evolution of the physical world which is worthy of our attention. It is perhaps the most important work of disciplined introspection ever created. This model arose out

*The Seething Sea of Infinite Potential*

---

of the metaphysical traditions of the ancient Hindu cultures of the East, dating back more than 5,500 hundred years. This work is known collectively as the Vedas. According to the construction of this ancient book of verses, the causal plane of consciousness operates without form or differentiation, expressing itself as harmonically resonating tones in a vast sea of absolute silence.

According to recent translations of the Rk Veda, consciousness and the processes of creation and annihilation are inextricably related at an initial point which is defined as a singularity - a single waveform - a sound - which contains by definition an infinite realm of all possibilities. The Vedas hold that this singularity is archetypal by nature, demonstrating no polarity, duality or other manifestations of a convergent relationship in time/space.

The singularity is further defined as a sound which arises into being from a causal plane comprised of all possibilities, a sea of infinite potential existing in absolute silence. Each emergent singularity or tone resonates independently until it marries with another to create a perfectly matched pair. The resultant pair resonates in perfect harmony as a single point of duality with infinitely infolded potential. The combination of two harmonically resonating tones contains all elements of the material world in a primary prototype - a beginning, a gap of separation between beginning and ending, and a sound of completion.

The organization of the harmonic resonances represented by the structure of the Vedas occurs at the hadronic [sub-atomic] equivalent scale, which is referred to as the "gap." This is the interval between the dynamic and silent operators which correspond to the descriptions of synchrony and asynchrony found in the Lagrangian computations of super string theory. As matched pairs of "sound" find harmonic resonance with other pairs, combinations of harmonic resonances aggregate via a series of carefully defined levels of increasing complexity, which comport with the rules defined by quantum and hadronic mechanics, as formulated by the Myron Evans group and Santilli.

A compelling coherence between super string theory and the structure of the Vedas has been described by J. Hagelin<sup>497</sup>. The ten (10) dimensions defined in super string theory are equivalent to the ten (10) Mandalas contained in the

*The Stuff Descartes Left Out*

---

totality of the Vedas. The eight (8) field operators of super string theory comport nicely with eight (8) Parushas, which are defined as alternating dynamic and silent states. Each Parusha is characterized by three (3) discrete components. These elements, which compare with the three (3) dimensional axes defined in super string theory, are referred to in the Vedas as the Viewer, the Process of viewing and That which is observed. This is precisely the dynamic which operates between consciousness and the fundamental, primary particles [electrons and photons] which have been experimentally validated by the ground breaking work of Aspect and Wheeler.

According to the model represented by the structure of the Vedas, the processes of self-organizing creation and chaotic annihilation occur at all times and places without regard to time or distance. At this point, we must ask a fundamental question:

*“How is it that super string theory, the most sophisticated predictive model ever developed by modern science, describes the processes of creation in terms which are fundamentally consistent with those embodied in the construction of the Vedas? How is it that the privileged mathematical expressions used to articulate super string theory describe the same processes of creation and annihilation as the poetic verses of an ancient Hindu poem?” How and why this has occurred constitutes the basis for our new model.*

**Infinitely Infolded Order**

The quaternion expressions originally employed by Maxwell described the physical vacuum as a seething sea of infinite potential. The scalar potentials described by E.T. Whittaker, which were taken directly from Maxwell’s field equations, embody the causative mechanism which provides for infinitely infolded order at the primary scale. Using Whittaker’s work as a baseline, Bohm<sup>498</sup> described an implicate order of wholeness in terms he called “holo-movement,” a mechanism by which infinitely infolded order operates non-locally in all-time all-where.

*The Seething Sea of Infinite Potential*

---

In an act of magnificent intuition, Benoit Mandelbrot<sup>499</sup> discovered and described the physical, linear-sequential component of Bohm's holographic function, which he called "fractal geometry." At the physical level, fractal expressions constitute the record of evolution of every self-organizing, complex, open system. Fractal geometry has been shown to operate at all scales in the Cosmos.

The complementary non-local and non-linear counterpart of fractal expressions is the hologram, which is the mechanism by which nature infinitely enfolds information so that all information embodied at any scale of a system can be accessed at every scale, regardless of the time or distance which separates the locale of origination from the point of access. It has been conclusively shown that the Cosmos is holographic at all scales.

From the scalar potentials defined by Maxwell and Whittaker arise the linear, local field effects – gravity, electromagnetics and the strong and weak nuclear forces. These field effects operate in Minkowski 4-space, along the x, y and z axes, with local interactions measured as functions of increments of time. Non-local/non-linear field effects operate contemporaneously via torsion fields, which operate holographically throughout the Cosmos without regard to time or distance. The torsion field effect serves to couple Minkowski 4-space with the time domain itself. Physicality described in terms of mass is both time-excited and energetically excited at the primary level by the real and virtual photons which comprise it.

Mind operates in the time domain and couples with physicality by resonating harmonically within the fabric of material substance as a function of the time-domain polarization of transverse electromagnetic field effects operating at the primary level. The constants by which Mind couples with physicality are known and have been experimentally verified and reproduced.

And by this set of mechanisms, dynamics and primary causes, Consciousness produces physicality [as one complementary, linear/local, polar aspect of reality-as-it-is] and couples it with Mind [which is the complementary non-local/non-linear, self-referent aspect of reality-as-it-is] to create a Universe

***The Stuff Descartes Left Out***

---

which expresses self-organizing creation and catastrophic annihilation in an astonishing panorama of infinite variety. In the Vedas, this process of continual creation and annihilation is referred to as the Dance of Shiva. It is this dance which Capra witnessed before he wrote ***The Tao of Physics***.

What we find in this combination of concepts is an astonishingly beautiful engine, so elegant in its simplicity and so powerful in its effects as to be utterly breathtaking. What is exciting about the new model is its capacity to accommodate the anomalies which are incompatible with the Standard Model. By its use we are able to describe how such things as transpersonal communication, non-local effects at a distance, micro-psi, remote viewing, morphogenetic fields and telekinesis [among others] actually operate. More importantly, the new model provides us with a conceptual framework for engineering applications, technologies and processes by which quantum healing, instantaneous “learning,” over-unity energy systems and consciousness-based information can be accessed and achieved.

**Conclusions**

There is one more element to be evaluated before we can bring the model to closure. We have demonstrated that consciousness operates at the fundament of the Cosmos as an infinite field of undifferentiated information. The means by which Consciousness demonstrates its self-referent nature and couples with physicality has also been shown. A number of the functions of Mind, operating in conjunction with physicality, have been discussed, including a number of the elements of transpersonal communication, remote viewing, near death experiences and so on. One question remains to be answered:

*"Can consciousness be deliberately harnessed to access information from the causal plane which is outside the domain of individual memory and personal experience?"*

If it can, and if we can understand how the mechanisms associated with those functions operate, we will have brought the design of our model to closure.



**SECTION TWO**  
***The Stuff Descartes Left Out***

**CHAPTER ELEVEN**  
***The Timeless Nature of Mind***

When Alain Aspect and his team demonstrated the inextricable connection between Mind and matter, many of us expected that this revelation would compel scientists as a community and Science as an institution to fundamentally alter the way they look at the world. To our great dismay but to no one's surprise, the shift in perception occasioned by this and other equally compelling discoveries has not yet occurred. Scientists as a community have not yet come to grips with the fundamental verity that matter is by its very nature *information*, operating as a manifestation of a causal plane consisting of infinite, undifferentiated potential. We have chosen to call this underlying plane of undifferentiated, self-referential information Consciousness.

**The Real Question**

We began by asking the question,

*“Where does one go to obtain valid information about how nature works when the functions of Consciousness can no longer be disregarded as fundamental to the process of inquiry?”*

At all scales, the choices of the observer and the means of observation exert a direct, measurable influence on the behavior of that which is being observed. What this means for science is unequivocal. No investigation into the nature of the Cosmos can be considered complete without taking this fundamental aspect of nature into account. Descartes got it wrong – consciousness cannot be separated from matter in any meaningful sense.

*The Stuff Descartes Left Out*

Are the effects we are describing negligible? Supporters of the Standard Model insist that the effects of consciousness on experimental processes are not only negligible but are irrelevant. In the face of the mounting evidence which suggests otherwise, hard core scientists can no longer be so cavalier in their dismissal of the role or importance of consciousness on the effects of observation on any research protocols. In the softer sciences, the line which separates the choices of the observer from the means of observation and the behavior of that which is being observed is even less distinct.

Can Mind be deliberately induced to seek out, find and access information contained in the causal plane, retrieve it, recall it and convey it to others? And can this be done in a way which allows the information thus retrieved to be independently and empirically verified?

We have only to look at the extraordinary work of Dr. Brian Weiss to discover how the processes of the Mind can be decoupled from our physicality to explore the timeless realm of consciousness.

**Past Life Regression**

Like so many other pioneers whose work is fundamentally altering the way we conduct research, Dr. Brian Weiss is a scientist's scientist. He was graduated magna cum laude, Phi Beta Kappa, from Columbia University. He received his M.D. degree from the Yale University School of Medicine where he was also chief resident in psychiatry. He has been a professor at several prestigious university medical schools and has published more than 40 scientific papers in the fields of psychopharmacology, brain chemistry, sleep disorders, depression, anxiety states, substance abuse disorders and Alzheimer's Disease.

He contributed to the book, **The Biology of Cholinergic Function**, which though hardly a best seller helped some of his more insomniac patients fall asleep more easily. By his own account, Brian is a left-brained, obsessive-compulsive skeptic, particularly with respect to any of the "unscientific" fields of investigation such as parapsychology. Before he began to treat a patient he

*The Timeless Nature of Mind*

refers to as Catherine, he knew nothing about and had absolutely no interest in the use of hypnosis to induce past life regression.

Dr. Weiss' first book, **Many Lives, Many Masters**<sup>500</sup> has become a watershed in the field of psychiatry. Indeed, many of the findings disclosed in the book are so disturbing that Brian forestalled publishing it for more than four years. Nevertheless, as a scientist of the first order, in spite of his fear that the publication of the book could result in professional suicide, it eventually became apparent that his findings simply had to be reported. Fortunately, instead of being professionally ostracized for reporting the extraordinary things which occurred during his treatment of Catherine, Dr. Weiss' work has become the de facto standard for an entirely new field of psychiatry.

What happened to him and Catherine over the short period of time he treated her is essential to the construction of our new model. It illustrates, as do thousands of other carefully documented reports which followed the publication of his book, that Mind can be induced, focused, guided, conditioned and directed to deliberately access information in a way which has not been documented in our era. And it is precisely this set of tools which holds the key to the architecture of our new methodology. If you have not read Dr. Weiss' books, I highly recommend them<sup>501</sup>.

Here is what happened. Beginning in 1982, while Dr. Weiss was practicing psychiatry at Mount Sinai Medical Center in Miami Beach, Florida, a young radiology technician whom he refers to as Catherine, came to him for treatment. The story is best told in his own words.

*Catherine was a patient who was referred to me about a year after I had become Chairman of the Department of Psychiatry at Mount Sinai Medical Center in Miami Beach, Florida. In her late twenties, a Catholic woman from New England, Catherine was quite comfortable with her religion, not questioning this part of her life. She was suffering from fears, phobias, paralyzing panic attacks, depression, and recurrent nightmares. Her symptoms had been lifelong and were now worsening.*

***The Stuff Descartes Left Out***

*After more than a year of conventional psychotherapy, she remained severely impaired. I felt she should have been more improved at the end of that time span. A hospital laboratory technician, she had the intelligence and insight to benefit from therapy. There was nothing in her basic makeup to suggest that her case would be a difficult one. Indeed, her background suggested a good prognosis. Since Catherine had a chronic fear of gagging and choking, she refused all medications, so I could not use antidepressants or tranquilizers, drugs I was trained to use to treat symptoms like hers. Her refusal turned out to be a blessing in disguise, although I did not know it at that time.*

*Finally, Catherine consented to try hypnosis, a form of focused concentration, to remember back to her childhood and attempt to find the repressed or forgotten traumas that I felt must be causing her current symptoms.*

*Catherine was able to enter into a deep hypnotic trance state, and she began to remember events that she consciously had been unable to recall. She remembered being pushed from a diving board and choking while in the water. She also recalled being frightened by the gas mask placed on her face in the dentist's office, and, worst of all, she remembered being fondled by her alcoholic father when she was three years old, his huge hand held over her mouth to keep her quiet. I was certain that now we had the answers. I was equally certain that she would now get better.*

*But her symptoms remained severe. I was very surprised. I had expected more of a response. As I pondered this stalemate, I concluded that there must be more traumas still buried in her subconscious. If her father had fondled her when she was three, perhaps he had done this at an even earlier age. We should try again.*

*The Timeless Nature of Mind*

*The next week I once again hypnotized Catherine to a deep level. But this time, I inadvertently gave her an open-ended non-directive instruction.*

*“Go back to the time from which your symptoms arise,” I suggested.*

*I had expected Catherine to return once again to her early childhood.*

*Instead, she flipped back about four thousand years into an ancient near-Eastern lifetime, one in which she had a different face and body, different hair, a different name. She remembered details of topography, clothes, and everyday items from that time. She recalled events in that lifetime until ultimately she drowned in a flood or a tidal wave, as her baby was torn from her arms by the force of the water. As Catherine died, she floated above her body, replicating the near death experience work of Dr. Elisabeth Kubler-Ross, Dr. Raymond Moody, Dr. Kenneth Ring, and others. Yet she had never heard of these people or their work.*

*During this hypnosis session, Catherine remembered two other lifetimes. In one, she was a Spanish prostitute in the 18<sup>th</sup> century, and in another, a Greek woman who had lived a few hundred years after the near-Eastern lifetime.*

*I was shocked and skeptical. I had hypnotized hundreds of patients over the years, but this had never happened before. I had come to know Catherine well over the course of more than a year of intensive psychotherapy. I knew that she was not psychotic, did not hallucinate, did not have multiple personalities, was not particularly suggestible, and did not abuse drugs or alcohol. I concluded that her “memories” must have consisted of fantasy or dreamlike material.*

***The Stuff Descartes Left Out***

*But something very unusual happened. Catherine's symptoms began to improve dramatically, and I knew that fantasy or dreamlike material would not lead to such a fast and complete clinical cure. Week by week, this patient's formerly intractable symptoms disappeared as under hypnosis she remembered more past lives. Within a few months she was totally cured, without the use of any medicines.*

*My considerable skepticism was gradually eroding. During the fourth or fifth hypnosis session something even stranger transpired. After reliving a death in an ancient lifetime, Catherine floated above her body and was drawn to the familiar spiritual light she always encountered in the in-between lifetimes state.*

*"They tell me there are many gods, for God is in each of us," she told me in a husky voice. And then she completely changed the rest of my life.*

What happened next was a pivotal event which fundamentally altered Dr. Weiss' view of himself, his relationship to his patients and his reason for being on the planet.

*Your father is here, and your son, who is a small child. Your father says you will know him because his name is Avrom, and your daughter is named after him. Also, his death was due to his heart. Your son's heart was also important, for it was backward, like a chicken's. He made a great sacrifice for you out of his love. His soul is very advanced...his death satisfied his parent's debts. Also, he wanted to show you that medicine could only go so far, that its scope is very limited.*

*Catherine stopped speaking, and I sat in awed silence as my numbed mind tried to sort things out. The room felt icy cold.<sup>502</sup>*

*Here in 1982 in my quiet, darkened office, a deafening cascade of hidden, secret truths was pouring upon me. I was swimming in a*

*The Timeless Nature of Mind*

*spiritual sea, and I loved the water. My arms were gooseflesh. Catherine could not possibly know this information. There was no place even to look it up. My father's Hebrew name, that I had a son who died in infancy from a one-in-ten-million heart defect, my brooding about medicine, my father's death, and my daughter's naming – it was too much, too specific, too true. This unsophisticated laboratory technician was acting as a conduit for transcendental knowledge. And if she could reveal these truths, what else was there? I needed to know more.*<sup>503</sup>

*After the shock subsided, I returned to the behavior of an obsessive-compulsive, scientifically trained psychiatrist. I scoured the libraries and bookstores for even more information. I found some excellent work, such as Dr. Ian Stevenson's research with young children who have demonstrated reincarnation-type memories<sup>504</sup>. I also found a few published studies of clinicians who had used past life regression, which is the use of hypnosis and other related techniques that allow the patient's subconscious mind to go back in time to retrieve memories from prior lifetimes. I now know that many more clinicians are afraid to go public, fearing the reactions, worrying about their careers and reputations.*

*Catherine, whose story is described in complete detail in *Many Lives Many Masters*, traversed a dozen of her lifetimes, and she was cured. She continues to lead a happier, more joyful life, freed from her paralyzing symptoms and from her pervasive fear of death. She knows that a part of her containing her memory and personality and yet possessing a far greater perspective than her conscious mind will survive her physical death.*

*After my experience with Catherine, my perspective on psychotherapy began to change radically. I realized that past life therapy offered a rapid method of treating psychiatric symptoms, symptoms that had previously taken many months or years of*

***The Stuff Descartes Left Out***

*costly therapy to alleviate. Here was a much more direct way to heal pain and fear. I began using this therapy on other patients and again had excellent results. At the time of this writing, I have regressed hundreds of patients to past lives during their individual therapy sessions. I have regressed many times that number in group workshops.*

*Perhaps even more important than the curing of specific physical and emotional symptoms is the knowledge that we do not die when our bodies do. We are immortal. We do survive physical death.<sup>505</sup>*

**Timeless, Holographic Nature of Mind**

The phenomenon of past life regression illustrated by this account has been validated by several thousand carefully documented cases. What this process suggests about the nature of Mind and the way it can be focused to holographically access information is compelling. We have looked at the phenomenon of remote viewing and the ability of Mind in a focused state to seek out and non-locally retrieve information from a remote site in the physical dimension [Minkowski 4-space], irrespective of the locality of the physical body.

We have evaluated the phenomenon called the Near Death Experience in terms of the ability of Mind, as distinct from the localized physical functions of the Sylvian Fissure of the occipital lobe, to access, retrieve, apprehend, identify, process, remember and utilize information which can only be described as time-domain polarized and holographic. The problem with harnessing the NDE is that the process is not voluntary - we can hardly justify inducing death to facilitate a casual research project, although some researchers have not been restrained by such moral scruples.

In the work of Dr. Weiss and his colleagues, we find a global repository of information which can be accessed by the deliberate, voluntary use of hypnosis to access information from past lives and information not included in the memory of a past life, but which is nevertheless independently verifiable in the most intimate regards. One goal of hypnosis, as well as meditation, is to access



*The Timeless Nature of Mind*

the subconscious. This is the part of our mind that lies beneath ordinary consciousness, beneath the constant bombardment of thoughts, feelings, outside stimuli, and other assaults on our awareness. The subconscious mind functions at a level deeper than our usual level of awareness. In the subconscious mind, mental processes occur without our conscious perception of them. We experience moments of intuition, wisdom and creativity when these subconscious processes flash into our conscious awareness.

The subconscious is not limited by our imposed boundaries of logic, space and time. It can remember and know everything, from any time. It can transmit creative solutions to our problems. It can transcend the ordinary to touch upon a wisdom far beyond our everyday capabilities. Hypnosis accesses the wisdom of the subconscious mind in a focused way in order to achieve healing.<sup>506</sup>

**Endless Cycles**

The Tibetan Book of Living and Dying<sup>507</sup>, the Egyptian Book of the Dead<sup>508</sup> and the Vedas<sup>509</sup> all describe the same set of universal processes, steps, phenomena and functional dynamics related to death, dying, reincarnation and the in-between states which separate one lifetime from another, which are characterized in the scientific research data we have evaluated. Equipped with this information, it appears that we can access information of almost every imaginable variety, using a properly engineered integration to harness the attributes of Mind to support scientific and experiential research protocols.

Using the coupling constants developed by Lisitsyn<sup>510</sup>, Kaznacheev<sup>511</sup>, Akimov<sup>512</sup> as described by Tom Bearden, who describes in the most precise terms how Mind couples with physicality to perform all the functions of intelligence described by Howard W. Gardner<sup>513</sup> and Ken Wilber<sup>514</sup>, it appears we can harness our technology to deliberately induce altered states of consciousness via which a whole new variety of data can be accessed and retrieved. It is likely that we can substantially accelerate the process of not just learning new skills but of understanding how various aspects of nature operate at any scale<sup>515</sup>. In short, using what we now know about the relationship

*The Stuff Descartes Left Out*

between Consciousness, scalar potentials and the real attributes of complementarity in our physical universe, it is possible to actually engineer reality itself. This is at the same time a wonderful and terrifying realization.

**Engineering Our Reality**

There is one thing leading practitioners of consciousness-based research agree about. The secrets of the Cosmos, those which can only be accessed through the dedicated, disciplined use of Consciousness, are protected from malevolent abuse by a natural safety valve. Dale Graff, who served for nearly 20 years as the director of the US government's remote viewing programs for the military, writes in the introduction to his book "**River Dreams**,"<sup>516</sup> that no one who engages in the continued, deliberate use of consciousness to access information can fail to be fundamentally altered by the practice. Graff's insight is explicitly echoed by the work of Brian Weiss, Raymond Moody, Kenneth Ring, Elizabeth Kubler-Ross, Melvin Morse, Ian Stevenson, Francisco Varela, Deepak Chopra and hundreds, perhaps thousands, of others whose life's work has taken them into the realm of consciousness-based research. I have relied extensively on their work to develop the consciousness-based research model described in this book.

Intention, the component of the exercise of will which defines how we plan to use the information we acquire, plays a specific role in the use of consciousness to penetrate the mysteries of the Cosmos. Several discoveries resulting from our research into such things are inescapable. The evidence currently at our disposal suggests that we visit the physical plane repeatedly, incarnating from one lifetime to the next as an inevitable, intrinsic aspect of our eternal personal development.

The responsibility we bear for the consequences of our choices follows us from lifetime to lifetime, coloring our experience and impacting our relationships until we finally learn the lessons occasioned by the eternal developmental processes associated with life. Revisiting traumatic experiences which occurred in past lives has been shown to dramatically ameliorate current illness, dysfunction and disease.

*The Timeless Nature of Mind*

This fundamental aspect of life and Being imposes a perspective on our experience which is as inescapable as physical death. As Per Bak, Fritjof Capra, David Bohm and Rupert Sheldrake have shown, we are inextricably tied to everything in our experience; indeed, if our understanding about such things is to be relied on, neither our individual essence nor the fields which comprise our species, nor anything about who and what we are, can be detached in any meaningful sense from the Cosmos.

**A New Set of Notions**

My notion about how this works is based on my understanding of the underlying principles which comprise the model we have been building. The causal plane of consciousness has been shown to be self-referent at all scales.<sup>517</sup> It is also fractal/holographic in its evolution<sup>518</sup>. What this suggests about the nature of Soul and our interrelatedness with each other, as a species (a fractally defined group of increasing complexity and variety) and as similar but distinct individuals within the species, is consistent with the behavior of open, complex systems which organize themselves to a point of criticality. Fractal systems are not just imaginary, theoretical systems of self-referent equations. They are as real and dynamic as life itself. In fact, fractals are the local, linear record of the evolution of complex, self-organizing physical systems across the eons of time.

If we understand anything at all about the attributes of self organizing systems – and the evolution of the Cosmos certainly epitomizes such a phenomenon – it is perfectly consistent to suggest that Consciousness manifests itself in this and other dimensions according to the same set of rules which produce fractal geometries in nature. Indeed, as we have seen, nature **is** a manifestation of fractal geometries at every scale.

**Individual Soul - The Ultimate Fractal Expression**

In the same way, it is reasonable and consistent to suggest that Consciousness is constantly evolving as a manifestation of the ultimate fractal expression. In this sense, Consciousness itself can be considered the master,

*The Stuff Descartes Left Out*

self-referent formula. This notion is perfectly congruent with every other physical aspect of the Cosmos. It explains what we observe about the evolution of species and the individuation which occurs between members of every species.

This corresponds with what we have predicted about phenomena such as punctuated equilibrium and the power laws which characterize creation and “avalanche” events. It supports our notions about transpersonal communication, morphic fields, remote viewing, near death experiences and past life regression. It suggests, above all, that the individuation of our personal identity, which functions in the time domain and couples with physicality during our repeated lifetimes, in this and perhaps other dimensions, is as eternal and immortal as Consciousness itself.<sup>519</sup>

As an intellectual proposition, this insight has thus far failed to motivate humans to significantly alter our attitudes about the planet and each other. But when our individual consciousness experiences direct contact with the causal plane, in an ineffable merging with the One, we are fundamentally and permanently altered. The literature which reports such experiences is utterly consistent in this regard. During the development of this manuscript, I have repeatedly been allowed to access information at this level. Each time I have experienced the kind of global “knowing” which occurs in this altered state of consciousness, my view of life has been fundamentally altered.

Misuse of the information which is obtained or accessed during such an experience is not prohibited in any deterministic sense. Rather, the realization that we are eternal by nature, that physical death is nothing more than a transition from one state of being to another, that we are responsible for taking care of each other and our mother Earth because we are all inextricably related to one another, is more than sufficient to compel us to act prudently and responsibly.

The realization that our real purpose for living and being is to learn the secrets of the Universe and help each other evolve, from lifetime to lifetime

*The Timeless Nature of Mind*

throughout the eons, should be sufficient to compel us to cease being suicidal and move in other, more enlightened directions.

**The Final Question**

Can we harness what we know to accelerate the process and remediate the damage we have inflicted on the planet and each other? Can we step away from proscriptive practices which enslave us, disempower us and separate us from our true nature? Perhaps. We have the technology. We are developing the methodology to employ what we know. We certainly have sufficient reason to use it. What remains to be seen is whether or not we have the will to do so.

## **APPENDIX ONE**

### ***Disciplined Metaphysical Practice:***

#### **East Meets West**

The notion that Eastern metaphysical practices can be coupled with the concepts and experimental rigors of Western science is a relatively new idea. A review of the literature suggests that as early as the mid-19<sup>th</sup> century, scientific investigators in the West were actively engaged in extensive research and experimentation in this regard.

In the early 20<sup>th</sup> century, Leadbeter and Besant [for example] made a concerted and impeccably documented effort to marry the rigorous metaphysical disciplines taught by J. Krishnamurti with scientific research into the nature of the atom and its constituents. Their work is thoroughly documented<sup>520</sup> and can be reviewed by any interested researcher. We have already reviewed the work of Dr. Stephen Phillips, who successfully reconciled their findings with the results produced by Nobel Laureate Murray Gell-Mann and his colleagues at FermiLabs.<sup>521</sup> In more recent times, Fritjof Capra,<sup>522</sup> Gary Zukav,<sup>523</sup> Timothy Leary,<sup>524</sup> Ram Dass,<sup>525</sup> Brugh Joy,<sup>526</sup> Ken Wilber<sup>527</sup> and others have written extensively regarding their discoveries of the links between science (as it is practiced in the West) and the mystical traditions of the East.

As we have wound our way through this journey of discovery, we have also examined a variety of other concerted attempts in more recent decades to systematically evaluate the mechanisms by which the Mind can be harnessed to exert non-local effects on our own biology, other persons, objects or systems at a distance.<sup>528</sup> The list of research efforts currently underway in this area continues to grow at a prodigious rate and makes fascinating reading.

In addition, largely as a result of the growth of the World Wide Web and the Internet, our ability to penetrate and track ongoing research has been significantly enhanced. With a nominal amount of effort, a telephone connection and some basic computer equipment, anyone can harness a search engine to conduct preliminary research into any of the exceedingly interesting consciousness-based projects currently underway all around the globe. Because

of the Internet, it is now possible for the first time in history to actively share and digest such information in virtually real time. As with all such tools which arise from open, complex, self-organizing systems in the form of linguistic expression, the Internet provides a great volume of information which is both cogent and coherent. Unfortunately, it is also often necessary to wade through terabytes of irrelevant and misleading information to find a few nuggets of genuine value. Mining the Web for reliable information has become a highly valued skill set in its own right.

### **Meditative Practices**

Meditative practices have evolved over the centuries as mankind has attempted to transcend the limitations of physicality to access information at the Source. While the forms of meditative practice are as varied as the cultures which spawned them, we find a number of salient elements common to all of them.

Journalist Bill Moyers worked with scholar of antiquities Joseph Campbell to create a documentary series entitled “The Masks of the Gods.”<sup>529</sup> In that series and the books, monographs and lectures which followed, Moyers and Campbell revealed profound insights into the practice and evolution of metaphysical arts over the centuries. This body of work was unique in its time. It resulted in the emergence of a whole new generation of academic inquiry. Today, 25 years later, we are the grateful beneficiaries of their scholarship, dedication and genius.

The use of metaphysical practices to gain access to scientific information is a rare occurrence. Indeed, it is of more than passing interest to note that the genesis of the word “science” is to be found in the original root word “séance,” which is the ancient practice of working through psychically gifted mediums to engage in conversations with those who have died. While the validity of the practice itself certainly remains open to legitimate scientific investigation, it is no accident that those who seek to uncover the mysteries of the Cosmos should be denominated in terms of the original means of investigation. The practice is

almost as ancient as civilization itself, dating back at least to the time of the Greeks and the Delphic oracles.

As a result of the work of Campbell and other investigators, such as Dean Radin, Stan Grof, Joseph Chilton Pierce, Rupert Sheldrake, Howard W. Gardner, Timothy Ferris, Russell Targ, Jeremy Campbell and others, it is probably fair to suggest that the ability to deliberately engage in metaphysical practices is a talent which is latent in the entire human gene pool, distributed throughout the general population in the same degree as all other natural human talents. If this notion is consistent with what we think we understand about such things, it follows that in the same way virtually anyone can be expected to have a latent capacity for music, mathematics, art, language, rote memory, athletics, and so on, any person of average intelligence should be able to develop a functional proficiency in the metaphysical arts.

### **The Role of Conditioning**

If we have learned anything about the human condition, it is that our physicality yields to conditioning. We have discovered that diligent, focused practice often produces genius even when the latent aptitude for a certain kind of talent is nominal. You don't have to be Wolfgang Mozart to play, compose or appreciate beautiful music and you don't have to be Richard Feynman to develop a usable mastery of mathematics. In the same way, it is not necessary to become a monk, priest or avatar in order to develop a useful proficiency in the metaphysical arts. The capacity to perform metaphysical arts at an acceptable, useful, functional level is a reasonable expectation for nearly everyone. Some of us, of course, find that we are more or less equipped to become functionally proficient at one or more metaphysical disciplines, while others will discover (if they have not already) that they either possess uncommon natural abilities or are functionally "tone deaf" as it were.

### **Who Can Do It?**

The question of the extent to which a normal, ordinary, average person from any segment of the general population can employ metaphysical disciplines to



investigate and understand the mysteries of the Cosmos is the key issue. With training and dedication, virtually anyone can become functionally proficient at some basic level. However, the real issue is the extent to which we will allow ourselves and each other to use this natural set of talents to develop a cogent set of skills. This is not a question of whether the disciplined practice of metaphysical practices can realistically be coupled with a rigorous experimental process to produce results which are valid, repeatable, and verifiable. There is no question that this marriage of methodologies is possible, in the most practical sense of the word. We already have hard, verifiable, repeatable evidence to demonstrate this point.

Instead, because of the extent to which enculturation proscribes the individual use of such basic talents, the real challenge is to develop a methodology which is not related to or regulated by religious or cultural predilections. No one suggests that this is a simple matter. It is not simple at all because the deliberate practice of metaphysical arts often flies in the face of many deeply entrenched cultural and religious beliefs. However, if we can step past our prejudices to view the disciplined practice of metaphysical arts as a straightforward exercise akin to learning to play the piano, there is no technological or practical reason why we cannot fundamentally enhance the way we investigate the mysteries of the Cosmos, somewhere beyond the edge of current understanding. What does this new breed of metaphysical practice look like? At its most basic stages, it involves precisely the same development cycle as the facilitation of every other human talent.

**Basic Aptitude Testing:**

First, the level of basic, latent aptitude needs to be ascertained by some reasonable, practical, equitable method. How this is to be done is problematical. Laboratory protocols currently in use to examine, analyze and evaluate primitive levels of undeveloped talent for music are substantially different than those used to determine a latent aptitude for psychic applications. This matter is further complicated by the fact that in our culture, an aptitude for musical skills is socially valued and supported. An aptitude for psychic skills is neither

socially valued nor supported, at least in North America. The Salem witch trials are still very much a part of our cultural psyche.

Among other things, this means that in order to develop effective, efficient testing protocols, we are faced with the collective challenge of putting our prejudices regarding metaphysical practices aside and replacing them with an enlightened, equitable, rational system of testing and evaluation. This is not an easy thing to accomplish. To understand how rigidly our cultural values are reinforced by the methods we use to measure intelligence, for example, all we have to do is examine the territorial imperative which continues to mandate the continued use of the Stanford-Binet I.Q. tests to determine intelligence, even though it is patently clear that the Stanford-Binet method is fundamentally flawed.<sup>530</sup> It continues to be universally used because the industry which has grown up around its application now exercises significant political and economic control over the publicly supported, governmentally funded educational system we currently rely on.<sup>531</sup>

It makes little or no sense to apply indexes which measure a capacity for rote memory [which is precisely and only what the Stanford-Binet test pretends to measure] to determine a person's capacity for music, art, athletics, languages, mathematics (or any other of the twelve basic human talents H. Gardner has identified.)<sup>532</sup> Nevertheless, we still persist in our universal use of this seriously flawed tool. In the same way, so long as the native capacity to engage in metaphysical practices is socially proscribed and stigmatized, there is little likelihood that the tremendous latent capacity for metaphysical proficiency extant in the general population will emerge into any kind of general practice. Instead, what we can expect to perpetuate is the evolution of a seriously flawed and fundamentally deficient system of education, particularly as regards the enlightened pursuit of scientific investigation. The legacy of Descartes' turf deal still haunts us today.

Most laboratory experiments designed to test for psychic abilities are substantially prejudiced against finding any aptitude at all.<sup>533</sup> Protocols currently in general use are deliberately designed to produce boredom, fatigue and exhaustion. If the tests for psychic ability were designed to encourage

performance and facilitate the development of psychic skill sets, in the same way we test and encourage the development of latent aptitudes in music, it is likely the results of our tests would be fundamentally different than those reported in the literature. There are a number of examples of the extent to which the methodology currently employed to conduct such investigations is biased by design.<sup>534</sup>

### **Methodology:**

Before one can teach music effectively, a methodology must be developed and adapted, tested and validated with repeated trials [and errors]. So it is with teaching people how to engage in the disciplined practices associated with metaphysics. In the case of metaphysical practices, we have access to a wealth of information from which to develop our methodology. Much of the methodology which has been shown to be effective is the result of thousands of years of evolutionary development and maturity. Again, the challenge is to separate methodology from dogma and ritual. Joseph Campbell's superlative work provides a splendid road map for the development of a non-dogmatic, truly inductive methodology to support the development of skill sets and metaphysical disciplines.

In the current era, we find an increasing number of privately funded programs whose sole purpose is to teach metaphysical arts to anyone who is willing to develop the disciplines involved. The list includes but is certainly not limited to The Monroe Institute,<sup>535</sup> the foundational work of Brugh Joy,<sup>536</sup> and remote viewing as taught by Joseph McMoneagle,<sup>537</sup> and Dale Graff.<sup>538</sup> The work of Deepak Chopra<sup>539</sup> has deliberately been developed in a way which marries the techniques associated with developing metaphysical skills to a dedicated and disciplined practice, which is fundamentally devoid of religious or cultural bias. The methodologies being taught by these individuals and their organizations rely on the same basic set of techniques used to facilitate increasing levels of proficiency in any related skill sets. These include:

- Meditation: This technique involves learning how to maintain a consistent inward focus for prolonged periods of time. It is a discipline

which has been conclusively shown to respond to practice, commitment and determination. Regularity of practice is the key to this component.

- Controlled Breathing: The effectiveness of breathing techniques is ancient knowledge. Control of the breath has been employed by every major culture which has survived into the current era. The most significant pioneering work of the current era has been conducted for more than 30 years by Dr. Stan Grof<sup>540</sup> and his associates at the Institute for Integral Studies. Dr. Grof is the inventor of the technique known as circular breathing, which has been demonstrated to produce astounding results in thousands of tests.
- Guided Focus & Mental Exercises: The talent for psychic performance yields to repeated practice and conditioning like every other human skill set. The key to integrating this component into any training program is consistency and real time, constructive feed back.
- Validation & Feedback: As with biofeedback systems and the acquired disciplines required to control autonomic nervous system functions [heart rate, brain waves, galvanic skin responses, etc.], the development cycle for improving psychic skills has been conclusively shown to improve with real time validation and constructive feedback. Nowhere is this more dramatically demonstrated than in the writings of Ingo Swann<sup>541</sup>, one of the original and most spectacular participants in the StarGate Remote Viewing program as well as the practices of the Monroe Institute<sup>542</sup>. The technique described by Joe MacMoneagle<sup>543</sup> is regarded as the most comprehensive model currently available.
- Perfect Practice: Teachers, coaches and facilitators of every skill-based discipline have demonstrated that the key to perfect performance is to be found in perfect practice. The techniques found to be most effective in developing adroitness with psychic skill sets rely on guided imagery, video tapes, and so on.
- Inductive Processes: Witnessing live demonstrations by those who are adept and other activities which serve to create a perfect, positive image in which the student can visualize themselves as performing perfectly often induces higher levels of performance. This is borne out in parallel by the extraordinary success enjoyed by practitioners of the Suzuki Method<sup>544</sup> of music education and as described specifically by the Eyring Institute<sup>545</sup> in its 1979 publication entitled ***Study of Certain Seemingly Abnormal Deformations and Transformations of Metals.***

### **Reports of the Eyring Research Institute**

One of the most fascinating things discovered by the scientists from the Eyring Research Institute who investigated and filmed metal bending by

average, ordinary people is that while few if any of them could perform the task set alone, nearly all of them (with the curious exception of the camera man) could cause metal spoons, titanium-alloyed aluminum bars and other materials to deform in the presence of others who were adept. This appears to be particularly true for children. What this suggests is that because of the way morphic fields operate, the inductive processes demonstrated in the works of Carlos Castaneda<sup>546</sup> and Brugh Joy<sup>547</sup> are an essential ingredient in learning and developing such skills.

There appears to be a dynamic threshold associated with the practice of some metaphysical art forms. Until a person has actually experienced such an event, it is extremely difficult to become proficient at baseline skills. However, once a practitioner has actually experienced how it “feels” to perform a metaphysical act successfully, it is incrementally less difficult to repeat the act. With practice, feats once believed to be impossible have been shown to become almost mundane.

### **A Personal Experiment**

For an entertaining and totally non-threatening way of testing how this works, I strongly recommend the book ***Divination Workbook: An Expert's Guide to Awakening the Power and Wisdom of Your Soul***, by Reverend Iris K. Barratt. This wonderful little book, winner of the Visionary Peacemaker Award, teaches anyone who is willing to make an honest attempt how to use pendulums to access information with consciousness. It contains a fascinating collection of exercises which provide a means for immediate validation. This is a perfect example of precisely what we are talking about doing.

### **Techniques**

Additional techniques used to support the process in one way or another include:

- Hypnosis: Hypnosis is an externally induced altered state which uses the unconscious Mind to focus on specific topics or experiences. Because Mind operates in the time domain, without regard to physicality, and couples with physicality to perform the functions

associated with both conscious and unconscious processes, it is possible using hypnotic techniques to deliberately focus the Mind on specific tasks which can only be performed in the time domain. The literature which discusses this technique is limited but can be found as far back as the early 1900's<sup>548</sup>. The recent work of Dr. Brian Weiss and his colleagues demonstrates that hypnotic techniques can be successfully adapted to facilitate the investigation of information which is only available in the time domain, and which is not related in any way to personal memories of past life experiences.<sup>549</sup>

- Journals: It is essential to keep a detailed journal which recounts the aspects of each training and practice session. The journal should focus on both details regarding the experience and the feelings associated with them. The journal functions can include a wide variety of expressions [i.e., video tapes, audio tapes, notes, photographs, scientific recording devices, etc.], all of which taken together provide an invaluable record of the events associated with mastering metaphysical skills.
- Neurolinguistic Programming: NLP is a fascinating tool which utilizes the current level of insight into the holographic nature of Mind to facilitate the conscious, deliberate use of consciousness as an investigative and healing tool.<sup>550</sup>
- Physical Technologies: Over the past 45 years, particularly since the psychic orgy of the 60's, hundreds of devices have been developed to enhance, accelerate and condition awareness, induce altered states of consciousness and facilitate healing. For a particularly entertaining and equitable treatment of this subject, I recommend ***Would the Buddha Wear a Walkman?*** by Judith Hooper and Dick Teresi.<sup>551</sup>
- Biofeedback Devices: Paul McCartney and Ringo Starr created a real sensation the night they appeared on the Johnny Carson show and demonstrated their acquired ability to consciously synchronize their heart rates with a musical tempo played by Doc Severenson's Tonight Show Orchestra. This is as vivid an illustration as we are likely to see that the ability to consciously, deliberately regulate functions of the autonomic nervous system, which were once believed to be completely outside the realm of voluntary control, is a skill which can be acquired by almost anyone. In the same way heartbeat can be deliberately regulated, Ernest Laszlo's research has shown that meditation can be harnessed to teach practitioners to deliberately regulate their alpha and theta waves, heart rates and other variable to achieve states of altered consciousness.

**A Warning**

The primary reason for developing a methodology which is deliberately divorced from religious preferences is that history is replete with examples of how people who have been naturally gifted with certain metaphysical abilities have abused their giftedness to exploit, manipulate and create codependency among gullible, needy followers.<sup>552</sup> This is dangerous because it defeats the purpose for which this methodology is being developed.

The dangers associated with cults are a matter of public record.<sup>553</sup> Wherever we find cults, we also find a generalized cultural repression of one or more of the basic ingredients which are essential to self-actualization. Cults fill this void by creating an opportunity for their followers to engage in community with others who are like-minded. When the leaders of cults discover the extent to which "true believers" are willing to allow themselves to be manipulated, the line which separates propriety from exploitation quickly becomes indistinguishable.<sup>554</sup>

We are not suggesting that human nature be altered to accommodate this new methodology. We are suggesting, however, that the key to developing a methodology for harnessing the timeless capacity of Mind to access information, of every kind, at will, can only be as successful as the degree to which we can apply the techniques outside the constraints of doctrine, dogma and ritual. What we are really attempting to accomplish here is to develop a means by which the human equipment can be trained to operate in concert with the timeless capacities of the Mind to access information. This is not a mystical matter, nor is it mysterious in either its form or its practice.

If the rise in the number of New Age bookstores, publications, workshops, seminars, conventions, lectures and course work over the past thirty or so years is any indication, our culture is failing to provide the means for personal discovery and spiritual awakening which is needed. Indeed, it is largely because of this sense of intrinsic entitlement to the means for personal investigation and discovery that works such as this book have any place at all. Notwithstanding, a review of the number of non-fiction books which have climbed to the top of

the New York Times Best Seller list, many of which are specifically related to the topics discussed here, is at least illustrative. As a society, we are less bounded by traditional, cultural proscriptions against the use of metaphysical disciplines to obtain information and have experiences which are personally meaningful. And this is as it should be.

### **Altered States of Consciousness**

There is no substitute for personal proficiency when it comes to performing a skill set. When any skill set has been sufficiently developed to a nominal level of proficiency, advanced technologies can be applied to enhance performance to levels which are not otherwise possible. While the Mind is not a muscle, the physicality to which Mind is coupled yields to conditioning. What we are attempting to do with this methodology is to teach our physicality to perform Mind-related functions in the time domain. This is the same process used to condition the physicality to perform any other skill sets. The fact that Mind works in the time domain, which is coupled to physicality, and operates non-locally [and therefore holographically] from each locale, means that once the physicality has been properly conditioned, intention can be employed to direct the Mind's focus to any number of variables.

Scientists at the Monroe Institute, for example, began really examining what happens when our physiognomy becomes attuned to a frequency resonant state during mediation.<sup>555</sup> The conditions which characterize an "altered state of consciousness" as described in the edited works of Charles Tart,<sup>556</sup> for example, all seem to act in concert. These conditions include:

- Alpha and Theta waves which oscillate in a frequency range between 5-12 cycles per second. The frequency varies with the time of day and has been conclusively shown to correspond directly with (1) the Schumann Resonance and (2) the alpha and theta wave forms demonstrated by other meditators in close proximity.
- Pulse rates which are below the natural resting heart rate, in the range of 35-50 beats per minute.
- Respiration rates which are below the natural resting rate, in the range of 10-12 breaths per minute.



- The effects of certain breathing techniques, especially the application of "circular breath" as developed by S. Grof<sup>557</sup> and certain breathing techniques associated with the practice of Kundalini Yoga.<sup>558</sup>
- Oxygen levels which exceed normal uptake levels by as much as 20%.
- The effects of certain aromas. Various techniques include vaporization of essential oils [especially frankincense, sandalwood, vetiver (oil of tranquility), etc.], burning of incense and use of scented candles.
- The effects of certain types of music. Volume is a significant consideration.<sup>559</sup>
- The effects of candle light, particularly with a flicker rate also ranging in the 7-17 cycle per second range.
- The effects of toning, particularly multi-phonic toning such as that perfected by certain orders of Tibetan monks, including chanting and harmonic singing.
- The effects of certain physical postures, particularly those associated with certain forms of Hatha Yoga<sup>560</sup>.
- The effects created by carefully designed or selected physical surroundings, particularly those which are quiet, isolated from noise and physically comfortable.
- The imposition of certain carefully defined and closely monitored disciplines.<sup>561</sup>

### **Psi-Enhancing Technologies**

The ancient Greek astronomer Ptolemy (who spent most of his time living in Egypt) was probably the first person in recorded history to build a machine to alter consciousness. As the story goes, he built a wheel in line with the sun and spun it. People would stare at the wheel while it was turning, watching the flashing lights emitted between the spokes and enter an altered state, complete with visual effects.<sup>562</sup>

In more recent times, especially in the 60's, ***Naked Lunch*** author William Burroughs<sup>563</sup> and his friends built what they called a Dream Machine. It contained a bright light inside a cylinder, which had holes punched in it. Burroughs and his friends would spin the cylinder and stare with their eyes closed at the stroboscopic flashes produced by this device. What they had

created was a machine which demonstrated what we now refer to as a "flicker effect." Burroughs reported seeing dazzling lights in his brain, "hallucinatory visions of extraordinary brilliance and color, with fireballs that resembled the mandalas of Eastern mysticism."<sup>564</sup>

*Sitting in front of the machine became somewhat addictive. While there was no absence of recreational drugs in those days, Burroughs and his group were content to sit in front of a colander-like device which scattered light waves over their eyelids. Brain-altering machines, sometimes described as the Nautilus equipment for the mind, range from the grand daddy of all such devices, the Synchro Energizer - a \$75,000 industrial strength contraption which features a control panel right out of Star Wars and requires a trained operator - to the MC<sup>2</sup>, which is a walkman-like device which allows you to zap your brain in the privacy of your own home for the modest price of \$350.<sup>565</sup>*

Armed with this information, practitioners of consciousness-based skills have created a variety of technological innovations, facilitation methodologies and techniques to accelerate metaphysical skill development and enhance proficiency.

There are a number of public and private organizations which offer training which is consistent with our objectives. I have included an extensive list of organizations and institutions whose course work has either been highly recommended by others whose judgment I trust, or with which I have become personally familiar. The list is not intended to be exhaustive. If an organization you are familiar with is not included in this list, no inference should be made about its suitability or competence.

A personal comment seems appropriate here. As with the development of many new tools or skill sets, those who are entrusted to teach must first be taught. In the case of consciousness-based skills, the cultural imperative can reliably be predicted to arbitrarily impose standards, agendas, and values on our efforts which are both proscriptive and prohibitive. Religious beliefs which

label practitioners of metaphysical arts as evil, sinful or heretical have pervaded our culture since its inception. This is not news. It is history.

Fortunately, the winds of change are blowing across the West – not in any geographical sense necessarily, but certainly in a cultural sense. The practices of meditation, visualization, yoga, controlled breathing, hypnosis, acupuncture, ayurvedic healing and other such practices which closely skirt metaphysical pursuits, are becoming more and more common. This is extremely encouraging because it suggests that at least among generation X, the cultural attachment to the pervasive attitudes which occasioned the Salem witch trials may finally be far enough distant to have lost any meaningful effect.

There are those who will roundly criticize the approach advocated here on the basis that metaphysics cannot or perhaps should not be practiced without adherence to an overriding spiritual philosophy. This is a notion equally as outdated as the idea that such practices are sinful. The most important element of our collective search for truth is to be found in our willingness to trust the process itself. There is no single, privileged path to truth. Rather, every path carved by an unwavering commitment and marked by clarity of intention cannot fail to find access to truth at some meaningful scale.

The fact that we are conscious, sentient creatures who are aware of our awareness suggests that we are equipped by design with the attributes requisite to seeking and finding truth. We are a part of consciousness, a magnificent manifestation of it. We find ourselves seeking to understand the truth about our role in the grand scheme of the Cosmos from inside the system, as inextricably interwoven components of it.

It has been my experience as both a practitioner and facilitator of metaphysical skill sets that everyone who elects to set aside their considerations and engage in the process is deeply touched at some point by their experience. We are discovering that the Awakening experience, in which we realize for the first time the awesome majesty of our connection to the One, consists of a set of elements which are universal to the human experience. This connection is deeply personal and fundamentally empowering because we come

to understand how wonderfully unique, how beautifully crafted, how fundamentally interrelated we all are.

Anyone who has had such an experience will tell you that no amount of prior intellectual exercise can provide meaningful insight into the power of the experience itself or the depth of emotional impact resulting from it. This is not something which can be taught as we are accustomed to teaching other, more mundane things. Rather, the skills, disciplines, and techniques which can be relied on to produce access to information through such an experience *can* be taught. We can teach skill sets. We can facilitate incremental levels of proficiency. We can induce accelerated acquisition of the skills themselves by practicing together with those who are adept.

Many of us are engaged in the process of discovering how to hone our skills, polish our techniques and sharpen our skill sets. The methodologies are improving at what seems to be an exponential rate. Along the way, we are discovering who we are and why we have come here. In the language of self organizing criticality, it appears that as a society, we may indeed be approaching a point of criticality in this pursuit.

The sooner we can put aside our irrational prejudices and fears about such things, the sooner we will induce a critical shift in the quality of the human experience for ourselves and everyone around us. No one owns truth. No one has privileged access to it. All of us are equipped with an architecture which is specifically adapted to achieve continuous, unrestricted access to it. Knowing this, if we fail to rise to the full measure of our evolutionary potential before we destroy the planet and everything on it, who will be left to blame?

The next step in the process of developing a cogent methodology is to create a universal course of study which teaches what is known to a broad spectrum of students from widely varying backgrounds. Several laudable attempts have already been started in this direction.<sup>566</sup> At some point in the near future, a degree program in Metaphysical Arts needs to be offered and stable sources of funding provided to support its development.

**Summary**

The bottom line is this: it is clear that scientific research which seeks to uncover the mysteries of the Cosmos cannot be complete without harnessing the timeless attributes of consciousness to remediate what can only be described as a severely crippled physics. The ability to engage in Mind-based metaphysical practices, designed to make our current methodology fully robust, requires nothing more than a commitment to developing a set of cogent protocols and teaching the skills to a broad segment of the population, particularly those who are already engaged in scientific research.

To the extent we rise to the challenges imposed by this mandate, we can expect to achieve levels of understanding and insight into the processes and mysteries of Nature never before contemplated. To the extent that we fail, we can plan to remain stuck in the madness and insanity which characterizes the world we all live in today.

## **APPENDIX TWO**

### ***The Final Engineering***

For the first time in the history of mankind, we have at our disposal the information and technologies needed to create the world just as we want it. All the information needed to understand how nature works is currently available in a sufficiently robust state to enable us to literally create, alter, modify and condition physical reality to suit our needs and preferences. As Tom Bearden has so aptly said,

*"This is the final engineering"*<sup>567</sup>.

Taken at face value, this is an astonishing and extremely troubling notion. The fact that many of the practitioners of mainstream science are working very hard to accommodate this sweeping idea is cause for celebration.

#### **Remediating Nuclear Waste**

Among other things, we have at our disposal a new set of tools to remediate the incredibly toxic stockpiles of radioactive nuclear waste materials which are accumulating all over the planet.<sup>568</sup> Radioactive waste does not have to be buried under the ground or dumped into the oceans. It does not have to infiltrate into the ground water and despoil dwindling supplies of potable fresh water. It does not have to be allowed to contaminate the air we breathe and endanger the continuation of all life on the planet.

It is time to cite specific examples of the kinds of technologies which are currently under development to engineer our reality in a way which works for everyone. What follows is a brief, non-technical explanation of the phenomena currently referred to as Soliton Ion Acceleration (SIA). For a more detailed explanation of this and related techniques, and an explanation of the processes at work during the use of SIA's to remediate radioactive emissions from spent nuclear fuels, I suggest you read Dr. S-X Jin's scientific paper entitled ***The***

***Transmutation of Nuclear Waste Using High Density Cluster Accelerator.***<sup>569</sup>

**Electron Clusters**

The concept of Soliton Ion Accelerators began with work originally conducted by scientist Ken Shoulders of Bodega Bay, California. On May 21, 1991, Mr. Shoulders was awarded patent number US 05,018,180 by the U.S. Patent and Trademark Office for his invention, which was entitled ***Energy Conversion Using High Charge Density***. In his patent, Mr. Shoulders claims that a highly charged burst of electrons can be created under controlled conditions, assuming a form which would remain stable long enough to enable investigators to direct them deliberately into target materials with predictable results. His technology relies on a voltage which is  $10^3$  (1,000 times) less than that used in a typical high velocity particle accelerator. Since electrons are much lower in mass than protons or neutrons, much less energy is required to accelerate them to significant velocities (10% of the speed of light) towards a target<sup>570</sup>. Further, his research shows that the average speed of high density electron SIA's is measured in the neighborhood of 1/10<sup>th</sup> the speed of light, rather than 40%-60% C, as reported in particle accelerator experiments using protons and neutrons.

After nearly a decade of independent research by such luminaries as Dr. Hal Puthoff<sup>571</sup>, Professors Ilyanuck<sup>572</sup> [Belarus] and Mesyats<sup>573</sup> [Ukraine], Dr. S-X Jin [China/USA] and others, it was discovered that SIA's exhibit some extremely peculiar properties. Among other things, it was discovered that the SIA's being generated in laboratories in the US exhibit a toroidal [smoke ring] shape measuring one micron [one millionth of a meter] in diameter, while those used in Belarus measure 20 microns. SIA's generated by Chinese scientists are reported to measure 50 microns. It was not until August 1998, when Dr. S-X Jin was able to complete the mathematical formulation which describes the dynamics which operate in SIA's, that we were able to understand why this phenomenon occurs.

At the INE Symposium held at the University of Utah in August 1998, Jin delivered a paper which described the quantum mechanical forces which operate to form electron SIA's<sup>574</sup>. The incremental diameters observed and measured by three distinctly different labs resulted from variations in current/voltage being applied, variations in the materials used to form the probe/cluster generator devices and variations in the gaseous/liquid environments in which the SIA's were being propagated. The Jin formulation predicted this result, described with unequivocal clarity what was happening and explained this phenomena for the very first time. His findings are extremely interesting, and can be summarized as follows.

### **Soliton Ion Accelerators**

Soliton Ion Accelerators of the one micron variety [which is the smallest quantum mechanical configuration believed to be possible] consist of approximately 100 billion [ $10^{10}$ ] electrons. This conforms to the mathematically predicted number, referred to as Avogadro's number<sup>575</sup>. The fact that electrons are all negatively charged particles and are not supposed to aggregate together to form anything like a stable configuration, has been troubling to conventional physicists who have examined the Shoulders patent. Nevertheless, what happens according to Jin's formulation is that under the right conditions, with carefully controlled variables, billions of electrons created by a single highly charged pulse of electrical current, operate as a single open, self-organizing system.<sup>576</sup> This is precisely what happens with the creation of a smoke ring, which is a manifestation of a standing wave or "soliton". After being discharged from the probe, approximately 100 billion electrons, propagated into a relatively constricted environment, exert quantum coherence on each other to form a very stable, archetypal structure called a toroid.

The toroid becomes stable by virtue of the self-determined orbital values assumed by each of the electrons and, almost instantly thereafter, by the complete aggregation of all the electrons bound into the toroidal structure operating as a self-organizing system at the point of criticality. When the rules of quantum mechanics are applied to this phenomenon, it becomes clear that



the quantum increments for highly charged electron clusters are 20 micron and 50 micron diameters.

When the Jin formulation is finally validated in carefully controlled laboratory experiments, we expect to demonstrate that the 20 and 50 micron toroids are really stably configured aggregations of one micron toroids which form ring structures, operating in proximity with each other in much the same way galaxies revolve around each other, to form what are called super-galaxies by astronomers. We believe the same fundamental forces are at work at both scales.

When an SIA of one micron diameter is formed, its center is mathematically described in terms of a highly concentrated negative charge. Because the toroid architecture is stable, experimenters have discovered that it can actually be directed at a specific target as much as 20 centimeters away without losing its viability. The velocity of such structures has been measured at approximately 10% light speed by Jin. Independent measurements by Shoulders, Puthoff, Mesyats, Illyanuck and others have confirmed his measurements. What is most exciting about this attribute of the soliton ion accelerators is what happens when the SIA is directed through a proton-rich environment [such as deuteride  $H_3$  gas] before being directed to impact a selected target material.

Jin's formulation predicts [and current experimental evidence verifies] that when an SIA is passed through a proton rich environment, protons are captured in the center of the toroid at the rate of one proton for every one million electrons. This is consistent with the predictions supported by Santilli's new model of Hadronic Mechanics.<sup>577</sup> As the toroids containing the captured protons [or other heavy ion particles] impact the target material, a very interesting thing happens. In high velocity particle accelerators, heavy ions are typically accelerated to 40%-60% of the speed of light. At those velocities, the amount of kinetic energy exerted by each heavy particle is sufficient to completely annihilate the nucleus of an atom on impact. This is the mechanism by which nuclear fission occurs. As a result of a high velocity thermonuclear collision, all nuclear particles are liberated, along with massive amounts of

electrons [in the form of heat], photons [in the form of visible light], Gamma radiation and other emissions not in the visible light spectrum.

But when a proton-rich SIA strikes a nucleus, the reaction is strikingly different. At 10% light speed, the amount of kinetic energy exerted by the heavy ions is sufficient to cause the protons and neutrons forming a nucleus to break apart temporarily, forming a plasma or ion cloud. During this process, few if any protons or neutrons are actually expelled or "radiated" from the target material. During this process, significant amounts of electrons [also in the form of heat] and photons [also in the form of light] are emitted - in fact, Shoulders estimates in his patent documents that upwards of 10 times as much energy may be liberated during this process as is required to create and accelerate the SIA's themselves.

Following the dissipation of energy which results from this relatively low velocity impact, neutrons, protons and electrons then recombine to form materials with smaller nuclear values, which operate at more stable energy states. Mass spectrometer analysis of the residues remaining after treatment of a radioactive solution with an SIA-type device reveals the presence of significant amounts of radioactively inert Lithium, which was not present in any concentrations in the original solution.<sup>578</sup>

### **Implications**

The implications of this experimentally validated process are quite profound. For one thing, if a cost-effective technique can be developed to treat radioactive emissions emanating from the huge stockpiles of accumulated nuclear waste materials, the result would be so important as to compel international attention and cooperation. In our laboratory, tests have been successfully conducted on radioactive Thorium in a concentrated liquid solution under carefully controlled conditions. If the results of our tests can be generalized to sufficiently robust industrial applications, we may be able to remediate spent liquid waste materials onsite. Engineering estimates suggest that portable devices based on this approach could be robotically controlled and cost less than \$3 million each to manufacture and deploy. Using a primitive benchtop prototype device, Jin

has been able to reduce radioactive emissions generated by radioactive Thorium in liquid solution by more than 98% in less than 7 hours.<sup>579</sup>

Equally compelling are the research results produced by contemporary research groups which show that significantly more heat and light is produced during the bombardment of radioactive nuclear waste materials by SIA's than is required to activate and drive the processes<sup>580</sup>. If this phenomenon can be experimentally controlled and validated, it is possible that much of the excess light and heat can be harnessed to produce usable power. This is a phenomenon which deserves to be investigated because it constitutes a scientifically sound, experimentally validated result produced by a process which cannot be understood in terms of the Standard Model. A system based on this technology could form the basis for applications which could produce usable, virtually free energy as a result of the successful remediation of spent nuclear fuels.

Finally, this area of research suggests something genuinely profound about the validity and reliability of the standard model of quantum mechanics and particle physics. If the SIA processes can be shown to operate under carefully controlled conditions, as Jin's preliminary experiments and mathematical formulations predict, our notions about the periodic table of elements will have to be significantly modified. If Jin's SIA approach can be perfected, it may be possible to atomically engineer one material to form another, without having to pass them through any of the intermediary isotopic stages mandated by the current structure of the periodic table. With carefully controlled SIA processes, atomic engineering could become as commonplace as test tube chemistry. We're still a long way away from that, but the notion that materials can literally be transmuted into other dissimilar materials, by deliberately altering their nuclear values during SIA bombardment, under controlled laboratory conditions, is as exciting a breakthrough as we're ever likely to witness.

This is not so far fetched as it may seem. Atomically engineered Carbon is becoming an indispensable part of scientific research. Plants are now in operation which atomically engineer molecules of Carbon to produce a material referred to in the literature as "Bucky Balls<sup>581</sup>." This material, which was

originally discovered as a component of meteorites and never found to occur naturally on the planet Earth, is now manufactured in quantity to satisfy the demands of scientific research and industrial manufacturing. Atomic engineering is also a focus of concerted research by major corporations engaged in the design and manufacture of integrated chip technologies. We have repeatedly referred to this work throughout the book.

### **Alternative Energy Sources**

Today, right this minute, we have at our disposal a collection of technologies which can generate enough energy to satisfy the needs of every man, woman and child on the planet without ever damming another river, burning another ounce of fossil fuel, or fissioning another cubic centimeter of radioactive material.<sup>582</sup> More than a dozen technologies currently exist which generate electric power so cleanly and efficiently that it may not be economically efficient to meter it. This is true for almost every imaginable application, including transportation, residential, commercial, industrial and recreational uses.

Dr. Tom Valone has written a fine paper which describes in thoroughly understandable terms how each of these options work. I have taken the liberty of excerpting portions of his paper to illustrate this point.

### **Energy Production Technologies**

More than 85% of the energy consumed in the US is produced by the combustion of fossil fuels. The phenomenon currently referred to as the Greenhouse Effect is believed to be directly related to the increasing use of fossil fuels and the CO<sub>2</sub> they emit into the atmosphere. A number of new energy production sources are emerging which produce no hydrocarbon emissions and which, therefore, do not contribute to global warming. Most of these technologies have one thing in common: they have been developed by impeccable scientific research but are generally unknown to the public.

In 1998, the U.S. Department of Energy (DOE) issued its Comprehensive National Energy Strategy (CNES)<sup>583</sup> which included as one of its five goals the following excerpt:

**Goal IV: Expand Future Energy Choices** - pursuing continued progress in science and technology to provide future generations with a robust portfolio of clean and reasonably priced energy sources.

Objective 1. Maintain a strong national knowledge base as the foundation for informed energy decisions, new energy systems and enabling technologies of the future.

Objective 2. Expand long term energy options.

To date, DOE has not begun developing, much less maintaining, a robust knowledge base of future energy choices. Neither has the agency expanded research into the development of new energy systems or long term energy options. In a study performed by Integrity Research Institute<sup>584</sup> on the progress of CNES two years later, it is not surprising to discover that instead of forging a new energy policy and developing new energy resources, DOE has worked actively to suppress enabling technologies.

Concern for global warming and the expected increase in carbon emissions by American industry is not reflected in DOE's current policy memoranda. Instead, the DOE has

- endorsed continued national reliance on natural gas for all future generations,
- rescinded the Nuclear Energy Research Initiative (NER) grant awarded to Dr. George C. Miley, University of Illinois at Champagne/Urbana, and
- withdrawn an offer to host a Conference on Future Energy (COFE). It is clear that the DOE has no intention of fulfilling the promise of CNES. Accordingly, it is now up to the private sector to conduct scientific research into emerging new energy production systems and enabling technologies.

It is generally agreed that emerging energy technologies which qualify as realistic alternatives must not produce carbon emissions or otherwise contribute to global warming. The Worldwatch Institute has recently written,

---

*"Stabilizing atmospheric CO<sub>2</sub> concentrations at safe levels will require a 60--80 percent cut in carbon emissions from current levels, according to the estimates of scientists."<sup>585</sup>*

The technologies which can be relied on to meet these requirements are classed in the following categories:

**Cold Fog Discovery:** Many prototype systems exist today which efficiently convert potential energy into useful work. An example of such a system is the "Cold Fog" discovery of Dr. Peter Graneau of Northwestern University. Dr. Graneau's system converts chemical bond energy into kinetic energy by injecting rain water with a high voltage discharge of 39.8 Joules. Normal rain water subjected to this treatment becomes a cold fog which loses approximately 31.2 Joules of low-grade heat and a comparable amount (29.2 Joules) in the form of kinetic fog energy output. As reported in the prestigious *Journal of Plasma Physics*<sup>586</sup> the output energy exceeds the input energy by about 100%, creating a 2:1 over-unity condition. The energy output produced by this system can be captured and harnessed to drive a motorized conversion system.

**Betavoltaic Battery:** The betavoltaic battery is the invention of Dr. Paul Brown [US 4,835,433], who is currently President of Global Atomics Corporation. It integrates a benign electron-emitter source known as Tritium [an isotope of Hydrogen] which emits a stream of electrons [a 5.7 KeV beta particle] over its half life of 12.5 years. The useful life of a battery containing this material is estimated to be approximately 25 years. It is an inexpensive, long-life, high energy density technology with a wide range of potential applications. Lucent Technologies has contracted with Dr. Brown to produce tritiated amorphous silicon for use in the semiconductor industry in such applications as notebook computers, cellular telephones and watch batteries. The batteries have demonstrated a mean energy density of 2.4 watt-hours per kilogram.<sup>587</sup> The importance of this discovery is that these devices will operate at power levels well above conventional batteries and never need to be recharged.

**Nuclear Remediation:** The technology described in the attached papers by Dr. S-X Jin constitutes an enormously promising source of "free" energy. Using

High Density SIA accelerators, it is now technologically feasible to produce 10-20 times as much energy by remediating radioactivity emissions from stockpiles of nuclear waste products as they originally produced. As a result of the patented work of Kenneth Shoulders, S-X Jin<sup>588</sup>, Dr. Hal Puthoff, Prof. Illyanuch, Prof. Mesyats, and others, this new low velocity method for remediating nuclear waste with electron-captured protons, has been demonstrated in laboratory tests to generate substantially more energy [in the form of photons as light and electrons as heat] than is required to power the treatment apparatus itself. The technique produces electron clusters with energy densities equivalent to 25,000 degrees Celsius upon impact with a target material, while consuming only 20 micro-joules to produce the effect. The electron clusters travel at no more than 10% light speed and have been shown to penetrate any substance with a high degree of precision. Using a Deuterium loaded Palladium foil, bombardment areas demonstrate transmutation into silicon, calcium, magnesium and lithium. Jin's paper describes how the high density electron clusters achieve impact results similar to those produced by high velocity ion accelerators, including penetration of the nucleus, with  $10^3$  less power.

The new physics of like-charges clustering in bundles under low power conditions opens a wide range of possible applications. The potential over-unity efficiency of these systems is currently estimated to be at least 9:1.

**Biomass Gasification:** Examples of such systems can be found in the processes developed by Dr. David Wallman<sup>589</sup> [US 5,417,817], Dr. Ruggero Santilli<sup>590</sup>, Dr. Randall Mills [US 6,024,935], and others. What these technologies have in common is that they operate by producing a variety of combustible gases from a wide variety of municipal waste, biomass waste, sewage and other materials containing high concentrations of hydrocarbons. Each of these systems produces substantially more energy content in the collected gases than is required to drive the carbon-arc filaments which operationalize them. The amount of CO<sub>2</sub> generated by the combustion of the gases derived from these processes is precisely the same as the materials absorbed while they were originally being formed. Contrast this with burning

fossil fuels (diesel, gasoline, oil, natural gas) which resurrect old buried carbon and add it to the atmosphere.

The combustion of gases produced by biomass processing is usually characterized as follows: It requires 3300 BTU to produce 250 liters per hour of  $\text{COH}_2$  (8.5 ft<sup>3</sup>/hour). With a heating value of over 500 BTU per ft<sup>3</sup>, the  $\text{COH}_2$  output energy exceeds 4,000 BTU, often approaching 5,000 BTU in high efficiency designs. Accordingly, the biomass gasification process operates at an over-unity efficiency of between 125%-150%. This process is a largely untapped resource. Millions of gallons of farm-produced biomass is going to waste, as is the energy potential represented by the  $\text{COH}_2$  which could be produced from municipal sewage and waste water systems. This is not a trivial energy resource. The Republic of South Africa does not import a single drop of petroleum to support its transportation requirements. Instead, 100% of its diesel fuel and gasoline is produced by two plants which operate on these principles.

**Thin Film Electrolytic Cells:** A number of seasoned technology integrators have developed thin-film energy storage technologies which hold considerable promise. Dr. George Miley<sup>591</sup>, Dr. Robert Hockaday<sup>592</sup> and others have developed thin film technologies with energy densities exceeding 250-400 watt hours per kilogram. Dr. Miley's invention is illustrative. Using a flowing pack-bed type electrolytic cell with 1-molar  $\text{LiSO}_4$  in light water, 1mm plastic beads with a very thin [500-1,000 angstrom] film of metal [nickel, palladium, titanium] are employed.

A special sputtering technique is used to spray the metals onto the surface of the beads. With 2-3 volts of electrical power and 1.5 milli-amperes of current, the single film experiments have shown the material to produce more than 10 times as much output power as input. The input power is no more than 0.01 watts while .5 watt of heat is produced. It is likely that the physics involved in this reaction involve the release of energy as a by-product of nuclear transmutation. Dr. Miley has written, "The key finding from these studies has been the observation of a large array of "new" elements (i.e., different from the original bead coating), many with significant deviations from natural isotopic compositions, after the run.



Great care has been made to insure that these elements are distinguished from isotopic impurities by use of a "clean cell" with high purity components and electrolytes, in addition to the pre-and post-run analyses. Even low-energy radiation was detected from the bead days after each experiment. Applications to space power, providing a 1 Kwatt cell with only 500 cc of active electrode is predicted." Note that this particular invention, with its large over-unity energy yield, was awarded a NERI grant by the DOE. At the insistent urging of the American Physical Society and representatives from MIT and other universities whose laboratories are currently engaged in high temperature gas cooled nuclear reactor research, Secretary Richardson eventually withdrew the grant.

### **Emerging Energy Technologies**

In addition to these newly emerging technologies, a long list of alternatives is currently available for further research and development support. These include technologies developed by Dr. Deborah Chung, State University of New York [Buffalo], who has discovered "negative" resistance in carbon fibers.<sup>593</sup> James Griggs is the inventor of the hydrosonic pump [US 5,385,298}, which is an over-unity apparatus for heating fluids which exhibits sonoluminescence. Dr. Paulo Correa has developed a pulse-charged abnormal glow discharge energy conversion system.<sup>594</sup> Dr. Frank Mead [US 5,590,031} has developed a system which is one of many such patented systems focused on zero point energy conversion. The extraction of energy and heat from the physical vacuum has been proposed by Dr. Hal Puthoff and Dr. Daniel Cole.<sup>595</sup>

For an interesting tour de force of the state of the art, I highly recommend two recent books on the subject. Keith Tutt's new book, ***The Search For Free Energy: A Scientific Tale of Jealousy, Genius and Electricity*** (Simon and Schuster with foreword by Arthur C. Clarke) is a wonderful read. Tutt's long term experience with inventors, energy wizards and technology scams provides an entertaining, fascinating insight into the world of emerging energy-related technologies.

A second book, developed by Dr. Dohn K. Riley, Mark McLaughlin and the good folks at the Alternative Energy Institute in Tahoe City, California, is

entitled ***Turning the Corner: Energy Solutions for the 21<sup>st</sup> Century***. The importance of this book is that the AEI is at the forefront of the community of scientists and researchers who are developing new energy resources. This book covers a very broad collection of new and improved technologies across the entire spectrum. The authors do a fine job of articulating some difficult scientific concepts in the process of describing the landscape.

### **Endlessly Renewable Resources**

What these technologies suggest is compelling. If the US were to do nothing more than implement a nationwide system for either remediating spent nuclear waste or gasifying biomass produced by livestock, the energy output which could be made available from either of these resources would be sufficient to satisfy all power requirements for the foreseeable future, regardless of population growth or industrial expansion. There is no cogent reason for burying nuclear waste in the ground and visiting a horror on our grandchildren which we cannot even imagine when it is patently clear that the technology exists right now to remediate the waste, produce clean energy and altogether eliminate our reliance on fossil fuels and their derivatives.

One thing is clear: for less than \$10,000,000, DOE could support the successful development of new energy technologies sufficiently robust to completely eliminate any need for petroleum imports, fossil fuel combustion, hydro-electric dams or the use of existing nuclear power plants. Within ten years, a cogent development program could be put in place to convert biomass into usable synthetic gases at a sufficient rate to eliminate any need for natural gas or the refining of diesel fuel or gasoline. This is no longer a question of technology. The environment can be substantially remediated and the use of fossil fuels completely halted in less than 10 years if we have the political will to make it happen, based on the technologies which are known today.

In fact, pilot plants are already in operation in other parts of the world which convert municipal and biological waste into diesel fuel, gasoline and synthetic gas so efficiently that it is no longer cost effective in those countries to import a single drop of oil.

**Some Troubling Questions**

Have we embraced these technologies and distributed them throughout the world? Have we harnessed the renewable resources comprised of municipal and biological waste products to ameliorate our addiction to imported petroleum? Have we embraced the use of the primary products of waste recycling to produce electricity to power our homes, businesses and communities? No, instead we have ridiculed the inventors and suppressed their technologies.

Why? Because the overriding investment in owning and controlling access to energy resources, which are arbitrarily held in scarce supply in order to control global economic and social engineering, is so powerful that no amount of good science has yet exerted sufficient influence to make any significant difference. These are not scientific or technological decisions any longer. The choices about how we harness what we know how to do have to be made in the political arena.

## **APPENDIX THREE**

### ***Healing Technologies***

The technology exists today, right this minute, to substantially remediate cancer<sup>596</sup>, viral diseases<sup>597</sup> and the ravages of genetically propagated physical ailments<sup>598</sup> without surgery, pharmaceuticals or nuclear irradiation. These technologies, all of which have been available since the late 1970's, have been ruthlessly and systematically suppressed. This is not a new phenomenon. It happened with the discovery of penicillin, the Salk polio vaccines and Dr. Candace Pert's HIV CT-4 peptide-receptor treatment, developed specifically to prevent the spread of AIDS <sup>599</sup>.

Why do we allow this suicidal behavior to continue? Because Science, with a big "S", continues to gravitate to the privileged sources of research funding whose short term economic interests are threatened by the emergence of the technologies which could heal the planet, liberate its people and free them of disease. The story of Antoine Priore's experimental device is a prime example.

#### **The Story of Antoine Priore`**

In the 1960's and 1970's, in France Antoine Priore built and tested electromagnetic healing machines of startling effectiveness. In hundreds and hundreds of rigorous tests with laboratory animals, Priore's machine cured a wide variety of the most difficult kinds of terminal, fatal diseases known today.

Funded by the French government in the amount of several million dollars, Priore's machines demonstrated a nearly 100% cure of a wide variety of terminal cancers and leukemias, in thousands of rigorous laboratory tests with animals. These results were shown to medical scientists as early as 1960.

Many of the experiments and tests were done by prestigious members of the French Academy of Sciences. Robert Courrier, head of the Biology Section and Secretaire Perpetuel, personally introduced Priore's astounding results to the French Academy. The operation of the Priore machine was seemingly

incomprehensible. Many orthodox French scientists—some of them world renowned—were outraged at the success of such a machine, crying that science should have nothing to do with "black boxes."

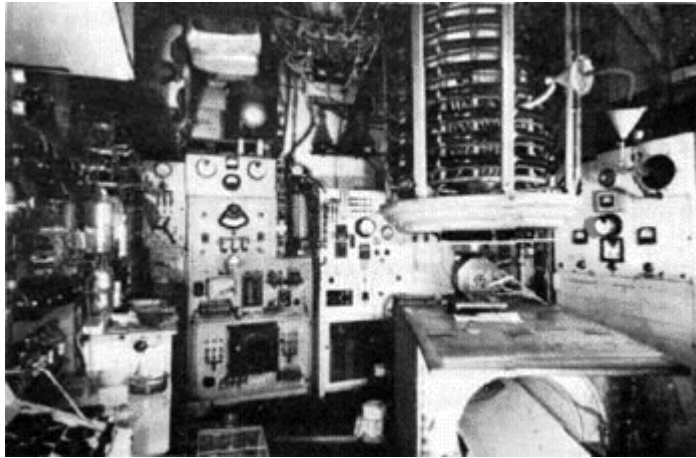
The members of the Academy demanded that Priore explain the mechanism utilized by his machine, but he either wouldn't or couldn't explain the curative mechanism. Priore certainly knew how to build the machine and make it work. It is debatable to this day whether anyone—Priore included —actually understood its principle of operation.

Neither the French Academy nor Antoine Priore knew anything of the concept known as phase conjugation at that time. In fact, the entire Western World knew nothing of phase conjugation in the 1960's when Priore was getting his finest results. At that time, only the Soviets knew of time-reversed waves. Certainly Priore's machine was impressive.

### **Priore's Machine**

The device was constructed so that a plasma of mercury and neon gas contained in a large glass tube was pulsed with a 9.4 gigahertz wave, modulated on a carrier frequency of 17 megahertz. These waves were produced by radio emitters and magnetrons in the presence of a 1,000 gauss magnetic field. Experimental animals were exposed to this magnetic field during irradiation. The mixture of waves (some 17 or so) coming from the plasma tube, modulating and riding the magnetic field, passed through every cell in the animals' bodies.

**One of Priore's intermediate devices. This device cured terminal cancers and leukemias in thousands of laboratory animals.(Courtesy Bob Whitney)**



Since Priore's time, we have discovered that a plasma can convert a transverse wave to a longitudinal wave. We have also learned that phase conjugated (time-reversed) waves can be produced by certain kinds of controlled plasmas. Priore's apparatus produced a scalar EM wave/signal which was time reversed, consisting of deliberately constructed, infolded components including phase conjugate waves.

A cancer cell is a normal human cell gone "awry", operating out of control of the body's master cellular control system. Cancerous cells, viewed as a sort of separate, parasitic group of cells, form a special kind of organism having its own master cellular control system "level," which is infolded within the host's biopotential.<sup>600</sup>

A specific, constant electromagnetic "delta" or change in the electromagnetic signal that differentiates the parasitic cancerous "organism" from the normal human cellular organism. This "delta" manifests as a constant, complex-structured charge operating in the body's atomic nuclei. It is exactly as if the body's biopotential had been charged up by Kaznacheyev's "death photons" for that specific cancer condition.

If this cancerous electromagnetic energy signature —or a frequency shifted "transform" of it to a different frequency band—is phase conjugated (time reversed), a specific healing "delta" frequency pattern results. If phase conjugate

replicas of a cancer's cell's specific "delta" frequencies are fed into the body having that cancer, the deviation of the cancer cell's master cellular control system is effectively "time reversed."

This results in the return of the cancer cell to control of the animal's original master cellular control program. The cancerous cell will either be immediately destroyed or reverted back to a normal cell. A very similar process can be engineered to remediate just about every disease bacterium and infectious agent known to medical science.

### **Time Reversed Phase Conjugates of 'Death Photons' are "Healing Photons"**

The Kaznacheyev experiments in the Soviet Union proved that cellular death and disease pattern can be induced by a specific electromagnetic pattern carried on an electromagnetic signal, if the target cells are bombarded with the pattern-carrying carrier signals for any appreciable length of time. What was not published of Kaznacheyev's work was the correspondent work which showed that electromagnetic reversal of cellular death and disease conditions can be achieved by irradiating the diseased cell cultures with time reversed, phase conjugated replicas of the pattern-carrying induction signal.

In simplified terms, if an action in forward time induces a condition, then the time-reversal of that action will reverse the condition. The concept is almost laughably simple. The time-reversal of an electromagnetic disease process is a specific healing process for that disease. In his device, Priore internally structured the carrier photons themselves—making them **vacuum engines**. He phase conjugated his vacuum engines, and then passed these time-reversed vacuum engines down and through a strong magnetic field which thoroughly penetrated all cells of the biological organism being treated.

The scalar components (structured photons) representing the time-reversal of the disease were absorbed and reradiated in all the cells, "charging up" the nuclei of the atoms in the organism to some potential level of the exact "healing and reversing pattern." In the process, the cancer/leukemia pattern/charge also destroyed the cancer calls, or converted them back to normal cells as appropriate. As a highly simplified analogy, the complex signal - viewed as a

scalar Fourier expansion - represented a "stress" against any abnormal cellular control system encountered and returned it to the normal cell's master cellular control system of the body.

When encountering a normal control system operating in normal cells, the Priore treatment produced zero stress. However, when the time reversed signal encountered an abnormal control system in tumor cells, it produced great stress on them, reverting them to normal cells which responded to the body's master control program. Thus, to a normal cell the Priore signal pattern acted somewhat like a comb passing through one's hair. No interference occurred with the normal cell, whose scalar control pattern remained phase-locked to the body's master cellular control system and in phase with it.

The Priore signal stimulated and "stroked" the normal cell, but did not injure or modify it at all. On the other hand, the scalar control pattern operating in abnormal cancerous or diseased cells is out of phase with the body's master cellular control system and is not phase-locked to it. The Priore signal caused direct interference with the abnormal cell's independent scalar control system. The magnetically amplified interference pattern propagated by the treatment device resulted in the reconstruction of normal energy patterns within the atomic nuclei of the cancerous cell. It worked by jamming the tumor cells abnormal scalar life signal.

*This destroyed the cancerous cell by two mechanisms: (1) physical energy was kindled directly in the abnormal cell, causing direct mechanical damage, and (2) the cancerous cell, being an "independent living critter," had its scalar life channel (connecting its primitive "mind" to its "body") jammed and stopped. If the cancerous cell was reverted to a normal cell by the Priore stress before being destroyed, it became just a normal cell and the Priore stress had no further effect upon it.*

### **The Effect is Universally Applicable**

Any disease with a cellular, biochemical, or genetic basis can be cured in like fashion. Priore's method, for example, was clearly shown to be able to



completely reverse clogging of the arteries with fatty deposits, and to be able to lower the cholesterol level to normal, even in the presence of an abnormally high cholesterol diet. His method also showed complete mastery and cure of sleeping sickness and trypanosome-induced illnesses.

Often Priore found that every cell of the body—even the hair— must be irradiated and treated ("charged up") with the signal, for the disease pattern was in every cell. The master cellular control system is holographic—the pattern (substructured potential with its dynamic, oscillating components) is in each component (each atomic nucleus, hence in each cell.)

Every structural level of the body larger than the cell also has its own correlated pattern, or modulation, on the overall. A biological organism can regenerate lost limbs, for example, if it can utilize its natural recovery process in a Priore manner. Even though Priore's work was presented to the French Academy of Sciences by Robert Courrier, the prestigious head of the Biology Section, the Academy could not understand the device and its functioning. That was because the Academicians knew nothing of scalar electromagnetics, and phase conjugation, and the Priore machine was a scalar electromagnetic device using phase conjugation.

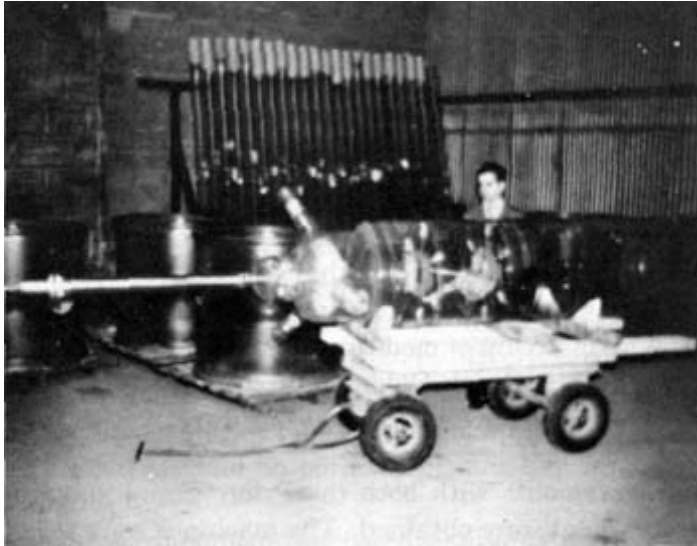
### **In the Mid-70's It Ended**

In 1974, a change of local government lost Priore his government supporters. His support and funding were lost. Ironically, Priore was just completing a 4-stories-tall apparatus capable of radiating and treating entire human bodies. It would have been capable of curing cancer and leukemia in humans rather than just in laboratory rats. His previous machines were much smaller, and only a small animal could be irradiated whole-body. In that machine Priore used a "lamp," a special section, in which 17 specific frequencies were mixed and modulated upon the 9.4 gigahertz carrier wave.

*The machine was large enough to irradiate humans over their whole body. It should have been capable of curing cancer and leukemia in two five-minute irradiations, one week apart. While Priore was still alive, with my associates I spent nearly two years of*

*my life in an effort to bring the Priore device to market and into the mainstream of medical research and development.*

**The large, special, phase-conjugating plasma tube for Priore's giant device. The final machine would have treated humans "whole-body." (Courtesy Bob Whitney)**



*Robert Whitney, Frank Golden, and Tony Gideon played the major role, going to France and negotiating directly with the Priore group and the French government. Verbal agreements with both the Priore group and with the French government were obtained. The machines were to be built, assembled, and tested in Bordeaux. Then they were to be dismantled and shipped to the purchasers—large medical research and development laboratories where they would be reassembled on site.*

*A group of wealthy backers was going to provide the necessary millions to fund the effort. Final contracts were being drawn. Mysteriously, all funding for the project was suddenly withdrawn. Our backers were "leaned on" very hard and strongly threatened. Nothing we could do could revive the project. Priore never again recovered his funding, and later died. The machine fell into disarray and was disassembled.*

**Capping assembly for the top of Priore's giant plasma tube device. The last device would have treated human patients "whole-body." The cap assembly was the third floor of the device.(Courtesy Bob Whitney)**



*The proof that the requisite time-reversed signal can be produced, and will ride down a magnetic field, to penetrate every cell and every atomic nucleus in the body, is already in the present hard-core physics literature, if one knows where to look and how to properly interpret the work. The fact that such signals can reverse nearly every major cellular illness condition of the body also has been proven by Priore` and the scientists who worked with him. Copious, voluminous references to his work are contained in the French scientific literature. The Priore-type cure for AIDS and other diseases only requires the necessary funding and personnel to be redeveloped and reestablished.<sup>601</sup>*

### **Some Thoughts in Conclusion**

As I have learned about the stunning technologies which are discussed in this book and the genius, commitment and dedication which have produced them, I cannot help but wonder about one important, unanswered question. In the early 20's, when the Lorentz transforms were being generally applied to

electrodynamics, Einstein, Cartan and others were deeply engrossed in the development of the General Theory of Relativity and the formulation of quantum mechanics. E. Cartan intuited, both in his private ruminations and in the mathematical constructs he was developing, that the spinning action of sub-atomic particles and the time-domain polarization of virtual and real photons play a fundamental role in the way Nature works.

Cartan's work and the collateral work of others like him at the time, which described the torsion created by what we have come to refer to as "spinors," was discarded because they had no idea that sub-atomic particles relate to each other in terms of the way they spin. The notions of time-domain polarization, scalar potentials and the dynamics of non-local "torsion" field propagation, as originally described by Maxwell's quaternions, were also discarded because of the essential leveling effect exerted by the application of the Lorentz transforms. Accordingly, in subsequent work based on the General Theory of Relativity, formulations emerged which described the four linear, sequential field forces as primary rather than derivative.

By the time A. Einstein and E. Cartan had formulated the early versions of the General Theory which were crippled by their inclusion of the Lorentz transforms, Leadbeter and Besant had been documenting their micro-psi investigation into the nature of fundamental particles for more than 20 years. Their findings clearly demonstrated the fundamental importance of spinors, the propagation of non-local torsion field effects associated with such behaviors, the time-domain polarization associated with the energetic oscillation of photons and the role of the underlying scalar potentials.

What would our science be like today if Einstein and Cartan had been willing to accommodate the work produced by Leadbeter and Besant, nearly 100 years ago? What would the world be like if scientists had known for 100 years that Mind operates in the time domain and couples with physicality in a way which is fundamentally linked to non-local field effects, dynamic coupling constants and the time-domain polarization of electromagnetic transverse waves? What would the practice of medicine look like today if doctors had known for 100 years that disease is the result of errors in the information-generating codes driven by our DNA and that it can be corrected by harnessing

magnetic fields, non-local field effects and harmonic frequency resonances to reprogram the information sets to eliminate illness and disease?

In fact, what would our world look like today if scientists had been able 100 years ago to build the standard model to include the information acquired and the practices demonstrated by Leadbeter and Besant, and many others like them, during their nearly 30 years of impeccably controlled consciousness-based research? It doesn't take a rocket scientist to conclude that the world we live in today would be fundamentally different than it is now if this marriage of science and metaphysics had occurred at the beginning of the 20<sup>th</sup> Century.

Today, our challenge is much more difficult than theirs. Not only do we face the not inconsiderable challenge of engineering this marriage in an era characterized by a fundamentally resistive scientific community, but we also have to be willing to put aside a host of bad habits which did not prevail in Einstein's time. As invested as we are in the technological magic produced as a result of the way we practice our science in the 21<sup>st</sup> Century, how much better would our lives be if we could practice a brand of science which not only recognizes the role of Consciousness in the universal scheme of things, but actually harnesses the infinite capacity of the Mind to learn all the things we do not yet understand about why Nature works the way it does?

This is the challenge which faces us all at the beginning of a new century. We now have the means to really "see" beyond the Edge in a way which has never before been possible. As a global community which seems to be grinding inexorably towards self-destruction, we certainly have more than enough reason to use it. What remains to be seen is whether or not we have the courage, the will, to do so.

## ACKNOWLEDGEMENTS

The writing of this book has been an odyssey for me. It began 10 years ago as part of my personal search for meaning and wholeness. Largely as a result of this quest and what I have discovered about myself and my place in the world, I am more whole than at any other time in my life. Along the way, as the result of the unselfish sacrifices of so many people I cannot name them all, I have discovered some things about life and living that I believe are worth sharing.

This book represents the culmination of a lifetime of work and study. In the process of coming to understand the concepts and ideas presented here, my life has been enriched beyond my fondest imaginings. I have been a student of science and an integrator for virtually all my adult life. As a result, I understand something about what science has to say regarding the physical world we live in and how it works.

I have always been a prodigious reader. Continuous access to eclectic diversity sustains and energizes me. Perhaps more importantly, it enables me to maintain a broad perspective. My little window on the world is limited only by the extent to which I can remain conscious long enough to read, meditate and create new integrations. In these later years, I seem to spend as much time working through the mysteries during the dream time as I do when I am awake.

Sometime during my journey of personal healing, I began to realize that much about what we have to come to know as science and organized religion is fundamentally flawed. I began to see it in my reading. I observed it in the laboratory. I discovered evidence of it at scientific conferences and found that others had come to some of the same conclusions in publications from a wide variety of sources. As I began to probe more deeply, I began to recognize the threads of a common pattern, an accumulation of phenomena which are clearly at odds with, excluded from or unexplained by the standard model. And then something wonderful happened.

One night, after reading a portion of Carlos Castaneda's wonderful book, ***The Art of Dreaming***, I succeeded in deliberately inducing a powerful, lucid dream. I awoke repeatedly during that night with tears of inexpressible joy

streaming down my face. I was so awestruck by what I learned during successive segments of that dream that my life was altered forever.

I had been asking the question which frames the thesis of this book for several years. As a result of that dream and many others like it which have followed, which were equally profound and compelling, I enjoyed the privilege of talking and working with some of the finest minds on the planet. Synchronicity has played an increasingly important role during this process. Just the right people, the perfect book, compelling information, unanticipated gifts and all manner of gratuities have been delivered to me at just the right time, time and again, over the past six years. When I first noticed this happening, I was acutely discomfited by it. But as I came to recognize what was occurring, I learned to get out of the way and allow the information to emerge according to its own timetable.

Because of the way the material contained in this book has been supplied, sometimes in ways so beautifully integrated that it has taken my breath away, it can truly be said that this book is the result of no real work of my own. Rather, the notions expressed here have emerged in a way that has sometimes been so beyond my control, so compelling, as to be utterly irresistible. Since I am a left brained, type-A, objective-oriented sort of person, the adjustment to this way of allowing my questions to be answered has been challenging.

Some of the ideas and concepts contained in this work are new. Many of the notions expressed here are controversial. Perhaps more than most, I am aware of the extent to which the values of some religious organizations and the philosophical underpinnings of the standard model of science are called into question by this work. I do not pretend to have originated these ideas – rather, I have carefully, thoroughly investigated the information included in these pages until I have become certain that it rises to an acceptable standard of validity and verifiability. It is what it is.

Where it has been possible, I have met or talked personally with those whose work is referred to here. Where it has not been possible to make personal contact, I have attempted to correspond with the sources quoted here or with others who know or who have worked with them. In the absence of either

alternative, I have given attribution wherever possible. Where I have been personally engaged in experimental processes designed to test those ideas, I have deferred my comments to the endnotes.

In the final analysis, the conclusions reached by the end of the book are the result of a rigorous evaluation of literally thousands of primary and secondary sources, describing work carried out by scientists, technicians and engineers working in laboratories all over the globe. If the conclusions I have drawn from their work are in error, the errors have been honestly arrived at. To the extent that the conclusions and connections I have identified are vindicated by the work of others, I express my profound gratitude in advance.

After years of research and the inner work which is reflected in these pages, of one thing I have become quite certain: because of the way we practice science, the war to save this beautiful planet is being lost to short sightedness, megalomania and greed. The human race has not yet awakened to the fact that we are inextricably conjoined with everything else in the world. We do not own it but rather are its stewards. Unless and until we come to terms with this verity, the world and all living things on it will continue to live in a deadly peril of our own making.

We have at our disposal absolutely everything we need to save the planet and each other. This is no longer a matter solely relegated to the development of more sophisticated technologies. Indeed, if we can summon the courage to perfect our access to and reliance on truth in our own lives, one life at a time, together we can create a world of breathtaking beauty and peace, founded on kindness and compassion, sufficient to suit all our needs. It is to this purpose that this book and my life are dedicated.

David G. Yurth

May 22, 2002

Holladay, Utah



**Y-Bias and Angularity:©**  
***The Dynamics of Self-Organizing Criticality***  
***From the Zero Point to Infinity***

**Abstract:**

The quest of modern physics has been to develop a model which correctly describes the role and dynamics of the interactions by which Nature works. In order for the model which describes these interactions to be robust, it must not only accommodate phenomena which are known to occur, but must also accommodate all rigorously documented phenomena, predict phenomena which are as-yet undiscovered, and allow for the inclusion of all rigorously observed, impeccably documented, carefully reported data derived from all sources. To be adequate, any universally applicable physical model must also accommodate the contemporaneous interaction between Descartes' 'physical stuff' and 'spirit stuff' with equal cogency.

The current model fails to rise to this standard. It is based on a number of fundamentally flawed, incomplete and arbitrarily imposed assumptions. In the 35 years since the Standard Model was improved by the Copenhagen School, the reductionist methodology which typifies scientific research has run up hard against the most daunting of all Nature's mysteries. Experimental results provided by the most powerful microscopes, largest telescopes, fastest linear accelerators and other advanced devices, demonstrate that there is an underlying order in the cosmos which has not yet been understood. The shortcomings of the Standard Model are ameliorated by the application of the rules of Self-Organizing Criticality in complex, open systems [SOC][[602](#)] as integrated with the dynamics described as Y-Bias and Angularity.[[603](#)]

**Concept: Y-Bias/Angularity & Self-Organizing Criticality (SOC):**

The authors provide a simple, elegant model of scalar interactions, which accommodates phenomena not heretofore accommodated, by describing how the fundamental processes of **Y-Bias Interactions** [[604](#)] and optimal

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

concomitant **Angularity** combine to operationalize the autopoietic processes found in **Self-Organizing Criticality** [605] [SOC] as described by Bak et al. These dynamics combine to produce the space-time continuum described by Minkowski as 4-space [ $L^4$ ], defined in terms of time, matter, energy and Local-Linear/Non-Local, Non-Linear [ $L^2/N^2L^2$ ] field effects.

Intrinsic to the process of unraveling this fundamental mystery is the authors' attempt to define three essential and heretofore inadequately defined components of the SOC process: (1) mass, (2) magnetism, and (3) gravitational field effects. In addition, the authors integrate the 'undulating waveform' attributes defined in Whittaker's famous 1903 formulation with Mandelbrot's fractal geometries and the Fibonacci Series to provide a model of organizational dynamics which resolves the cosmological issues defined as:

- The Antimatter Problem
- The Galaxy Formation Problem
- The Isotropy Problem
- The Flatness Problem

Finally, the authors provide a scalar roadmap which describes how matter, energy, time and all other field effects arise from the Physical Vacuum [606] via the Zero Point [607] to constitute  $L^4$  at ten distinct scales of quantum complexity. The schema posited here accommodates the concomitant role and dynamics of dissipative structures [Prigogine, Stengers et al] and self-organizing criticality [Bak et al] at each of the ten scales and, further, illustrates how matter, energy, time and field effects are generated as increasingly complex products of the Y-Bias interactions between charge ensembles occurring at the finest scales. Digital images of archetypal shapes and forms occurring at the Third through Tenth scales illustrate how Y-Bias interactions combine to produce the effects found in all SOC systems throughout the cosmos. The interactions attributed to the first three scales are described in conceptual and

mathematical terms, supported by examples of the behaviors and attributes associated with SOC evolution at the finest scales.

**Background:**

The Standard Model of Physics and the General Theory of Relativity [GTR] hold that all matter, energy and field forces were created at the instant of the Big Bang [e.g. Weinberg et al], and that time, gravitational force, electromagnetic forces, and the strong and weak [van der Waals] nuclear forces are distinct, mutually exclusive field effects acting *a priori* throughout all of  $L^4$ . In the alternative, Y-Bias and Angularity Theory proposes that matter, energy, time and all field effects are constantly being constructed and deconstructed from the Physical Vacuum, via the Zero Point, as a perpetual cycle of Self-Organizing Criticality and structural dissipation.

The authors posit that the critical dynamics which drive the operational mechanics of the SOC processes, which also operate to create/deconstruct  $L^4$ , can be defined in terms of the Y-Bias interactions occurring between virtual charge ensembles and virtual photons in the Physical Vacuum, via the Zero Point, and at all subsequent scales. Increasing complexity in the organization of matter and energy occurs at successive scales of organization to produce the observable phenomena which populate  $L^4$ . It is further posited that the degree of angularity between such interactions is definitive, determining at the primary scalar interaction [for example] whether time domain and spin-polarized charge ensembles will remain viable and robust [i.e., rise above the  $1/f$  noise threshold quanta] and subsequently combine with other equally robust interaction products to increase organizational complexity and propagate field effects, or, in the alternative, fail to achieve coherence and thus deconstruct to their prior, virtual, and undifferentiated states in the Physical Vacuum.

For those interactions which achieve coherence at the primary scale, the angularity of the subsequent Y-Bias interactions determines whether the

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

eventual manifestation will subsequently become observable as matter, energy, time and/or field effects. Y-Bias interactions define the nature and extent to which all scalar interactions in the Physical Vacuum satisfy the SOC demands of fractal boundedness or unboundedness, which are observed to operate across the infinite expanses of time and space, in realtime. By this means, materiality in the physical world eventually unfolds and enfolds at all scales, as Bohm rightly suggested. While the dynamics and mechanics of SOC systems are neither widely addressed nor actually accommodated by the Standard Model, they are nevertheless rigorously observed and reported throughout scientific literature. The work of Bak and others demonstrates, and Y-Bias/Angularity Theory holds, that the cosmos is a single, open, complex SOC system at all scales.

Prigogine and Stengers [608] were awarded the Nobel Prize in Physics for their breakthrough work in the field of dissipative structures. Their work supported subsequent experimental and theoretical advancements provided by Bak [609] and his colleagues at the Brookhaven National Laboratories, which resulted in the explication and rigorous experimental verification of the set of rules which has come to be referred to in the literature as the Law of Self-organizing Criticality [SOC]. The significance of Bak's work is that it provides the definitive theoretical basis describing how the cosmos simultaneously and catastrophically annihilates and automatically organizes matter and energy at all scales, to create and deconstruct the physical universe we observe. SOC systems exhibit four uniform characteristics which have been rigorously shown to operate universally and uniformly at all scales throughout the cosmos. These include (1) logarithmic power law relationships between related events in complex, open systems or sub-systems, (2) punctuated equilibrium, (3) fractal geometries defined by the Fibonacci series and (4)  $1/f$  quantum noise thresholds.

While the attributes of SOC systems are well known and have been rigorously documented by a global community of qualified researchers, the

dynamics which operationalize the mechanics of such systems have not heretofore been clearly understood. Several reasons are cited for the general failure to develop a fully evolved model describing the primary scalar interactions intrinsic to SOC systems. D. Ayres et al has articulated and experimentally verified the nature, role and dynamics associated with the magnitude and angularity of SOC interactions. His observations and writings identify this body of knowledge as "Y-Bias and Angularity Theory." [610]

According to Ayres et al, all interactions in the cosmos can be described in terms of (1) the magnitude of the weighted waveform and vector velocities exerted along the Y-axis of one interacting component upon the X/Z axis trajectory of another, (2) the angle of intersection between them, and (3) described in terms of the resultant weighted waveform and vector velocities, time domain and spin-polarization effects which are manifest as the product of their interaction. The authors assert that this dynamic, which has heretofore not been incorporated into the Standard Model, provides the missing link to understanding how nature works as an SOC system at all scales.

### **Entropy Conversion and Dissipative Structures:**

In their seminal book ***Order Out of Chaos***, Nobel laureates Ilya Prigogine and Isabelle Stengers [611] provide a road map for man's new dialogue with nature. Their work broke totally new ground when it was published because it brought a simple, elegant order to the search for an answer to the question,

*"If the universe operates in a perpetual state of chaos [which was what was believed before the book was published], why hasn't it self-destructed long before now?"*

The corollary to this question is equally compelling. It asks,

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

*"If entropy is the primary dynamic which operates to determine the nature of the cosmos, how can autopoiesis [self-organization in open, complex systems] be simultaneously accommodated? [612]*

The underlying phenomena which give rise to this question revolve around a condition described in mathematical constructs as "entropy". Entropy is a mathematical construct used to describe the state of chaos which exists in a given system as the result of irreversible dissipative processes. [613] The work of Stengers and Prigogine did not address similar effects arising from internally generated self-organizing quantum interactions, all of which taken together constitute the entire set of dynamics which are known to drive autopoietic SOC systems. In any system which has not reached a state of self-organizing criticality [defined as the point at which creative and/or catastrophic events occur spontaneously within the system, without the intervention of outside forces], the rules of chaos and entropy operate with predictable consistency.

**The Origins of Entropy**

The coherent integration of disordered virtual energy [undifferentiated information] which operates in the Physical Vacuum, and the conversion of this virtual energy into observable energy at the primary scale [via what has come to be referred to in the literature as the Zero Point], is the process by which the field of constructive entropy [specifically, the Physical Vacuum], expressed as an infinite realm of self-referential statistical probabilities [Kafatos and Nadeau describe this field as 'the background reality-as-it-is] [614], is converted to deconstructive entropy, as observed in  $L^4$ . Bearden's hypothesis suggests this process occurs as follows [615]:

- At the scale of the Physical Vacuum, a charged scalar virtual ensemble *continuously absorbs* disordered virtual photon energy from its seething vacuum energy exchange.

**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

- The energy  $\Delta E$  <sup>(1)</sup> of each virtual energy photon absorbed is transformed into a virtual change  $\Delta m$  <sup>(2)</sup> in the *mass* of the charged particle, by  $(\Delta E)/c^2 = \Delta m$  <sup>(3)</sup>.
- Since mass is *unitary*, its successive virtual energy state causes  $\Delta m_i$  to integrate *coherently*, shown as  $\Delta m = \Delta m_1 + \Delta m_2 + \dots + \Delta m_i + \dots$ . This process *reorders* the absorbed disordered energy, but as a summation change  $\Delta m$  of mass-energy until the quantum threshold is reached.
- When sufficient virtual mass-energy change  $\Delta m$  is accumulated, there is sufficient mass-energy excitation  $1/f = \Delta E = (\Delta m)c^2$  <sup>(4)</sup> for emitting an *observable* photon.
- Because it is incessantly perturbed by vacuum fluctuations (*zitterbewegung*), once the quantum threshold ( $1/f$ ) is reached, the excited charged particle abruptly and forcibly decays by emitting a real, observable photon. At that moment, the coherent integration of virtual energy into observable energy has been accomplished.

Bearden's schema suggests that interactions at the primary scale, which produce the set of results [time, matter, energy, field effects] observed to arise

---

<sup>1</sup>  $\Delta E$ : In mathematical expressions, this term contains two elements.  $\Delta$  is referred to as 'delta.' It connotes a change or difference between states. E is used as an abbreviation for energy.

<sup>2</sup>  $\Delta m$ : In mathematical expressions, this term contains  $\Delta$ , the 'delta' or change value, as well as the symbol conventionally used to connote 'Mass.'

<sup>3</sup>  $(\Delta E)/c^2 = \Delta m$ : This expression is read as 'delta [change] in E [energy] divided by the square of C [speed of light] equals an equivalent change in mass. When rearranged in simple algebraic terms, by multiplying both sides of the equation by the value 'c<sup>2</sup>', we derive Einstein's famous equation  $E = MC^2$ .

<sup>4</sup>  $1/f = \Delta E = (\Delta m)c^2$ : **this expression means that when the quantum-defined minimal level of noise is equal to the change in energy, it is also equal to the concomitant change in mass.**

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

from the primary set of causal dynamics, occur at the Zero Point. What is not described in Bearden's hypothesis is the set of rules which govern (1) the unitary nature of mass, (2) how virtual energy is absorbed by virtual charge ensembles, (3) how virtual ensembles interact to exhibit the characteristics of charge, (4) why some charge ensembles become robust and others do not, and (5) how the conversion of virtual energy by charge ensembles eventually becomes differentiated as matter, energy, time domain polarity or field effects at the primary, secondary and tertiary scales, and so on.

The authors posit that the determining dynamics which operate to facilitate and regulate the absorption of undifferentiated virtual energy and the conversion of this positive entropy to constitute matter, energy, time and field effects, all of which continuously demonstrate entropy [emission of real photons] above the tertiary scale of evolution, are defined as the Y-Bias Effect, as determined by the Angularity of virtual charge ensemble interactions.

**Issues:****Not-Accommodated Phenomena**

In contrast to the simple, elegant, uniformly applicable and universally observed set of phenomena defined by Bak/Ayers, the architecture of the Standard Model fails to accommodate a number of important recent discoveries. Additionally, theoretical models recently developed to describe the dynamics which govern scalar interactions have thus far failed to accommodate rigorously documented phenomenological anomalies such as non-local effects at a distance, [616] scalar non-local field effects,[617] inertial mass reduction in non-linear gyroscopic oscillations,[618] consciousness interactions with primary particle and photon behaviors and beams of laser light,[619] delayed-choice experiments in astrophysical observations,[620] super-luminal data transport rates,[621] non-local field effect persistence,[622] over-unity plasma discharge effects[623], and the energy  $\Delta_E$  generated by the separation and recombination of Hydrogen atoms in a vacuum.[624] Recent astronomical



observations such as the behaviors of black holes, temperatures in excess of 100 million degrees F at the core of newly formed stars and galaxies, observed variations in the speed of light, and other naturally occurring phenomena not accommodated by the Standard Model, are both accommodated and predicted by the new model described here.

### **Standard Physical Model:**

R. Santilli, in his widely recognized and published work, has described the Standard Model as follows[625]:

*In the 1950s and '60s scientists faced a bewildering array of particles coming from particle accelerators as they pushed to ever higher energies. Order was offered in the 1960s when several scientists proposed what is now called the Standard Model.*

*In it, six types of Quark (and corresponding anti-Quark) are the building blocks for heavy particles. Mesons (middleweight particles) are made of two Quarks (or antiquarks). Baryons (heavyweights, including Protons and Neutrons in the nuclei of atoms) are made of three Quarks (or antiquarks).*

*Electrons, described as buzzing in clouds around the nucleus, are in a separate category called Leptons (lightweights). There are only six Leptons: Electrons, muons, and taus, plus three corresponding neutrinos. Leptons are their own fundamental particles. Like Quarks, Leptons are believed to be fundamental particles with no underlying structure.*

**Figure 1**

Quarks	u up	c charm	t top	$\gamma$ photon
	d down	s strange	b bottom	g gluon
Leptons	neutrinos			W W boson
	$\nu_e$ electron	$\nu_\mu$ muon	$\nu_\tau$ tau	Z Z boson

One of the fundamental question which remains unanswered by the Standard Model is compelling, when stated as follows:

*If Einstein's GTR [General Theory of Relativity] is admitted as the defining standard for all field effects which operate in the cosmos, and given that the relativistic attributes of  $C$  [the speed of light] constitute an absolute upper limit to the rate of information transport velocities in the 4-dimensional universe, by what combination of primary interactions is the cosmos able to operate in realtime, across 15- 20 Billion light years, as an SOC system?*

This question, in turn, gives rise to a discussion of other fundamental issues, including (1) the nature of the set of properties currently referred to as mass, magnetism and gravitational forces, as reflected in the Alpha Constant[626]; (2) the nature and dynamics of the class of phenomena currently referred to as "primary field effects;" and (3) the incompatible operative dynamics encompassed by current formulations of electromagnetism [as reformulated by Myron Evans, Lawrence Crowell etal] [627], quantum expressions of the gravitational forces and the laws of thermodynamics [as clarified by M. Melehey] [628], and the reformulation of Hadronic Mechanics [as produced by Santilli etal].

Intrinsic to this set of issues are the ancillary issues related to the role and nature of (1) hadronic spinors [Cartesian torsion as defined by Santilli's reformulated model of Hadronic mechanics] [629], (2) non-local scalar field effects [as experimentally verified by Gisin, Aspect, Wheeler, Poponin and

others] [630], and (3) the coupling of consciousness with hadronic interactions, photonic effects, local and non-local field effects and related phenomena [as experimentally verified by Drexler University, Eyring Research Institute, Aluminum Research Center, and others [631], and Dr. Dean Radin, UNLV] [632].

One fundamental shortcoming of the Standard Model illustrates how severely crippled this model has become. The Standard Model of physics takes for granted the often-stated "fact" that while a fixed primary charge produces a set of resultant fields and field effects, which are radiated directionally, in terms of varying weighted vector velocities, time and spin polarization, angular momentum and waveforms [as measured in Fermi units of  $10^{-13}$  cm], usually in the form of photons, as a consequence of its interaction with surrounding charges and its locale, the dynamics of its interactions have not yet been adequately explained. Further, the Standard Model does not illuminate the paradox that while the charge ensemble produces energy as a result of its interactions with other charge ensembles or field effects, experimental evidence demonstrates that this interaction takes place in spite of the fact that no observable energy is input to the source charge.

Again, in Bearden we find,

*Experiment establishes there is no observable energy input to the source charge. Yet charges continuously pour out energy and establish all EM [electromagnetic] fields, potentials, and their energy quanta. Classical EM and electrical engineering models accept that the associated charges are somehow the sources of all EM fields, potentials, and their energy output. But the models assume that the charges create those fields and potentials and their energy, from nothing at all, because they assume there is no dynamic energy input to the charge. Thus, present electrical power engineering uses*

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

*a seriously flawed EM model that assumes total violation of the conservation of energy law. [633]*

Second, Bell's Theorem and the General Theory of Relativity predict non-local effects at a distance.[634] Gisin's 1997 experimental verification of Bell's Theorem at CERN demonstrates conclusively that non-locality at a distance is an intrinsic attribute of Electron-Positron pairs.[635] Nevertheless, non-locality and well documented anomalies involving non-local field effects, such as those referred to in the literature as Poponin's Phantom DNA Effect[636], are prohibited by the current model of physics as universally occurring, natural scalar phenomena.

Third, the current notion, embodied in the GTR and EPR [Einstein, Podalski, Rosen] formulation of gravitational effects, is that gravitational force, electromagnetic force, the strong and weak nuclear forces are primary, pre-existing and mutually exclusive.[637] Y-Bias/Angularity Theory suggests that the traditional field effects identified by the Standard Model are neither primary nor mutually exclusive.[638] Rather, when viewed in the context of Y-Bias interactions, all local-linear [ $L^2$ ] and nonlocal/nonlinear [ $N^2L^2$ ] field effects are found to be derivatives of the same set of primary scale Y-Bias interactions occurring at the Zero Point, as defined and governed by Bak's autopoietic rules of self-organizing criticality.

Fourth, while the work of Bak et al rigorously validates the operative dynamics of autopoietic interactions in SOC systems, physics as a convention and Science as an institution have thus far failed to integrate this seminal information into the fabric of the Standard Model. The absence of a cogent cosmology, based on SOC rules, renders the Standard Model both incomplete and fundamentally flawed because it cannot accommodate any of the naturally-occurring non-local effects at a distance -- phenomena which have been observed, documented, rigorously verified and consistently reported for more

than 100 years, and which are the fundamental constituent attributes of the fabric of the cosmos.

Fifth, the Second Postulate of the STR [Special Theory of Relativity] sets an arbitrary upper limit to the relative velocity of both physical and virtual photons operating in  $L^4$ . Nevertheless, rigorously disciplined experimental evidence demonstrates that semantic information [in both digital and analog forms] can be propagated and received at least  $10^9 \text{ C}^{(5)}$  [this refers to capital C as a relativistic value, as opposed to 'c', which is accepted as an absolute value in current formulations of field forces][639], without attenuation by any known interposed materials or distance.

Sixth, the General Theory of Relativity [GTR] and the exceptions provided in the 2<sup>nd</sup> Postulate of the Special Theory [STR], which describe quantized radiation of virtual photons, are inconsistent with a rigorous analysis of photographic imaging conducted during the past decade by the Hubble Space Telescope. According to the GTR,[640] Hubble should not be able to snap sharply focused pictures of far distant objects. Nevertheless, Hubble's images are crisp and sharply focused, regardless of the absolute distance to the light-emitting source. According to Ragazzoni et al, whose team studied Hubble pictures of a galaxy more than 5 billion light-years away and, separately, an exploding star 42 million light-years distant,

*When light arrives from a distant object, some parts of the light's wave should be retarded with respect to others, because each would take slightly different paths through the "foam." [ref: "quantum foam" as found in Superstring and M Theory]. Light will appear to come from positions around the actual source, causing a blur.[641]*

---

<sup>5</sup>  $10^9$ : This mathematical expression means that the underlying factor [C, the speed of light] is multiplied by the number ten, followed by 9 zeros, or the number 10,000,000,000.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

*"You don't see a universe that is blurred," he said. "If you take any Hubble Space Telescope Deep Field image you see sharp images, which is enough to tell us that the light has not been distorted or perturbed by fluctuations in space-time from the source to the observer."*

According to GTR, light is said to move in very small but measurable quanta. Time is presumed to move in correspondingly miniscule quantum bits. The bits are assumed to comport with Einstein's theory of general relativity, which describes physics at the large scale of the universe. In the final analysis, Einstein asserted that time, gravity and the fabric of space are all different manifestations of the same underlying phenomenon.

However, in recent years, theorists and rigorously verified experimental evidence have shown that a pair of quanta, consisting of a virtual photon of the Planck length and a similarly miniscule packet of Planck time, should be the smallest measurable physical components in the cosmos. Below these thresholds things should become undifferentiated [e.g., at the scale of the Physical Vacuum]. If light's travel is quantized as described in GTR, it could not, according to current theory, be variable in units below the Planck limit.

*"If time doesn't become 'fuzzy' beneath a Planck interval, this discovery will present problems to several astrophysical and cosmological models, including the Big Bang model of the universe."*  
[642].

One challenge for proponents of the Standard Model, if the studies by Lieu and Ragazzoni are on track, is that the instant of the Big Bang would have involved an infinitely hot and dense condition, which is specifically prohibited by the Standard Model and current theory. This anomaly strongly suggests that Time, as a quantized element of  $L^4$ , and as predicted by Y-Bias/Angularity

Theory, does not exist at the Zero Point. This suggests, in turn, that Time, as a mutually distinct dimension demonstrating its own energy density, is therefore a product of the primary scalar interactions which occur at the Zero Point, which serve to convert virtual charge ensembles with positive entropy to actual charge ensembles with dualistic properties demonstrating dissipative entropy.

Since this element of the new model is supported by rigorously validated mathematical expressions and verified by observable phenomena, the nature of the cosmos, including all its attributes in  $L^4$ , must be fundamentally different than that which is described by the GTR and the Standard Model.

### **Field Effects - Flaws and Myths**

The current notion, embodied in the GTR and EPR formulation of gravitational effects, is that gravitational force, electromagnetic force, and the strong and weak nuclear forces are the only forces in operation in the cosmos. Further, it is held that these field effects are primary, pre-existent to any interactions at any scale, and mutually exclusive.[643] This dictum requires that the four 'primary' field effects must be invariant; that is, wherever they are observed, they must operate with absolute linear consistency at all scales. The literature is now replete with impeccably documented evidence which demonstrates that none of these fields are invariant at any scale. Further, experimental evidence currently demonstrates that each of these field effects can be arbitrarily mitigated by the application of suitably engineered experimental macroscopic techniques which are the product of their mutual interactions.

Rigorously disciplined experimental reports demonstrate, for example, that the speed of light in a local and universal sense is neither invariant nor restricted to either upper or lower limits[644]; that gravitational force can be mitigated in a targeted locale[645]; that information transport velocities can operate in excess of  $10^9$  times  $C$  under controlled conditions[646]; and that the

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

disciplined exercise of human choice exerts a repeatable, demonstrable, quantifiable effect on matter, energy and the four 'primary' field effects[647].

While the phenomenological evidence is no longer arguable, no cogent explanation has yet been supplied in the context of the Standard Model to describe these interactions in a way which is consistent, experimentally verifiable or universally applicable. The authors posit that if the field effects described in the Standard Model are primary, no manipulation of a product of their interactions or effects at any scale can have the effect of mitigating them. Mitigations of all known field effects at all scales are now shown to comprise a ubiquitous set of localized exceptions to the generally accepted rules. This insight demands that the four 'primary' field effects be recognized as derivative effects which are manifestations of [and therefore subject to the dynamics of] an underlying set of quantifiable primary causes.

Y-Bias Theory holds that the traditional primary field effects are neither primary nor mutually exclusive.[648] Rather, the local-linear and nonlocal/nonlinear [referred to hereafter as  $L^2/N^2L^2$ ] field effects observed, verified, reported and described in the literature are all derivatives of the same primary Y-Bias interactions occurring at the Zero Point, governed by SOC dynamical rules, and carried from the most finite to the largest scales as primary, intrinsic, self-referential, and autopoietic attributes of Nature itself.

**Definitions - Self-Organizing Criticality:**

Criticality is mathematically defined as the state of highest efficiency in a complex system.[649] At the point of criticality, catastrophic events happen in a big way, all at once, and not by gradual degrees. This is as true of rush hour traffic jams as it is of mass extinctions and major weather events. When we understand this aspect of complex systems, we also begin to understand something fundamental about the way Nature works. When it is understood that this set of rules operates at all scales, it then becomes possible to develop a model which explains the observable phenomena which are not accommodated



by the Standard Model. It also becomes possible to predict the existence of phenomena not yet discovered, which can be logically presumed to operate according to these rules at larger and smaller scales than previously imagined.

The structure of the cosmos, as observed in  $L^4$ , is assumed to be universally coherent in terms of SOC rules. These rules provide that as undifferentiated "virtual" information originating in the Physical Vacuum [and emerging via the Zero Point] coalesces with other virtual ensembles to create fundamental pairings [which demonstrate duality, polarity, spin and time domain properties], the process of coalescence adheres to four primary conditions. According to Bak, all four conditions operate simultaneously and ubiquitously at all scales.[650]

### **The Role of Criticality**

Bak's investigation of SOC system dynamics began as an attempt to model the self-organizing behaviors associated with catastrophic avalanche events. The definitive experiment viewed this set of dynamics as embodied in a randomly organized pile of uniform grains of sand. As Bak and his team constructed each sand pile, they realized that there comes a time when the sand pile can no longer be considered just a stack of single, unrelated grains. As the mound of sand reaches the point of criticality [that point at which the quantum I/f threshold has been breached and the power laws become operative], the sand pile becomes a single, integrated, self-organizing system. As soon as this happens, it is no longer possible to predict the magnitude, location or frequency of any single avalanche event within the system. As the experimental evidence shows, even if we simultaneously know everything there is to know about every single grain of sand comprising the pile, the nature of open, complex and self-organizing SOC systems is such that we cannot improve the consistency, accuracy or reliability of our predictions regarding its behaviors in any locale. In SOC systems as they operate in Nature, there is no linear, 1-to-1 relationship between events occurring in the past and those which are anticipated in the future.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

We can predict only what the power laws permit. The importance of this insight cannot be overstated. It means, among other things, that in spite of all the best technologies and instrumentation we will ever devise, we will never, under any circumstances, be able to reliably predict the magnitude, location or timing of any events which occur as part of any complex, open SOC system[651]. This includes earthquakes[652], solar flares, stock market behaviors, mass extinctions, meteor strikes, weather, geologic events or the behaviors of human interactions such as the Internet. If our way of thinking about the world we live is modified to comport with the way the cosmos really works, instead of the way the world is described by the Standard Model, our approach to exploring the mysteries of the cosmos must be altered in ways that are still largely unimaginable.

**Complex, Self-organizing SOC Systems**

For the purposes of this discussion, a complex, open, self-organizing system is defined as one which demonstrates the characteristics of the condition known as criticality. For purposes of illustration, at the grandest of scales, the Milky Way Galaxy [like all galaxies found in the cosmos] is a complex, open, self-organizing system[653].

**Figure 2***Hubble/ NASA example of Celestial Organization*

The fact that this is universally acknowledged to be true presents some intriguing problems which cannot be accommodated by the Standard Model of physics currently in general use.

At a finer scale, the same is true of the solar system. In every sense, it demonstrates all the characteristics, attributes and behaviors associated with self-organizing systems.[654] So does our planet. Taken by itself as a single comprehensive unit, the Earth and its sub-systems all demonstrate the attributes of self-organizing criticality at every scale, from the release of virtual photons produced by energetic interactions to the Earth's participation as a member of the solar system set[655]. All these systems operate, as Capra[656] has rigorously reported, in an integrated, indivisible aggregation of inextricably inter-related constituents which, in the final analysis, comprise a single overall SOC system.[657]

### **Simple, Elegant Rules:**

According to the experimental data developed by Bak et al, it is evident that open, complex, self-organizing SOC systems simultaneously and universally demonstrate all four of the following attributes:

1. **Punctuated Equilibrium:** Criticality is defined as the point in SOC system evolution at which an observable event occurs. Between each event or "avalanche" there are relative periods of apparent stasis which are punctuated from time to time by other "avalanches" of various magnitudes. These avalanches can be literal, as in the case of Bak's sand pile [or the catastrophic rush of a field of snow down a slope], or they can take the form of mass extinctions, the rises and falls of the stock markets, the occurrence of solar flares, earthquakes, tornados, hurricanes or floods, wars, the evolutionary cycles of the Internet, the evolution of languages, etc. The phenomenon of punctuated equilibrium is an intrinsic dynamic comprising the quantum functions which have been observed to operate at all scales in Nature. In this view of SOC behaviors, the geological effects demonstrated by the Grand Canyon, for example, are the product of a series of catastrophic avalanche events

rather than the gradual grinding down of geological strata by hydro-dynamic erosion over millions of years.

2. **Power Laws:** The relationship between the magnitudes, frequencies and locale of individual avalanches can be expressed in terms of a simple exponential equation. There are no singular explanations for large events - the same forces which cause the Dow Jones Industrial Average to rise 5 points on one day also caused the crashes of 1929, 1987 and the Dot.com crash of 1999. Wherever we find that a logarithmic relationship exists between a series of catastrophic events, which can be plotted on a set of X-Y coordinates as straight line with a slope, we can be absolutely certain that the system which produced it is a self-organizing SOC system. The logarithmic relationship which characterizes the power laws governing SOC processes is primary to the formation of matter, energy, Time and all the field forces which operate in the cosmos. All of Nature, at all scales, manifests uniform compliance with this rule.
3. **Fractal Geometry:** First expressed by Benoit Mandelbrot[658] of IBM, fractal geometry is a mathematical construct which illustrates that where a complex, open, self-organizing system exists anywhere in our space-time continuum, it is self-similar at all scales. Fractals are the natural record of the evolution of natural, open, complex, self-organizing systems of all kinds. In this context, Y-Bias/Angularity Theory holds that the "boundedness – unboundedness" attributes manifest by the aggregations of scalar components, occurring at the Zero Point, define the eventual form each event will become at each subsequent scale of organization.

Boundedness, the conceptual construct reflected by the self-similarity which characterizes fractal geometry, occurs as the result of the interaction of scalar components beginning at the primary scale and extending throughout the micro and macrocosm. The formula which describes the fractal properties of SOC interactions is shown as

$$\mathbf{Z} \rightleftharpoons \mathbf{Z}^2 + \mathbf{C} \text{ } ^{(6)},$$

**Formula 1**

the nature, extent and dynamics of which are a subject of this discussion. By its nature, fractal geometry serves to organize discrete quanta of information into aggregations which are either bounded [as  $\mathbf{Z}$ ] or unbounded [as  $\mathbf{Z}^2 + \mathbf{C}$ ], in a way which preserves the primary data sets found at the Zero Point throughout each quantum-defined scale of subsequent organization. The fractal formula suggests that SOC dynamics are self-referential, as shown by the function ' $\rightleftharpoons$ ', which connotes interaction rather than equivalence. This is the primary function identified by Kafatos/Nadeau which renders 'background reality-as-it-is' self-referential at all scales. This function is also the operative dynamic which drives the Implicate Order postulated by Bohm.

When a complex system evolves to a state of self-organizing criticality over any increment of time  $[\Delta t]$ , the physical record of its evolutionary history can only be described in terms which are fractal. The shape of a riverine delta, the variegated slopes of a mountain range, the shape of a coral reef, and the corrugated features of the human brain are all records of the evolution of self-organizing systems manifest in fractal form. It is because fractal geometry constitutes the natural expression of the evolution of SOC systems that analysts have been able, for example, to

---

<sup>6</sup>  $\mathbf{Z} \rightleftharpoons \mathbf{Z}^2 + \mathbf{C}$ : This formula contains the term ' $\mathbf{Z}$ ' which means an angle of incidence between two interacting data sets or physical events. The symbol  $\rightleftharpoons$  depicts a realtime feedback loop in which each expression feeds information back to the other at a rate which is equal to the square of the speed of light. This interaction suggests that when until the information fed from the left side of the equation meets or exceeds a minimal quantum limit, shown in Self-organizing criticality as the function  $1/f$ , it remains bound by a nexus considered to be a zero point or 'seed' in fractal geometry. When the noise threshold  $[1/f]$  is breached, however, the data or resulting physical phenomenon then becomes self-sustaining until the next noise threshold is reached.

**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

develop applications which efficiently identify non-fractal patterns found in the natural landscape.

4.  **$1/f$  Noise:** In order for any observable event to occur within an SOC system, the interactions between individual components and field effects must exceed quantum-defined scalar "noise"  $[1/f]$  thresholds. For an aggregation of components at any scale to become self-organizing, the number of components, their aggregate properties and the Y-Bias/Angularity effects they exert on each other must combine to breach the minimal noise thresholds. By definition, this set of interactive properties and dynamics demands that all such interactions must be accompanied by and combine to create a concomitant set of harmonic resonances, regardless of the scale at which they occur. The nature and importance of harmonic resonance in this regard is addressed later under the sections which discuss the Fibonacci Series and its relationship to Gravitational Forces.

**Entropy as Broken Symmetry**

As Bearden rightly shows,[659] in particle physics every charged ensemble polarizes the locale of  $L^4$  contiguous to it. Each charge is surrounded by virtual charges of opposite sign, resulting in a dipolar ensemble and a highly energetic exchange between the charge and the active vacuum from which it emerges.

*The asymmetry of opposite charges (and thus of any di-polarity) is a proven broken symmetry.*

- *For a broken symmetry that is discovered, something virtual has become observable. In this case, that "something that has become virtual" is virtual energy evolved from the vacuum.*
- *Virtual EM <sup>(7)</sup> energy from the vacuum is continuously input to the charge's polarization ensemble, absorbed as a differential change in mass by the charged mass, coherently integrated as that*

---

<sup>7</sup> EM: in this expression, EM is the term used to connote electromagnetic field effects.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

*differential mass change, and then re-emitted as observable EM energy.*

By extension, this aspect of Y-Bias/Angularity in SOC systems at the Zero Point serves as a universal energy pumping mechanism. This concept provides the mechanism by which energy evolved from the Physical Vacuum is subsequently delivered to and retrieved from all subsequent scales of SOC development and deconstruction at all scales throughout the cosmos. As a whole, the universe operates as a single, complex, open, self-organizing system which is always in total balance.

**Primary Scale**

This is the scale at which the Zero Point interfaces with and first manifests the organization of ensemble interactions arising within the Physical Vacuum. During the 20th Century, our knowledge regarding finite scales and the properties of the Physical Vacuum has evolved somewhat but is still largely incomplete. The vacuum is popularly considered to be a void, an emptiness, or 'nothingness.' This is the definition of a bare vacuum [660]. However, as science has learned more about the properties of space, a new and contrasting description has arisen which physicists call the Physical Vacuum.[661]

**Descriptions of the Physical Vacuum**

Two competing theories describe the behavior and characteristics of the Physical Vacuum and the Zero Point. These are referred to in the literature as the **Quantum Electro-Dynamic** (QED) model [662], and the somewhat more recent **Stochastic Electro-Dynamic** (SED) model [663]. Both models arrive at the same conclusions, so the choice between them is one of aesthetics rather than substance. In some cases, the QED model gives results that are easier to visualize, while in other cases the SED model is more useful. Importantly, both come to the same conclusion. Even at absolute zero, the Physical Vacuum exhibits an inherent energy density. The QED model maintains that the Zero-Point reveals its existence through the effects of the fifth scale sub-atomic real

particles [Hadrons & Leptons] which emerge from it. By contrast, the SED approach affirms that the Zero Point exists as an interface between the physical world [L<sup>4</sup>] and the Physical Vacuum's undifferentiated 'sea' of electromagnetic fields or waves.[664] In String or 'M' Theory, this 'sea' is referred to as the 'quantum foam.'

### **Casimir Effects**

There is further evidence for the existence of the zero-point energy in this model, as manifest by a phenomenon referred to in the literature as the Casimir Effect. This phenomenon was predicted in 1948 by Hendrik Casimir, a Dutch scientist, and confirmed nine years later by M. J. Sparnaay of the Philips Laboratory in Eindhoven, Holland [665]. The Casimir Effect is demonstrated by juxtaposing two metal plates very close together in a vacuum. When they are as close as possible, a small but measurable force becomes evident that acts to push them together. The SED theory explains this by suggesting that as the metal plates get closer, they end up excluding all wavelengths at the Zero Point between the plates except the very short ones that are sub-multiple harmonics of the plates' distance apart. In other words, all the long wavelengths of the Zero Point are seen to act on the plates from the outside. The combined radiation pressure of these external waves is said to act to force the plates together.[666]

The surface Casimir Effect demonstrates the existence of the Zero Point as a function of the interaction of electromagnetic waves. Interestingly, Haisch, Rueda, Puthoff and others point out that there is a more microscopic version of the same phenomenon. In the case of closely spaced atoms or molecules, the all-pervasive Zero Point produces short-range attractive forces that are described in the Standard Model as the van der Waals forces. It is these attractive forces that permit real gases, for example, to be turned into liquids. When an 'ideal' gas is compressed, it behaves in a precise way. When a real gas is compressed, however, its actual behavior deviates from the ideal equation.



**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

The common objections to the actual existence of the Zero Point center around the idea that it is simply a theoretical construct. However, the presence of both the Casimir Effect and the Zitterbewegung, among other observational evidence, proves the reality of the Zero Point. What is not explained by either of these two models, however, is the set of dynamics by which the interactions they describe actually operate at the primary scale. Further, neither model provides mathematical expressions which address phenomena operating at scales more minute than the level of Fermions, Hadrons or Leptons. When applied to the observed interactions associated with Sub-Quarks [tertiary scale] and Quarks [fourth scale], neither model finds sufficient traction to be useful. The topology intrinsic to the architecture of the models described by Quantum Mechanics is fundamentally limited to the leveled topology allowed by the imposition of the Lorenz Transforms and its reliance on vector mathematics. Again, in Bearden we find,

*In its concept of the zero vector, vector mathematics discards zero-vector summations of active systems of vectors. It replaces such a summation with a zero vector. This is fine for mathematics as an abstract system, but it is in error when applied to real electromagnetic force fields of nature.*

*In the abstract mathematics, a vector zero summation is made the "absence of all finite vectors". Further, all vector zeros are made equal. No concept of the "internal stress" of the zero vector exists in abstract vector mathematics.*

*However, physically the zero summation or "balancing" of vector forces in a medium represents stress in that medium. In the physical case, a vector zero summation system of non-zero vectors has a dynamic substructure, and this substructure is an individual attribute.[667]*

**Einstein's Vector Magnetic Potentials**

Einstein introduced the concept that only the vector magnetic potential has a physical reality in electrodynamics. He postulated that the electric and magnetic fields are merely concepts we have developed to accommodate the reciprocity observed in field interactions between charge ensembles. Most modern physicists still do not accept this assertion. This remains true, even though more recent experimental research [the Aharonov-Bohm experiment] conclusively demonstrates that the A field is real (the experiment shows that A can alter the quantum wave function) [even] when all other EM effects have been completely shielded out.[[668](#)]

For years a controversy has raged around the Aharonov-Bohm effect, which demonstrates the reality of the Einstein vector potentials, among other things. In 1986, most physicists finally accepted the AB effect with its implications (see Physics Today, Jan. '86). However, in the intervening 20 years since his work was completed, no changes have yet been made to EM theory or the basic classical approach to electrical physics and engineering[[669](#)] as taught in colleges and universities.

**Whittaker's Electrodynamic Potential**

In E.T. Whittaker's classical 1902-1903 proofs [[670](#)], we find a categorical statement about the nature of Zero Point interactions. Whittaker's formulation addresses the fundamental issue of the scalar parameter referred to in the literature as 'Potential.' In mathematics, potential is described in terms of the intensity of some field or between interacting fields. Whittaker showed that any scalar EM potential is composed of a harmonic set of bidirectional phase-conjugated longitudinal EM wave pairs. He further showed that any EM field or wave, etc., can be decomposed into differential functions which are comprised of two scalar potentials. By applying Whittaker's 1903 decomposition of the scalar potential to the two scalar potentials described in his 1904 paper, and then applying the proper differential dynamics, we find that all EM fields, potentials, and waves are composed of internal structure and moving internal

parts continuously being 'replaced', as described in Van Flandern's analogy [671]. This description provides a valuable insight into the conundrum described by Bearden which constitutes a broken symmetry.

Whittaker's concept of potential is structured to show 'potential' as a **bi-directional energy flow**. [672] In his book **Gravitobiology**, T.E. Bearden [673] writes,

*"Space-time in a sense may be regarded as a conglomerate of potentials - including the scalar EM potentials [as described by Whittaker]. Therefore, the simplest structure of EM scalar potentials (trapped EM energy) is also nominally composed of such spin-2 gravitons. [674]"*

According to this construction, the structure of the scalar EM potentials which operate in the Physical Vacuum, as described by Whittaker, consists of coupled photon/anti-photon pairs. These are the virtual ensembles referred to elsewhere in the literature. The concept of the anti-photon has been posited by Bearden, Santilli and Evans as the embodiment of the reverse-time process. Therefore, any potential field can be considered as a bi-directional electromagnetic process/anti-process. Accordingly, power can be produced by means of fluctuations of field potential only in terms of an **inner field structural imbalance**. Bidirectional energy flow can be mathematically presented in terms of the equation

$$\mathbf{0} = \mathbf{A} + \mathbf{B}$$

**F.2** <sup>(8)</sup>

---

<sup>8</sup> F.2:  $0 = A+B$ . This expression means that two equivalent processes [A] and [B] which each flow in opposite directions produce the net result of zero.

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

where zero balance [0] is created as a product of the interaction of two opposite processes [A] and [B]. If one of the processes [for example, A] is deemed the source of power (Zero Point vacuum EM potential as the power source), then according to the thermodynamic formula which describes the dynamics of chronal gradients and chronal pressures [ $\mathbf{E} = \mathbf{grad}\phi(\mathbf{t})$ ], the other part of the balanced system, defined as process B, must also be changed.

The interaction between virtual ensembles which interact to create potential can therefore be described in terms of the following equation:

$$\mathbf{0} = \frac{\Delta \mathbf{A}}{\Delta t} + \frac{\Delta \mathbf{B}}{\Delta t} \quad \mathbf{F.3}^{(9)}$$

and in another view

$$\Delta \mathbf{A} / \Delta t = - \Delta \mathbf{B} / \Delta t \quad \mathbf{F.4}^{(10)}$$

If the time attribute exhibited by **B** is considered as reversed time  $\mathbf{t_r}$  and the time attribute exhibited by process **A** is considered to be direct time  $\mathbf{t_d}$ , we obtain the equation for a total energy conservation law that takes into consideration the interactions of **direct time** and **reversed time** as energy processes,

$$\frac{\Delta \mathbf{A}}{\Delta \mathbf{t_d}} = \frac{\Delta \mathbf{B}}{\Delta \mathbf{t_{ry}}} \quad \mathbf{F.5}^{(11)}$$

---

<sup>9</sup> F.3: This expression says that as field A changes direction over an increment of time, if field B also changes direction in the opposite sign over the same increment of time, the net product of their interaction is zero.

<sup>10</sup> F.4: This expression simply expresses the algebraic equivalence of the two field effects by moving one to the other side of the equation.

<sup>11</sup> F.5: This formula describes the  $\Delta \mathbf{t}$  in terms of its direction. The sub-script **d** suggests that time is moving in a forward, direction vector. The sub-script **r** suggests that time is moving in a reverse direction.

When this equation is considered carefully, we can draw no other conclusion except that the amount of power which can be tapped from the Physical Vacuum via the Zero Point is **unlimited**. Since entropy, and therefore 'time' as a linear expression of entropy, does not operate at the Zero Point, it must also follow that there is no limit to the power extraction potential via the Physical Vacuum, if a change of value in **A** is always offset by a corresponding change in the value of **B**. As Melehey rightly suggests, then, the conservation laws as applied to energy must become an expression of the **conservation of time balance at the Zero Point**.

This formulation leads us to a single, unequivocal conclusion:

*The Energy of all processes in direct time must be equal to the Energy of all processes in reversed time. [675]*

This formulation constitutes a unification of Newtonian mechanics (action - reaction) with current formulations of conservation laws. In the general view, it can properly be viewed as the Law of Energetic Balance. It is important to note in this context that zero is not nothing. It is an expression of a totally balanced structure. While we recognize that the structure of time can be described in more complex terms than as simply a bi-directional "time/reverse-time" function, we also recognize that this simplified expression is apt.

*The abstract concepts found in the ancient literature reflect this attribute of natural processes. The ancient Chinese symbol of the 'Yin/Yang' represents the embodiment of balance, framed within the construct of the zero. In the Vedas, as well as in the ancient literature of the Egyptians, the Kabala and the secrets of the Pythagoreans, we find analogues to this expression.[676]*

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

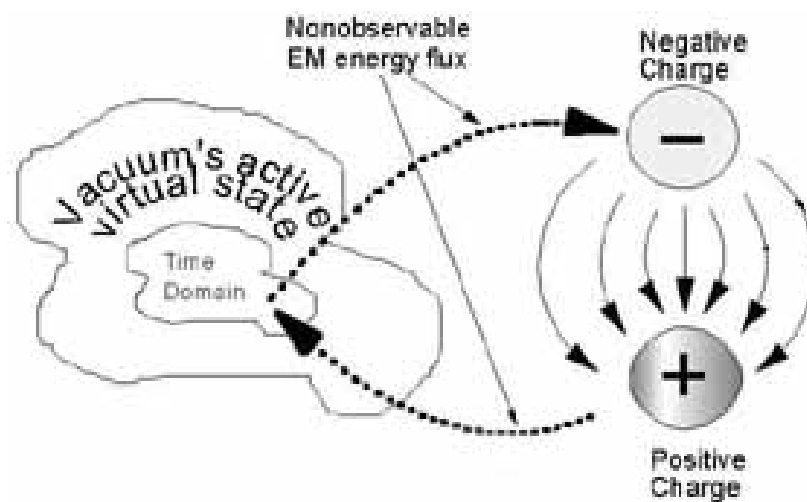
The fundamental point to be made here is this: at the Zero Point, where virtual ensembles interact to create the field potentials which then self-organize to form  $L^4$  at all subsequent scales, the amount of energy available to support the physical structures and functions of the material world is unlimited. Further, it is evident that the primal attributes of timeless balance are intrinsic to both the structure and function of everything which emerges, organizes and operates beyond the Zero Point. This insight gives us a wholly new vantage point from which to consider how Bohm's Implicate Order and Bell's 'Non-local Effects at a Distance' actually operate in the macrocosm.

**Secondary Scale**

This is the scale at which virtual ensembles of undifferentiated, self-referential potential interact to become data in the semantic sense. This is the scale at which Time first becomes operative as a separate and distinct dimension with energy density of its own. Additionally, this is the scale at which the SOC rules become fully operative.

In Bearden we find,

**Figure 3**



**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

Professor Emeritus Dipak K. Sen, Department of Mathematics at the University of Toronto has said of this analysis,

*The source charge problem – "the most difficult problem in classical and quantum electrodynamics" – has been solved by Bearden.*[[677](#)]

**Dynamics:**

At the secondary scale, the interactions of charge ensembles create time, as an expression of the dissipation of energy [entropy]. When entropy is reversed, by definition time must also be reversed. At the secondary scale, we observe a number of phenomena which are not accommodated by the Standard Model. As Y-Bias/Angularity Theory suggests, for a wide range of situations, it is useful to interpret all field effects as derivative polarized expressions arising from the primary scalar potentials.

A primary attribute of primary charge ensembles is the rotational behavior referred to as 'spin.' For example, while it may be true that the spin polarization states  $S_L$  and  $S_R$  [spin left and spin right] contradict a rule of quantum mechanics referred to as the Pauli Prohibition[[678](#)], where both attributes are found in the same ensemble, we beg the question by suggesting that under quantum mechanical conditions at finite scales, the fundamental laws of quantum physics as described in the Standard Model operate in ways we do not yet really understand [[679](#)]. If it were not so, Murray Gell-Mann would not have been awarded a Nobel Prize for the discovery and description of Quarks, which also violate the Pauli Exclusion Principle, by definition.

The fact that the mathematical structure Gell-Mann ascribed to the operational states of Quarks violates the EPR formulations of gravitational effect, coupled with the fact that his mathematical model prohibits the existence of any smaller class of sub-atomic particles, does not speak well of the adequacy of the Standard Model. In 1997, for example, Gell-Mann's former

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

colleagues at FermiLabs announced the discovery of Sub-Quarks [680], the constituent pairs of sub-atomic particles which are now known to comprise all six known Quark and Anti-quark particles. Presumably, these structures also violate the Pauli Exclusion Principle, since they operate at finer scales than either Quarks or Anti-quarks. The concept of a Physical Vacuum and the operation of five fields which are shown as derivative expressions of Y-Bias interactions [arising from interactions via a single undifferentiated field] cannot reasonably be excluded unless the discovery of Quarks and Sub-Quarks is also excluded.[681]

**Secondary Scale Interactions & Attributes**

A sizable list of attributes has been experimentally identified which demonstrates that interactions in the secondary scale operate concomitantly as holographic expressions, manifesting non-local/non-linear  $[N^2L^2]$  attributes, without regard to time and distance, and as fractals, evincing local-linear attributes in  $L^4$ . Operations at this scale are characterized by a variety of behaviors which have been described conceptually, experimentally and mathematically as functions of time domain and spin polarity, angular momentum, weighted waveform vector velocities and so on.

In August 1999, Dr. Myron Evans, Dr. Lawrence Crowell, Tom Bearden and a team of sixteen other physicists, engineers and mathematicians published the first reformulation of Maxwell's field equations in over a hundred years [682]. Contained in their extraordinary work are reformulations of the entire family of formulas which have been developed over the past 100 years to describe the attributes, functions and dynamics which characterize the characteristics, properties and mechanics of electromagnetic fields. Their seminal work demonstrates that the functions and attributes of the fields operating at this scale, including  $N^2L^2$  field effects, can be expressed in terms of parallel geometricized equations.[683]



*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

A careful analysis of the basic formulas developed by Akimov[684], Schwartz[685], Anastasovski[686], Trefilov[687], Reed[688], Santilli[689] and others, is extremely revealing – the most stunning thing about them is the discovery that the characteristics of all four primary fields and the 5<sup>th</sup> field [which we have called the  $N^2L^2$  field] appear to be completely accommodated by the set of functions which comprise spin polarity in linear, longitudinal and transverse wave functions, and angular momentum at both the quantum and macrocosmic level. While there is still much work to be done here, it seems more than coincidental that these attributes are precisely what cause the  $N^2L^2$  field to operate as it does. The formulas referred to include the Fermi-Pasta-Ullam Lattice [690], Einstein's equations, the Young-Mills equations[691] and Geisenberg's equations.[692]

It has been categorically shown that information is conveyed via the  $N^2L^2$  field at a rate which is at least  $10^9$  times faster than the speed of light. This revelation, which is largely due to the ground breaking work of Russian scientist V.A. Dubrovsky up to 1985, has now been confirmed by at least six other laboratories in the former Soviet states,[693] by Prof. Dr. Guenter Nimtz and his colleagues at Cologne University[694], and Lijun Wang[695], Alexander Kuzmich and Arthur Dogariu of the NEC Institute[696]. The group velocity of  $N^2L^2$  field waves has also independently been shown to be at least  $10^9$  times the speed of light.[697]

The litmus test regarding this issue is found in the recent award by NASA of a contract to develop a  $N^2L^2$  field communications system. The award was announced on August 19, 1999, under the title, **NASA Glenn Announces Breakthrough Propulsion Physics Selections**.[698]

A practical set of experiments which reveal just how important this concept is has been conducted both in the US and in the former Soviet states. In the United States, Bill Ramsay[699] describes an experiment in which scientist

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

Greg Hodowanec was able to record information produced by the occurrence of a solar flare more than eight and a half minutes before it was confirmed by NOAA, when the photons and particles liberated by the event entered the earth's atmosphere. He was able to measure the magnitude of the event, in real-time, as it occurred [700], more than 90,000,000 miles away. Candace Pert identifies a similar phenomenon in her exhaustive investigations and reporting of virtually instantaneous information transport in biological systems.[701]

Nick Anthony Fiorenza and Alistair Couper have both reported on the use of gravimetric devices to record the actual transit locations of the planet Pluto, orders of magnitude faster than was possible using measurements based on conventional light wave sensing devices.[702] The devices used by Fiorenza and Couper have been employed by Russian astronomers to determine the precise real-time locations of stellar formations and planets [703]. The results of their work bears heavily on the assumption that information contained in any single location in the cosmos can be instantaneously obtained at any other locale, regardless of the extent to which events are separated by time, space or distance. This assumes that the means of observation are engineered to comport with  $N^2L^2$  field dynamics rather than relying on the data transfer rates associated with radio frequency emissions [light].

We have reason to believe, based on the ground breaking work of V.A. Ablekov, David Bohm and Karl Pribram [704], that the  $N^2L^2$  field is holographic and operates ubiquitously, by definition, throughout the cosmos. The combination of the features identified by their research suggests that the phenomena associated with Bohm's 'Implicate Order' and Pribram's 'Holographic Model of Human Consciousness', which are otherwise inexplicable, can now be accommodated.

Unlike electromagnetism, where analogous charges repel and opposite charges attract, in  $N^2L^2$  fields similar charges attract and opposite charges repulse.[705]

As a  $N^2L^2$  field is generated by the classical spin of a magnetic plate, we can observe and measure the precise effects of the alteration of spin state on the object or system which is encompassed by it. At the Institute for Problems of Materials Science in Kiev, scientists have for more than 25 years used  $N^2L^2$  field generators as an essential component of the apparatus used to manufacture exceedingly exotic materials, for which we have no comparable products in the West. These include mono-molecular powdered metals, solid state energy accumulators, textiles comprised of woven basalt fibers, and certain varieties of atomically engineered carbon.[706]

$N^2L^2$  field emissions are non-dissipative and are not attenuated by the interposition of mass or the effects of distance.  $N^2L^2$  fields cannot be screened by any known materials except aluminum, nor any known combination of materials or fields.[707] The results of the 1986 Moscow M-2  $N^2L^2$  field wave communications experiments have been widely distributed. In this demonstration, a directional  $N^2L^2$  field was modulated with a simple variation of the Morse code. The signal was instantaneously received at a point more than 22 kilometers distant, using a simple low power gravimetric signal detection device. The signal was passed through steel reinforced concrete more than 50 meters thick, after having been propagated through a mountain more than 10 kilometers wide. Variations of this experiment have been successfully performed in a number of other locations in the former Soviet states and by the US Department of Defense since that time.[708]

The total absence of loss of signal strength, referred as attenuation, during the spread of a  $N^2L^2$  field wave group, suggests that long-distance communication may one day be possible with the use of very low transmission power and unlimited bandwidth. The fact that  $N^2L^2$  field waves are not attenuated [weakened] by any known material substances or fields suggests that we may one day be able to devise systems which are capable of

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

communicating through water or any density of physical material [709]. This concept also suggests that we should be able to devise communications systems capable of supporting real-time communication without regard to the vast distances of space.

Since all known substances possess a non-zero collective spin state [this means, in simple terms, that everything is always in motion at all scales], then all substances must also operate within their own localized  $N^2L^2$  fields. The expanse and frequency structure of any substance is determined by its chemical composition and the expanse structure of its molecules or crystalline lattice. A clear understanding of these mechanics in the context of Y-Bias interactions enables us to design-engineer energy storage devices which have energy conversion characteristics well in excess of gasoline [650 watt hours/kg].[710]

At the Institute for Problems of Materials Science located in Kiev, Republic of Ukraine, a scientific team led by Academicians Trefilov, Tovschuk and Kovalyuk created a solid-state energy cell which produces 850-1040 watt-hours/kilogram, in laboratory prototypes. This is at least 35-50 times the energy density of any known conventional energy storage devices developed in the West. The reliability of their claims regarding this technology has been verified by INEEL, DARPA and the AMTL. A key element of their crystalline lattice deposition method relies on the effects of a  $N^2L^2$  field beam technologies.[711] Russian scientists have now completed applications-engineering exercises which harness this phenomenon in the form of 'super-capacitors.'[712]

It has been shown that  $N^2L^2$  fields demonstrate persistence. This attribute is referred to in the literature as a "residual field effect." [713] A  $N^2L^2$  field source of a defined expanse and frequency has been consistently shown to polarize the localized region of the Physical Vacuum. Once the energizing space-spin source has been put in motion and a  $N^2L^2$  field has been created, and then removed to

another place, the space which surrounded the  $N^2L^2$  field generator continues to exhibit the effects of the  $N^2L^2$  field for as long as several hours. Poponin definitively demonstrated  $N^2L^2$  field persistence in a faraday-caged light-scattering chamber for periods in excess of 31 days.

In the context of Y-Bias and Angularity, the authors delineate the dynamics which cause the persistence of residual field effects. By this means they explain the functional dynamics associated with dowsing, magnetically effected molecules of water and so on.[714] A clear and present example of the applications made possible by this information is illustrated by the work of a team of physicians from the CIS. Using the work of V. Kronin as the basis for their treatment modality, a team of Russian physicians has been working at the laboratories of the Centers For Disease Control in Atlanta, Georgia, and Baylor University Medical Research Center in Houston, Texas, since 1998. Their project demonstrates a revolutionary new medical treatment modality which capitalizes on this attribute of  $N^2L^2$  field mechanics, to fundamentally cure patients infected with the hepatitis-C virus.[715]

Teams of scientists from more than 50 laboratories have shown that it is now feasible to deliberately perform a wide variety of carefully calibrated functions using  $N^2L^2$  field devices.[716] We can build  $N^2L^2$  field generators of both static and radiating types.[717] We can select, adjust and fine-tune frequencies modulated into the field with a high degree of precision.[718] We can modulate into and retrieve data out of a  $N^2L^2$  field, including via two dimensional spin matrices.[719] We can operate efficiently in a variety of different modes of signal radiation.[720] We can adjust and smooth the intensity of the S-waves and we can operate in both left and right S-wave chiral helicities.[721]

$N^2L^2$  fields can be detected, generated and switched on and off (such as in communications applications).[722] We have demonstrated that a  $N^2L^2$  field can

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

be designed to interact with laser beams [723], to modulate light frequencies and perform other functions.  $N^2L^2$  fields have been demonstrated to have a specific effect on biological processes [724] and have been shown to be generated by certain melting and solidifying materials.[725]  $N^2L^2$  fields affect the oscillation of quartz crystals [726], affect the functional characteristics of some Electronic components [727], and have been shown to have verifiable, measurable and predictable effects on gravity.[728]

**Experimental/ Observations:**

The seminal experimental verification of this principle has been provided by N. Gisin and his team at CERN, Geneva. [729] A team of physicists at the CERN particle accelerator facility in Geneva, Switzerland, led by Dr. Nicolas Gisin, demonstrated that there is a  $N^2L^2$  field effect which conveys information instantaneously, regardless of time or distance, at least  $10^9$  times faster than  $C$ , the speed of light.

**C.E.R.N. Non-Locality Experiments**

In 1996, Dr. Nicolas Gisin and his colleagues at Geneva's CERN linear particle accelerator facility made an incredible breakthrough related to Bell's Theorem and its predictions. Bell's predictions regarding non-local effects at a distance in a quantum system had never been verifiable because the physical devices needed to measure the instantaneous occurrence of two identical events at a distance had not yet been developed. But in 1996, Dr. Gisin and his colleagues performed an experiment which has significant implications.

Gisin et al succeeded in separating the twin particles of a Positron-Electron pair [via potassium-niobate crystal separation] and then sending them off in two opposite directions through more than 30 kilometers of fiber optic cable. As one of the particles was exposed to an electromagnetic field which altered its spin polarity, the second particle instantaneously accommodated this alteration by modifying its own spin polarity to compensate, in the same manner as it would have if the pair had not been separated.

After verifying this experiment a number of times, the team published a report which made the observation that the information which was shared between the two particles could not have been transmitted by light because the velocity of the information exchange occurred at least one order of magnitude (ten times) faster than the speed of light. They further suggested that the information must have been conveyed by a mechanism which is not known to science or accommodated by our current model of quantum mechanics. They have called their result “Simultaneity – Non-Local Effects at a Distance.”

This experiment goes to the heart of the matter. The standard model does not accommodate this result despite the fact that it is specifically predicted by Bell's Theorem. In fact, despite repeated validation of the phenomenon at increasingly greater distances, the scientific community in general has thus far refused to accept the inescapable fact that nothing in current formulations of scalar dynamics can be relied on to explain how and why this phenomenon operates. The authors posit that this concept is entirely understandable when considered in the context of Y-Bias, Angularity and SOC systems theory.

The direction of spin and charge polarity exhibited by interactions at the Zero Point are primary attributes of charge ensembles which are first manifest at the secondary scale. At this scale, as Frolov rightly suggests, time operates in both forward and backward directions, at all times maintaining a balanced condition. The following conditions illuminate this consideration:

1. Time is a dimension with energy density of its own, and [730]
2. The balanced time-as-energy component is an intrinsic attribute of real ensembles operating at the secondary scale, and
3. This attribute continues to operate without attenuation at all subsequent levels of organization, and

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

4. Electrons are not [as the standard model insists] 'their own primary particles', but are, rather, aggregations of virtual ensembles which are, as Maris rightly observes, themselves comprised of finer stuff [e.g., Leptoquarks], and
5. This set of properties is ubiquitous to and invariant within the fabric of the entire universe.

We now can explain how the information that defines the net sum values of charge, time-domain and spin polarity in primary and secondary scale interactions is transmissible throughout the cosmos, without regard to space or time. At this scale, because these interactions are by definition holographic, neither distance nor time impinge on the relationships or interactions between the ensembles.

In fact, at the secondary scale, Time operates with forward and backward balance as a self-organizing feature. In this sense, then, when any of the characteristics exhibited by one charge/spin ensemble with respect to its partner is altered, the attributes exhibited by the partnering ensemble **MUST** instantaneously respond in order to maintain the time-energy balance which operates at this scale, regardless of the distance which may separate them. In terms of Y-Bias and Angularity theory, in order for the SOC processes to operate as they do, the results predicted by Bell and experimentally verified by Gisin and Aharonov/Bohm must be so by definition.

### **Third [Tertiary] Scale**

This is the scale at which differentiated time-domain and spin-polarized charge ensemble pairs interact to create the first fully integrated components of the physical universe. The CDF Collaboration at FermiLabs refers to these primary components as Sub-Quarks of two specific varieties. This is the scale at which the attractive effects exerted by spinors are first observable as magnetic field effects which demonstrate polarity [731]. The headline reads, **FERMILAB MEDIA ADVISORY 2/7/96, CDF Results Raise Questions on Quark**



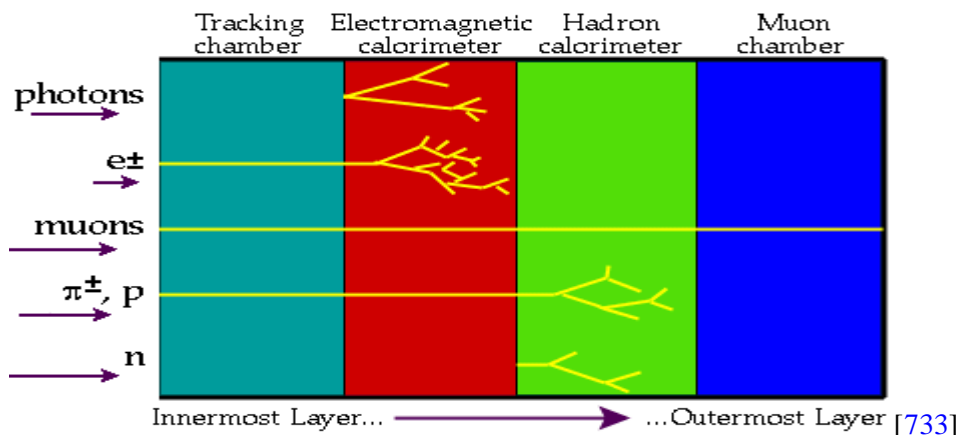
**Structure.** An article scheduled to appear in the February 9 issue of *Science* describes results contained in a paper submitted to ***Physical Review Letters*** by the 450-member Collider Detector collaboration at Fermilab. The CDF paper reports results that appear to be at odds with predictions based on the current theory of the fundamental structure of matter. The paper, submitted January 21, 1996, reports the collaboration's measurement of the probability that the fundamental constituents of matter [e.g., Quarks and Anti-quarks] will be deflected, or will "scatter," when very high energy Protons collide with anti-Protons, according to CDF spokesmen William Carithers and Giorgio Bellettini.

### **Dynamics:**

The nature of the Sub-Quark [and other lesser-known and perhaps more esoteric sub-atomic units such as Neutrinos] has proven to be somewhat troublesome to scientific purists.[732] The Sub-Quark demonstrates a most peculiar behavior, both physically and mathematically. As each Sub-Quark matches the spin and polarity of its partner [in the same way that defines the attributes of the interactions between Positron-Electron pairs], it demonstrates a distinct phased pulsing behavior, a 'quantum frequency' if you will, which shows up on a photographic emulsion plate as a series of dashes separated by discrete spaces. As the film plates developed at FermiLabs show, the first track of a Sub-Quark separated from its paired partner looked like this: \_\_\_\_\_

\_\_\_\_\_

**Figure 4**



When pressed to explain this phenomenon, the CDF team at first suggested a variety of possible alternatives: Perhaps the particle was so much smaller than the grain density of the photographic film emulsion that it could not be consistently displayed. This was considered a distinct possibility until the uniformity/regularity of the pulsating oscillation was established. Perhaps it was so much smaller than the quarter-wave frequency used by the scanning Electron microscope to capture the image that its image was incorrectly displayed. Perhaps there was something about the way the Sub-Quark was spinning, or was polarized at the time of impact, that distorted its magnetic field or unaccountably refracted the EM wave functions used to capture the image of its passage across the screen.

After years of work and the introduction of significant refinements to the image capturing process, the report published by the CDF Collaboration convincingly demonstrates that the attributes demonstrated by the dash-space-dash-space signature of the Sub-Quark are the result of a fascinating set of attributes which appear to be unique to Sub-Quarks. This behavior has only been observed in the hard vacuum environment of a high-speed linear particle accelerator, under carefully controlled conditions, with one notable exception.[\[734\]](#)

In the context of Y-Bias/Angularity theory, the set of attributes which operate at the tertiary scale to create Sub-Quarks is the product of four sets of interactions:

- Y-Bias angle of intersection of the secondary scale charge ensembles,
- Weighted waveform vector velocities of the secondary scale charge ensembles,
- Angular momentum of the secondary scale charge ensembles, and
- Chiral Helicity [angular momentum defined as quantum spin direction] of the intersecting charge ensembles.

In recent iterations of M Theory, the QED/SED hypotheses, and in accordance with Bell's Theorem and Whittaker's proofs, the quantum frequency and energy states of Sub-Quarks must by definition represent the cumulative aggregate effect of all these interacting time-domain polarization, spin polarity, Y-Bias angularity and EM polarity vectors. In Y-Bias/Angularity terms, the SOC behaviors and attributes demonstrated by these essential building blocks constitute the set of derivative effects exerted by the exercise of SOC dynamical rules.

Further, and perhaps more importantly, when taken as an aggregate expression of SOC organizational dynamics, Sub-Quarks become the first paired combinations of spin-polarized actual charge ensembles to demonstrate quantum waveform coherence, at a wide variety of frequencies, each of which appears to be consistent with the quantum frequency demonstrated by correlated sixth order [fully formed atoms] aggregations comprising the elements of the Periodic Table and their isotopes. The telling indicator which leads to this conclusion is that upon close examination of the CDF's experimentally and rigorously reported results, Sub-Quarks appear to manifest elemental quantum signatures in ranges which are harmonic with respect to certain frequencies [e.g., the elements of the periodic table and their isotopes] but which are dissonant with respect to no others.

This result is consistent with the results rigorously observed and experimentally verified by J. Hait and his research team at the University of California at San Diego, in which the amplifying and canceling patterns produced by the overlapping of the interference fringes surrounding two identically propagated beams of laser light demonstrate the dynamics of resonant and dissonant harmonics operating at the tertiary scale. This phenomenon operates in the context of a holographic image to perform all seven of the Boolean logic functions intrinsic to digital data processing [735]. This

discovery now provides the basis for the evolution of a truly photonic computational architecture which can operate without the interposition of optoelectric crystals.

### **The Importance of the Sub-Quark**

First, the reported experimental results suggest that the dash-space-dash-space quantum frequency signature demonstrated by Sub-Quarks may be unique to each elemental material rather than a Sub-Quark attribute in general. Researchers are still investigating whether this constitutes a kind of Sub-Quarkian fingerprint by which elemental materials could be conclusively identified as they form. If it can be verified, this would provide a result with implications reaching far beyond the domain of the current state-of-the-art of particle physics.

Second, and perhaps equally intriguing, is the realization that the Sub-Quark film track almost certainly demonstrates the time-domain polarization attributes of this sub-atomic unit, as predicted by Y-Bias/Angularity theory and as described by Bearden *et al.* The Sub-Quark's track looks the way it does because the particle exists and then does not exist, exists and then does not exist, in  $L^4$ , as a function of its energy pumping and self-organizing, self-sustaining nature. With the discovery of the Sub-Quark, we observe for the very first time a scientifically verified instance of self-organizing criticality and dissipative structural behaviors in a single measurable physical component.[736]

### **Experimental/ Observations:**

In 1996, Anastasovski experimentally verified that under certain carefully controlled conditions, photons of real light can be shown conclusively to demonstrate properties of measurable mass. This heretical idea is explained in Anastasovski's extraordinary book, *Quantum Mass Theory Compatible With Quantum Field Theory*. [737]

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

These two rigorously verified experimental protocols, coupled with the leading edge work of Humphrey Maris, lead us to conclude that the nature of Sub-Quarks, Quarks, Leptons/ Fermions and light itself is not adequately described by the Standard Model. Indeed, in the context of Y-Bias/Angularity and SOC theory, Sub-Quarks are an inevitable and indispensable component in the evolutionary process by which matter, energy, time, all field effects and light itself are brought into being. Armed with this fundamentally new way of 'seeing' how nature works at finer scales, we can both accommodate phenomena which have heretofore remained unexplainable and predict the discovery of other phenomena which have not yet been observed [or at least admitted] by mainstream science.

**Fourth [Quaternary] Scale**

This is the scale at which organized charge ensembles first demonstrate entropy, weighted waveform vector velocities, chiral helicities and other complementary attributes, which combine to create six known varieties of Quarks and their Anti-quark complementary opposites. This category of sub-atomic ensembles does not include the Leptoquark [believed to be a constituent of electrons, neutrinos, etc.] or the Pentaquark [a theoretically supportable quark structure only recently experimentally observed]. At this scale, the standard model imposes what has come to be known as the Pauli Exclusion Principle, to explain why some sub-atomic particles are prohibited from occupying the same space and/or energetic state while others are not. In the strictest sense, Quarks specifically violate the Pauli Exclusion Principle because, by definition, they are presumed to never operate or exist as singularities, and occupy precisely the same space as the Hadrons and Baryons which are supposed to be subject to the same exclusionary rules.

**Penta-Quarks – Unexplained Anomalies**

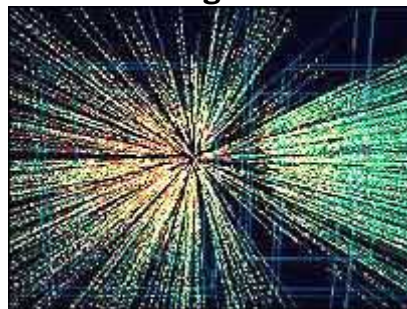
Physicists recently verified the existence of a class of subatomic particle that provides unexpected insights into the fundamental building blocks of matter. The discovery involves Quarks - particles that make up the Protons and

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

Neutrons usually found in the nuclei of atoms. The new particle is the so-called Pentaquark - five Quarks in formation [738]. Until now, physicists had only seen Quarks packed into two- or three-Quark combinations. The discovery of this new particle should have far-reaching consequences for our understanding of how the universe is put together.

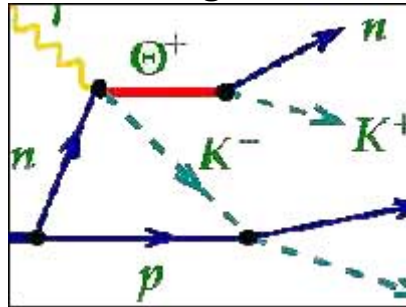
Until recently, no firm evidence of Pentaquarks existed, even though physicists have searched for these objects for over 30 years. In 2002, the first tentative evidence of the Pentaquark was put forward at an international scientific conference in Japan. In July 2003, a report of this work was submitted for publication to the journal Physical Review Letters. According to Dr. David Whitehouse, Science Editor for BBC News Online, the report says that Pentaquarks were created by blasting carbon atoms with highly energized X-rays. The work was performed by a Japanese team, led by Takashi Nakano of Osaka University. Other evidence for the Pentaquark has recently been reported by other experimenters, with perhaps the strongest evidence coming from the Jefferson Lab in Virginia, USA.

**Figure 5**



*Digital image of Carbon atoms  
being bombarded by X-rays.*

Physicist Ken Hicks of Ohio University, who took part in both the experiment and the confirmatory work at the Jefferson Lab, says it took him two months to convince himself that the Pentaquark was real. For a long time, scientists have been puzzled as to why only the Quark combinations formulated by Gell-Mann et al existed. Some predicted other combinations such as the Pentaquark, which consists of five Quarks, including an anti-Quark.

**Figure 6**

*Diagram of X-ray interactions with Carbon atoms to produce Pentaquark components.*

This diagram of the particle interactions which produced the results contained in the report validates an important thesis of the Y-Bias/Angularity Theory. It demonstrates, for example, that the Y-Bias angle of intersection between the interactive components is consistent throughout the structure and operates at the  $54^\circ - 56^\circ$  optimal angle predicted by Y-Bias author D. Ayers. This angle, which is intrinsic to the semantic structure of the Fibonacci Series, is reflected in the structure of matter and field interactions at all scales. The discovery of the Pentaquark, also known as a new exotic Baryon state, should have far-reaching consequences for our theory of particle interactions, which attempts to explain the structure of matter in terms of its Y-Bias and Angularity attributes.

### **Archetypal Forms**

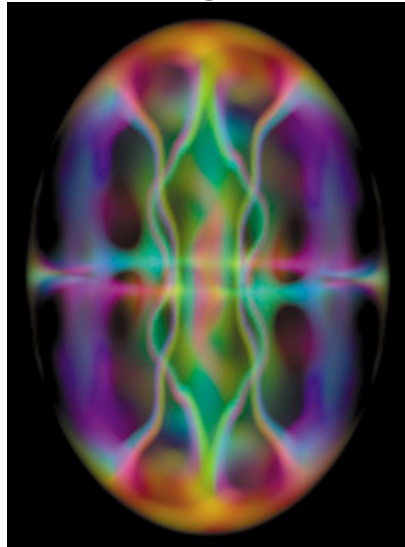
At the Quaternary scale and beyond, we observe the operation of archetypal forms everywhere in the cosmos. Why this is so and what it means about the way Nature works has never been adequately addressed by mainstream science. The authors posit that this phenomenon occurs because the cosmos operates according to a set of simple, elegant organizing principles which can be expected to find expression at every scale. For example, Y-Bias and Angularity Theory holds that topological variations of the Torus, seen as a Soliton in photonics and a Vortex in electromagnetism, should be found at every scale of systemic evolution throughout  $L^4$ . Beginning with the Quark, the presence of

such forms is rigorously reported in the literature of numerous scientific disciplines.

### **Bose Einstein Condensate**

The Y-Bias and Angularity vectors which operate to create a torus are known, particularly in a highly negatively charged locale [739]. At the Fourth Scale, we see them in standing waves [Solitons], as found in the Bose-Einstein Condensate [D. Jin, JILA/BEC].

**Figure 7**



*Emergence of vortex structure in a rotating Bose-Einstein Condensate [740]*

As this image amply illustrates, the coherent organization of disordered virtual energy ensembles which organize themselves to form the observable structures found in  $L^4$  is a process which operates consonant with  $1/f$  quantized SOC interactions. The Y-Bias angle of interaction between the disordered virtual photons arising from the Physical Vacuum is a fundamental determiner of the extent to which virtual photons and energy quanta couple to create matter, energy and/or field effects. The resultant product of this primary interaction is referred to here as the 'Bose Einstein Condensate.' In this illustration of Fourth Scale SOC behavior, the Y-Bias orientation of the charge ensembles with respect to each other is clearly consistent and uniform. The



angle of incidence of the respective intersections is measured at  $22.5^\circ$  and  $54.75^\circ$  respectively, which is consistent with the optimal angle of incidence found in variations of the Fibonacci Series and the Cherenkov Angle at various scales.

### **Quarks and Gravitational Force**

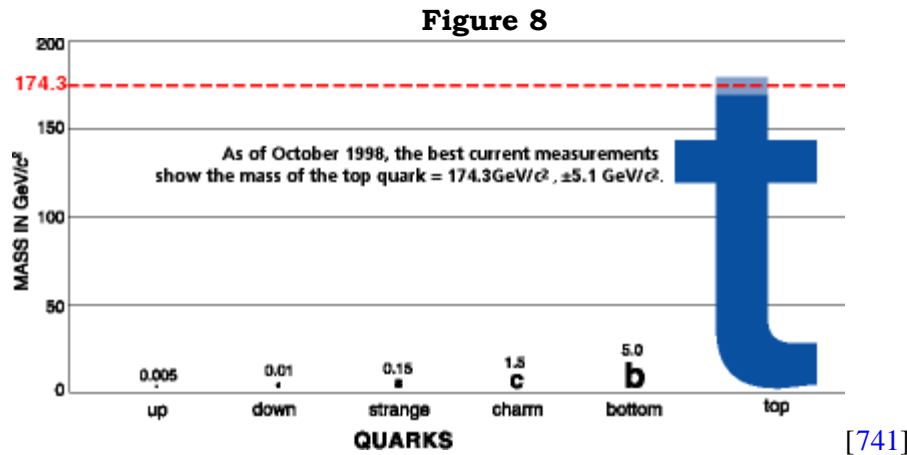
In addition, it has been rigorously reported and experimentally verified that Quarks are not subject to gravitational field effects. It was for this reason that Santilli and others strenuously objected to the postulation of Quarks provided by Gell-Mann and his collaborators at MIT. What this suggests about the structure of the cosmos and the true nature of mass as described by the Standard Model is profound. If gravitational field effects are primary, mutually exclusive and intrinsic to the fabric of the cosmos at all scales, nothing in the evolutionary structure of  $L^4$  should be exempt from its effects. The verification that Quarks are not subject to gravitational field effects suggests that such forces are derivative of evolutionary interactions rather than primary and mutually exclusive. In fact, this is precisely what Y-Bias/Angularity theory predicts.

### **Dynamics:**

Quarks are described by the Standard Model as a type of sub-atomic particle found inside Protons or Neutrons. The model holds that Hadrons and Baryons, the building blocks of nuclear architectures, are each comprised of three Quarks. Six kinds of Quarks are described by Gell-Mann. They are variously described as **up, down, strange, charm, bottom and top**. The bottom and top Quarks are sometimes called 'beauty' and 'truth' Quarks. Protons are shown to be made up of two 'ups' and one 'down' Quark. Neutrons are believed to be comprised of one 'up' and two 'down' Quarks, although one branch of astrophysics insists that Neutrons are the product of the combining of one Proton with a single Electron. Further, the standard model holds, despite the experimental results published by the CDF, that single Quarks have never been detected. They are believed to be always combined with other Quarks. By

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

this reasoning, mainstream science has concluded that Quarks are the primary, indivisible building blocks of  $L^4$ . Presumably, that is why Gell-Mann was awarded the Nobel Prize for the physical verification of two types of Quarks.



Nevertheless, rigorous experimental evidence conclusively demonstrates that current descriptions of the nature, dynamics, attributes and behaviors of Quarks, as found in the Standard Model, are both insufficient and incorrect. What is not explained by Gell-Mann and the Standard Model is perhaps more important than simply knowing that Quarks exist. Why, for example, is more than 99.9% of all the known matter in  $L^4$  comprised of only two of the six Quarks postulated by Gell-Mann? What is it about the nature and interaction of Quarks that causes them to behave as they do? What about the other four kinds of Quarks? If they are known to exist, and demonstrate the attributes ascribed to them, why don't they interact in ways which are consistent with the dictates of the GTR, EPR and the Standard Model? Why do the rules which apply to all other forms of matter require special conditions and exemptions in order for the Quark construct to be accommodated? And what about the Leptoquark and the Pentaquark? While their existence has been postulated, and Maris' work calls for them, nothing in the Standard Model or Gell-Mann's formulations accommodate or predict them.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

In terms of Y-Bias, Angularity and Self-Organizing Criticality Theory, the family of Quarks possesses characteristics which are derivatives of interactions which have occurred at finer scales, which, when taken together, comport with the underlying set of rules which operate uniformly and consistently throughout  $L^4$ , at all scales, without exceptions or special conditions. The underlying interactions which combine to create Quarks demonstrate harmonic resonance, even at the finest granularity of structure, as predicted by Plotnikov and Anastasovski. The angularity of the internal Y-Bias interactions of the Sub-Quarks, combined with all four of the SOC rules we have identified, causes the Quarks to manifest the spin-polarity, color, electrical charge and other characteristics which define their natures.

In Y-Bias/Angularity theory, two Quarks make up 99.9% of the matter found in  $L^4$  because these two Quarks combine at Y-Bias angles which optimally match spin, polarity, and electrical charge attributes in a way which satisfies the rules of SOC dynamics. Y-Bias/Angularity Theory predicts, in addition, that all six Quarks demonstrate a quantum oscillation frequency signature which is element and isotope specific. Quarks are not just generic aggregations of a general set of quantum-defined characteristics. Rather, Quarks of matching quantum signatures combine naturally to comprise Hadrons and Baryons which already carry some of the constituent-identifying characteristics, which eventually evolve to comprise the natural elements and their isotopes.

When viewed from this perspective, isotopes represent the less-than-optimal results of Y-Bias/Angularity interactions between Hadrons, Baryons and Leptons which are less stable, less balanced and less 'harmonically balanced' than their elemental sources. As a matter of practical consideration, this interpretation of the structure of matter and the field effects, energetic properties and interactions which manifest the behaviors of the materials identified in the periodic table of elements and isotopes, makes it possible to

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

explain why the application of integrated waveform and frequency signatures can be combined to mitigate or amplify all the basic properties manifest by matter in  $L^4$ .

**Experimental/ Observations:**

The Standard Model asserts that Quarks possess what is known as "Quark color charge." This property is named after primary colors but is ascribed to the Quarks by analogy. The Standard Model does not provide a means for describing this set of properties in a way that can be directly attributed to the intrinsic nature of Quarks. Rather, the concept of 'color charge' is a mathematical convenience which is intended to explain the nature of Quarks by naming their attributes rather than describing how and why these attributes arise and operate as they do.

According to this model, there are three such charges. Taken together, as a matter of mathematical convenience, these 'color charges' are held to be the causative attributes by which Quarks stick together to make larger particles, and which cause Protons and Neutrons to stick together despite the electrical repulsion between Protons. The 'charge colors' are called blue, green, red and anti-blue, anti-green and anti-red.

Work recently performed at the Stanford Linear Accelerator suggests that while there may be six varieties of Quarks, as Gell-Mann suggests, little has been done to reconcile the inexplicable conflicts between predictions made by the Standard Model and rigorously observed phenomena produced in their own facility, at FermiLabs and Brookhaven National Laboratories. The primary example of the extent to which the Standard Model is crippled is found in the failure of any laboratory to validate the Standard Model's predictions regarding the attributes and behaviors of a fundamental type of sub-atomic particle named the Muon.[\[742\]](#)

As Santilli rightly suggests, and as experimental evidence amply demonstrates, quantum mechanics becomes increasingly approximate as a means of describing interactive behaviors at increasingly finer scales. This is true because quantum mechanics is, itself, the product of a combination of flawed mathematical assumptions. Perhaps no one is better qualified nor more widely recognized as an authority on this subject than Ruggero Santilli. His reformulation of hadronic mechanics supplies the missing links which ameliorate the predictive errors intrinsic to the mainstream quantum mechanical approach. According to Santilli's model, when observable phenomena are rigorously reported so that all experimentally obtained data is included in an experimental analysis, Y-Bias/Angularity Theory can be applied to describe anomalous findings in terms of the extent to which they represent a range of Y-Bias interactions across the scale.

### **Fifth Scale**

This is the scale at which Quarks combine to create Hadrons of 26 types and Leptons of two known varieties. [743] It is at this scale that the phenomena referred to as gravitational field effects, electromagnetism and the nuclear forces are first evinced. Additionally, this is the scale at which the binding forces which combine Hadrons and Leptons to create atoms first become operative. These binding forces are measurable in the form of photons, energy quanta with distinct wave form attributes, physical particles with energy densities [mass] and non-local field effects. This is the scale at which the Standard Model first fails to provide reliable predictive indicators with respect to the physical attributes of  $L^4$ .

Three issues become paramount at this scale.

- First, this is the first scale at which gravitational effects become evident. Why this is so, and what it means for any cosmology which seeks to explain how gravitational effects operate, can now be

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

considered from a fundamentally different perspective when viewed through the lens of Y-Bias and Angularity Theory.

- Second, this is the first scale at which the property of mass referred to as the “permanent magnetic vector” is found in six members of one family of elements. In the absence of a cogent model which explains what magnetism is and how it works, it is not possible [for example] to understand why some materials are naturally magnetic while others are not. Neither is it possible to understand how permanent magnetic fields exert a definitive effect on non-magnetic materials. More importantly, without a cogent explanation for this phenomenon, it is not possible to understand many of the phenomena which are known to exist but are nevertheless prohibited by the Standard Model.
- Third, and perhaps most importantly, this is the first scale at which the physical attributes referred in the physics literature as 'mass' are observed. Again, it is possible to define what mass is in the context of Y-Bias and Angularity theory in a way which is not possible within the context of the Standard Model. This facilitates a more robust understanding of sub-atomic particle interactions and provides a sound basis for explaining how Nature works.

Accordingly, the authors provide a context for describing these phenomena by explaining what they are and how they operate in  $L^4$ , as manifestations of SOC behaviors operating at quantum-defined scales of self-organized criticality. While this discussion is not intended to be exhaustive, it is hoped that the application of the Y-Bias/Angularity concepts to these ambiguous constructs will serve to better integrate our understanding. Further, it is hoped that this approach will stimulate further investigation and research into these avenues of inquiry.

## Gravitational Fields, Magnetism and Mass

### Gravitational Field Effects

In personal correspondence with scientist Gary Vesperman, noted Russian physicist Dimitri Plotnikov has posited that the Law of Gravitational Effects can be stated in quantum mechanical terms as follows:

**F.6**

$$C(X,Y)=((2*B*\cos((2*E_0)/h)*\exp(-i*t*(E_0-A)/h)*(C(\cos(2*k*R*\cos(Z))+\cos(2*k*R*\sin(Z))))^2 \quad (12)$$

---



---


$$M_1*M_2*1/R^2$$

As in Whittaker, Anastasovski and Frolov, we find two aspects of this equation worthy of further consideration. The first part of the equation corresponds to the proportionality of the masses,  $= M_1*M_2$ . This suggests, among other things, that until the organization of Quarks reaches a minimal level of complexity, the aggregated set of properties and attributes which constitute Mass are not yet found to exist. Before this scale of organization is achieved, gravitational field effects are not found to operate on constituent spinors.<sup>[744]</sup> While Gell-Mann and his colleagues at MIT argue that this is not consistent with their findings, the evidence amassed since 1986 by many other teams of investigators clearly demonstrates that quarks do not exhibit any behaviors suggesting they are effected in any way by gravitational forces.

Second, and perhaps equally compelling, is the notion represented by the new factor '**Z**'. According to Plotnikov's analysis, gravitational field effects

---

<sup>12</sup> The Plotnikov formula of gravitational effects contains three expressions which are of interest here. The first, which is preceded by the expression  $[C(X,Y)]$  means that the interaction between the two masses X and Y, operate instantaneously. The second, the letter Z, connotes an angle of incidence between the field effects exerted by the masses X and Y on each other. The third, shown as  $[M_1*M_2*1/R^2]$  suggests that the strength of the interaction between the masses decreases by a value expressed as the square of the radius which separates them.

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

correspond to the inverse proportionality of the square of the distance between masses, as a function of harmonic resonance(s) between them. Accordingly, a new value appears - the incidence angle '**Z**' - which reflects the angularity quotient for the energy exchanged between the masses within a radius **R**.

If the gravitational interaction between the bodies depends on the distance separating them as a harmonic function, then at certain values of **R** the amplitude of the probability of the energy exchange between the two masses must become zero. That is, certain areas will be seen to emerge in the space between interacting masses where gravitational interaction between the masses is dissonant and therefore non-organized. On the other hand, certain areas will be seen to emerge where the resonance [Y-Bias/Angularity] of the interaction is maximal, which in some cases is evidenced by highly concentrated aggregations of matter.

### Fractal Substitution

In the context of Y-Bias and Angularity Theory, the characteristics of this interaction can be further illuminated by the substitution of Mandelbrot's primary operator defining harmonic resonance  $[Z \hookrightarrow Z^2 + C]$  for Plotnikov's constant **[Z]**. This substitution is warranted because the universe is observed to be fractal at all scales. This substitution yields two operators not identified by Plotnikov or Anastasovski. First, the nature of harmonic resonances operating between two masses becomes a dynamic interaction, the strength and value of which is defined as a Y-Bias interaction operating at an angle of incidence between them. This interaction works to create harmonic effects ranging from minimal to optimal, depending on the magnitude of the Y-Bias function and the Angularity of the interaction, as illustrated [for example] by the structure of the galaxy known as M51 and billions of other similarly structured galaxies. Accordingly, gravitational field effects are shown to not be invariant at any scale. Rather, as Anastasovski rightly holds, excitation of the field between masses must be seen in terms of a standing wave function, whose



attributes demonstrate amplitude, frequency, angular momentum, weighted waveform vector velocities, periodicity, phasing and so on, which interact harmonically in the context of a realtime fractal [SOC] feedback loop.[745]

This paradigm can be applied with respect to an analysis of the distribution of mass in the solar system. As predicted by Plotnikov and Whittaker, the Fibonacci relationships demonstrated by the energy exchange between the mass of the Sun and those of the orbiting planets [for example] occur only in maximal areas of Y-Bias and Angularity. In the areas between the planetary orbits, the probability amplitude diminishes to values which approach zero. In these areas, we find little or no mass, as predicted. Consider the motion of planets, represented by the formulation

$$\mathbf{W} = \frac{\Delta \mathbf{C}}{\Delta t} = \frac{(\Delta)}{\Delta t} \cdot \mathbf{C}(\mathbf{Z}), \quad \mathbf{F.7}^{(13)}$$

with the angular velocity responsible for the motion of planets shown as the component [**Z**]. This equation and the whirlpool structure of galaxies [for example] illustrate the range of conditions which operate across the range of Y-Bias interactions to create optimal and minimal gravitational field effects in space. This function operates to change the co-ordinates of these interactions over time as the complexity of such structures evolves. As Y-Bias and Angularity Theory predicts, the masses have nothing to do but roll down to the areas of maximum Y-Bias/Angularity effect in order to find stasis in stable orbits.

---

<sup>13</sup> F.7: In this formula, the field strength exerted by two rotating planets on each other is expressed in terms of their relative rate of spin, which is referred to in physics as their angular momentum. The expression Z occurs again, as an expression of the way in which the gravitational field effects are effected by the angle of incidence between the two masses.

## Fibonacci Relationships

The Fibonacci numbers have been known since ancient times. These are not random numbers but, rather, are members of the following sequence:

**0 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597  
2584 4181 etc.**

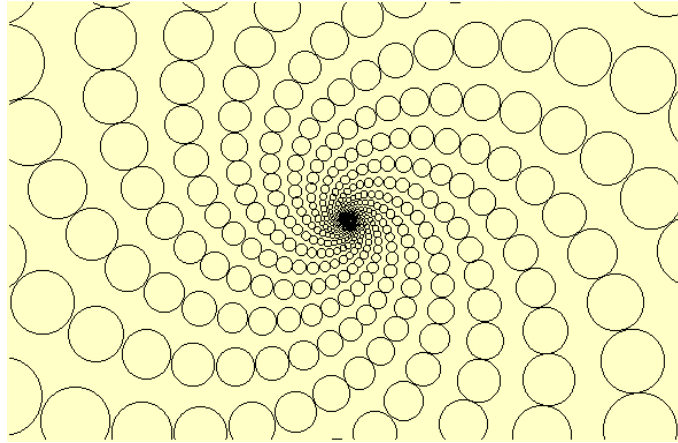
This sequence is known as the Fibonacci Series, and is well known in mathematics. Each number is the sum of the previous two. The ratio of successive pairs tends to the so-called golden section (GS) = 1.618033989, whose reciprocal is 0.618033989, so that we have a resultant product mathematically defined as:

$$1/GS = 1 + GS$$

**F.8**

The following diagram represents the range of values from **N = 0** to **N = 1000**, including the **F** numbers **377**, **610** and **987**, rescaled by dividing the vertical values by **N**, to show the multiple harmonics of the 'Golden Mean' more clearly. These are shown by [blue horizontal lines](#). The short blue lines mark the two golden section (**GS**) points in each segment. If the length of a long blue line is taken as 1, then the three segments have lengths  $GS^2$ ,  $GS^3$  and  $GS$  respectively.  $GS^2$  and a  $GS^3$  add to  $GS$ .

In a vertically integrated view, the plot of these functions appears as follows:

**Figure 9**

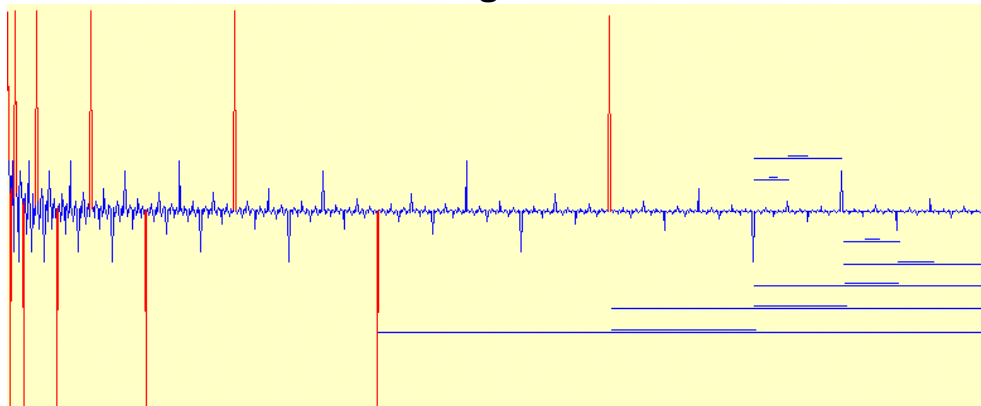
The values represented by the resultant function are -

$$\mathbf{GS = 0.618033989}$$

$$\mathbf{GS^2 = 0.3819659}$$

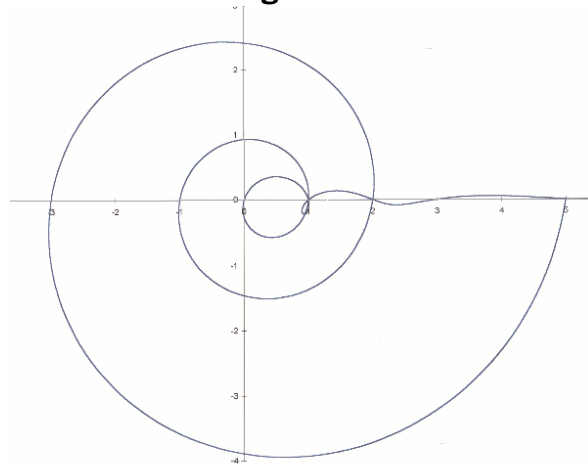
$$\mathbf{GS^3 = 0.2360678}$$

The bar-graph diagram derived from the same number set and values is rather like a one-dimensional fractal. Each element contains all the information contained in the entire expression, regardless of the smallness or largeness of the scale.

**Figure 10**

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

When plotted as an X-Y graph, the X-axis spiral intersects the Y-Bias at the values shown as 1 2 5 13 [etc.] on the positive axis, and 0 1 3 8 etc on the negative axis. The oscillatory part crosses at 0 1 1 2 3 5 8 13 [etc.] on the positive axis. The resulting curve is the analogue of SOC structures found at virtually all scales, the magnitude and strength of which vary as a function of the extent to which the intersections approach the optimal angularity defined by the Fibonacci Series. This is not surprising, since the spiral of the curve demonstrates its logarithmic nature as it expands.

**Figure 11**

The form and shape of this plot is precisely what Prigogine/Stenger's Dissipative Structures, Bak's SOC rules and Y-Bias/Angularity Theory describe. The fact that the relationships and attributes demonstrated across the scales of the cosmos demonstrate adherence to this same set of simple, elegant rules, suggests that our view of 'How Nature Works' must be substantially modified if we are to really understand its mysteries.

**Dark Matter**

If this assessment is correct, current notions about gravitational field effects which have occasioned the search for all the 'dark matter' and 'dark energy' thought to be missing in the cosmos must be obviated. In the alternative, Y-Bias and Angularity Theory suggests that the matter you see is the matter you

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

get. There is, in all likelihood, no such thing as Dark Matter or Dark Energy. What is needed, instead of a feckless search for something that is not there, which is little more than a desperate attempt to defend a set of questionable conclusions drawn from a severely crippled model, is to develop a wholesale modification of the assumptions which have heretofore been used to describe gravitational field effects in the first instance.

Astronomers are finally tracking down the whereabouts of most of the baryonic ('normal') matter that is postulated to have been created in the Big Bang but doesn't show up as stars or gas in the galaxies. The Chandra X-ray Observatory has discovered two huge intergalactic clouds of diffuse hot gas: They are the best evidence yet that a vast cosmic web of hot gas contains the long-sought Dark Matter - about half of the atoms and ions in the universe. Computer simulations of the formation of galaxies and galaxy clusters had indicated for some time that the missing baryons might be contained in an extremely diffuse web-like system of gas clouds from which galaxies and clusters of galaxies formed.

These clouds have defied detection because of their predicted temperature range of a few hundred thousand to a million degrees Celsius, and their extremely low density. Evidence for this warm-to-hot intergalactic matter (WHIM) had been detected around our Galaxy, or in the Local Group of galaxies, but the lack of definitive evidence for WHIM outside our immediate cosmic neighborhood made any estimates of the universal mass-density of baryons unreliable. The discovery of much more distant clouds came when Chandra took advantage of the historic X-ray brightening of the quasar-like galaxy Mkn 421 that began in October of 2002. Two Chandra observations of Mkn 421 in October 2002 and July 2003, yielded excellent quality X-ray spectral data.

These data showed that two separate clouds of hot gas at distances from Earth of 150 and 370 million light years were absorbing X-rays from Mkn 421.

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

The X-ray data show that ions of carbon, nitrogen, oxygen, and neon are present, and that the temperatures of the clouds are about 1 million degrees Celsius. Combining these data with observations at ultraviolet wavelengths made it possible to estimate the thickness (about 2 million light years) and mass density of the clouds. Assuming these clouds are representative of a universally dispersed phenomenon, the first reliable estimate of average mass density of baryons in such clouds throughout the universe was then possible: It is consistent with the mass density of the missing baryons.[746]

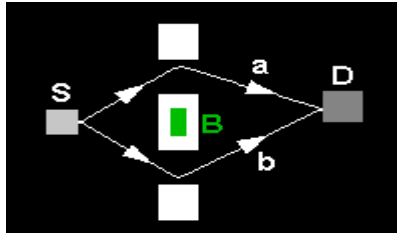
Secondly, and by extension, when examined in terms of an interactive harmonic resonance operating between two masses, whose constituent building blocks are comprised of time and spin-polarized energy ensembles, the resultant force vectors described by Whittaker's formulations must also apply. This means, by extension, that gravitational forces operate in precisely the same manner between masses as two intersecting beams of laser light [e.g., time-energized photons demonstrating standing wave attributes], which exchange information across the interference fringe [Hait's Y-Bias/Angularity as a function of  $[Z \leftrightarrow Z^2 + C]$ ] to create patterns of resonance and dissonance at the point of intersection in a hologram. The prime operator in this interaction is the fractal function ' $Z$ ', as used by Plotnikov and Bak.

### **Einstein's Vector Magnetic Potential**

Perhaps the final and most widely accepted authority on the matter should be allowed to inform this dialogue. Einstein posited that only the vector magnetic potential has a physical reality in electrodynamics. He believed [and his work amply demonstrates] that electric and magnetic fields are merely concepts we have developed to explain the reciprocity of field interactions. Most modern physicists still do not accept Einstein's assertion, despite the fact that more recent experimental research [e.g., the Aharonov-Bohm experiment] shows that the A field [the  $N^2L^2$  non-local/non-linear field described by Kafatos and Bohm, as demonstrated by Gisin] is quite real. Their seminal experiment shows

that the  $A$  field can alter the quantum wave function [even] *when all other EM effects have been completely shielded out.*[747]

**Figure 12**



*Schematic Diagram of the Bohm-Aharonov experimental protocol.*

In classical mechanics, the motion of a charged particle is not affected by the presence of magnetic fields in regions from which the particle is excluded. The motion of classical particles emitted by the source **S** is not affected by the magnetic field **B** because the particles cannot enter the region of space where the magnetic field is present. For a quantum charged particle there can be an observable phase shift in the interference pattern recorded at the detector **D**. This phase shift results from the fact that although the magnetic field is zero in the space accessible to the particle, the associated vector potential is not. The phase shift depends on the flux enclosed by the two alternative sets of paths **a** and **b**. But the overall envelope of the diffraction pattern is not displaced, indicating that no classical magnetic force acts on the particles. The Aharonov-Bohm effect demonstrates that it is the electromagnetic potentials, rather than the electric and magnetic fields, which are [as Einstein correctly intuited] the fundamental quantities in quantum dynamics. [748]

### **E. T. WHITTAKER - On the Differential Equations of Physics**

In the famous paper published by Physics Letters in 1903-04, E.T. Whittaker provided a mathematical proof which demonstrates that gravitational field forces are not only 'undulatory' [which we interpret in a semantic context

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

to mean harmonic and interactively resonant], but are also the result of field force interactions occurring between masses in the Y axis. The following summary taken from Whittaker's work suggests that the Y-Bias model is perfectly on target in this regard.

***Equation 5 - Gravitation and Electrostatic Attraction explained as modes of Wave-disturbance.***

The result of [formula 1], namely that any solution of the equation<sup>(14)</sup>

$$\frac{\partial^2 V}{\partial^2 x^2} + \frac{\partial^2 V}{\partial^2 y^2} + \frac{\partial^2 V}{\partial^2 z^2} = k^2 \frac{\partial^2 V}{\partial^2 t^2} \quad \text{F.9}$$

can be analysed into simple plane waves, throws a new light on the nature of those forces, such as gravitation and electrostatic attraction, which vary as the inverse square of the distance. For if a system of forces of this character be considered, their potential (or their component in any given direction) satisfies the equation on the differential equations of physics.<sup>(15)</sup>

$$\frac{\partial^2 V}{\partial^2 x^2} + \frac{\partial^2 V}{\partial^2 y^2} + \frac{\partial^2 V}{\partial^2 z^2} = 0 \quad \text{F.10}$$

and therefore *a` fortiori* it satisfies the equation

$$\frac{\partial^2 V}{\partial^2 x^2} + \frac{\partial^2 V}{\partial^2 y^2} + \frac{\partial^2 V}{\partial^2 z^2} = k^2 \frac{\partial^2 V}{\partial^2 t^2} \quad \text{F.11}$$

---

<sup>14</sup> This equation identifies four dimensional constructs, which are identified in terms of the X axis, Y axis, Z axis and **t**, time. It says that the sum of the square of the first three dimensions, expressed as a function of their relative wavefront velocities, is equal to the wavefront velocity of time, when time is multiplied by some constant **K**.

<sup>15</sup> This derivative substitutes zero for the equivalent function of the differential integral represented by the right hand set of values. What this implies is that the interaction of the three physical dimensions when viewed as interactions between masses occurs in zero time, or instantaneously.



where  $k$  is any constant. It follows from [1] that this potential (or force-component) can be analysed into simple plane waves in various directions, each wave being propagated with constant velocity. These waves interfere with each other in such a way that, when the action has once been set up, the disturbance at any point does not vary with the time, and depends only on the coordinates ( $x, y, z$ ) of the point.

It is not difficult to construct, synthetically, systems of coexistent simple waves, having the property that the total disturbance at any point (due to the sum of all the waves) varies from point to point, but does not vary with the time. A simple example of such a system is found in the following.<sup>(16)</sup>

Suppose that a particle is emitting spherical waves, such that the disturbance at a distance  $r$  from the origin, at time  $t$ , due to those waves whose wave-length lies between  $2\pi/\mu$  and  $2\pi/\mu + d\mu$ , is represented by  $\frac{2\pi}{\mu}$  and  $\frac{2\pi}{\mu + d\mu}$ ,  
 $\mu$   
 $\mu + d\mu$

is therefore represented by

$$\frac{2d\mu}{\pi\mu} \frac{\sin(\mu Vt - \mu r)}{r} \quad \text{F.12}$$

---

<sup>16</sup> The formulas which follow contain a number of discrete elements which are expressions of the various properties of the waves which are being propagated between two masses. Whittaker's formula is intended to portray in mathematical terms "...the total disturbance at any point (due to the sum of all the waves) varies from point to point, but does not vary with the time." The use of the differential integral symbol  $[\int]$  suggests that the range of interactions extends from  $0$  to Infinity  $[\infty]$ , suggesting in turn that while the velocity  $[V]$  of the waves extends across this range, the value for time  $[t]$  does not vary. This provides the basis for describing simultaneous, interactive wave propagation which is both infinite in expanse, instantaneous at all distances, and which 'undulates' to create addresses along the intersecting points where the wave interact, amplify and nullify each other as a function of their interference patterns.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

where  $V$  is the velocity of propagation of the waves. Then after the waves have reached the point  $r$ , so that  $(Vt - r)$  is positive, the total disturbance at the point (due to the sum of all the waves) is

$$\int_0^{\infty} \frac{2d\mu}{\pi\mu} \frac{\sin(\mu Vt - \mu r)}{r} . \quad \text{F.13}$$

Take  $\mu Vt - \mu r = y$ , where  $y$  is a new variable. Then this disturbance is

$$\frac{2}{\pi r} \int_0^{\infty} \frac{\sin y}{y} (dy) \quad \text{F.14}$$

or, since

$$\int_0^{\infty} \frac{\sin y}{y} (dy) = \frac{\pi}{2} \quad \text{F.15}$$

it is

$$\frac{1}{r} \quad \text{F.16}$$

*Therefore, the total disturbance at any point, due to this system of waves, is independent of the time, and is everywhere proportional to the gravitational potential due to the particle at the point.*

It is clear from the foregoing that the field of force due to a gravitating body can be analysed, by a "spectrum analysis" as it were, into an infinite number of constituent fields; and although the whole field of force does not vary with the time, yet *each of the constituent fields is of an undulatory character, consisting of a simple wave-disturbance propagated with uniform velocity.* This analysis of the field into constituent fields can most easily be

accomplished by analysing the potential  $1/r$  of each attracting particle into terms of the type

$$\frac{\sin(\mu Vt - \mu r)}{r} \qquad \text{F.17}$$

as in the example already given. To each of these terms will correspond one of the constituent fields. In each of these constituent fields the potential will be constant along each wave-front, and consequently the gravitational force in each constituent field will be perpendicular to the wave-front, i.e. *the waves will be longitudinal*.

But these results assimilate the propagation of gravity to that of light: for the undulatory phenomena just described, in which the varying vector is a gravitational force perpendicular to the wave-front, may be compared with the undulatory phenomena made familiar by the electromagnetic theory of light, in which the varying vectors consist of electric and magnetic forces parallel to the wave-front. The waves are in other respects exactly similar, and it seems probable that an identical property of the medium ensures their transmission through space.

This undulatory theory of gravity would require that gravity should be propagated with a finite velocity, which however need not be the same as that of light, and may be enormously greater.

Of course, this investigation does not explain the *cause* of gravity; all that is done is to show that in order to account for the propagation across space of forces which vary as the inverse square of the distance, we have only to suppose that the medium is capable of transmitting, with a definite though large velocity, simple periodic undulatory disturbances, similar to those whose propagation by the medium constitutes, according to the electromagnetic theory, the transmission of light.

**A New Gravitational Formulation**

Therefore, as Whittaker conclusively demonstrates, gravitational field effects arising from Mass interactions are rigorously shown to conform to SOC-mandated  $1/f$  quantum thresholds operating in harmonic resonance between masses, in a way which corresponds to Mandelbrot's fractal formula, as driven by the Fibonacci Series. The interaction between the masses operates as a self-referential live feedback loop between them, which is optimized as a function of the Y-Bias and Angularity values they exert on each other. Notwithstanding the commonly invoked arguments which suggest that this notion is invalidated by the aggregate values seen at larger scales [called 'granularity'] [749], it is nevertheless logical to suggest, therefore, that gravitational effects are a derivative expression of the Y-Bias/Angularity values exchanged between masses which exhibit properties referred to in the literature as 'harmonic resonance'. The resultant effect is demonstrated across the scales of the cosmos as an analogue of the Fibonacci series.

The structure of M51, The Whirlpool Nebula, illustrates how Whittaker's formulation actually appears in the heavens. The underlying set of interactive dynamics he described in 1903 operate across hundreds of thousands of light years to produce a typical self-organizing pattern of effects.

**Figure 8***Whirlpool Nebula [Hubble/NASA]*

M51 (also known as Arp~85 and VV~1) comprises the large spiral galaxy NGC5194 and its smaller, barred and more amorphous companion NGC5195. M51 was the first astronomical object in which spiral structure was discerned,

discovered by the Third Earl of Rosse in 1845. The spiral arms are perhaps the most perfect 'textbook' example in any nearby galaxy of Y-Bias/Angularity SOC dynamics as expressed by the Whittaker and Plotnikov formulations. This archetypal architecture is found at all scales above the Quaternary Scale and is a clear example of the observable effects attributable to the harmonic resonance function  $[Z \rightleftharpoons Z^2 + C]$  found in the Y-Bias derivative of Plotnikov's formulation of gravitational effects.[750]

### **Precessing Gyroscopes**

The acid test of this conclusion can be established by investigating the extent to which gravitational field effects can be mitigated in any region or locale by deliberately varying the Y-Bias and Angularity values which operate between the masses. For example, consider the widely reported experimental results which demonstrate inertial mass reduction in the case of a free-falling gyroscope which is precessed at an optimal angle. Widely published experimental results reveal that gravitational force is not mitigated in free-fall by a stable, non-precessing gyroscope. However, so long as precession is present, gravitational field effects are rigorously shown to be diminished. Sir Eric Laithwaite, inventor of the Magnetic Levitation technologies currently in widespread use in Germany and Japan, understood this principle. His work is both illustrative and compelling.[751]

According to Euler's equations, the composite force vectors in the **Y** and **Z** axes are perpendicular to the **X** axis of the rotor's rotation. The inertial value of the vertical component [+ on the **Y** axis] is always exactly identical to the downward force of gravity [minus on the **Y** axis] due to the weight of the gyroscope in the Earth's gravity, which keeps it from falling. The forward component is the precession-causing component.

The following set of relationships is proposed to describe this interaction:

**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

$$\frac{\text{forward component}}{\text{upward component}} = \frac{\text{gravitationally caused downward moment}}{\text{angular momentum of gyroscope}} = \frac{M}{I * \omega} \quad (17)$$

Again, experimental evidence bears this out. According to Y-Bias Theory, gravitational field effects are locally mitigated as a function of and in proportion to the Y-Bias angle exerted by the gyroscope on the inertial plane created by its angular momentum. This effect is the product of an interruption of the harmonic resonance which operates between the meta-dynamic system represented by the gyroscope and the planet. Because the interaction between masses operates in conformity with the fractally-deterministic SOC dynamics, the precession of the gyroscope exerts a perturbation on the Y-Bias which results in a discontinuity in the standing wave coherence between them. The effect of this interaction is to diminish the gravitational field effect, which is measured in terms of latency in the acceleration rate, demonstrated as reduced acceleration by the falling gyroscope.

As Laithwaite demonstrated, a precessing gyroscope can move appreciable mass through space. In his writings, he says

*'The spinning top showed us that all the time, but we couldn't see it. If the gyroscope does not produce the full amount of centrifugal force on its pivot in the centre then indeed you have produced mass transfer.'*

*'It became more exciting than ever now because I could explain the unexplainable. Gyroscopes became absolutely in accordance*

---

<sup>17</sup> For the purpose of clarity and simplicity, we have substituted the linguistic description of the dynamics of gyroscopic precession for the more complex differential expressions. For mathematicians and scientists, these formulas are ubiquitously available. For non-scientists, the point to be made by this section is that a precessing gyroscope provides us with a way to examine and analyze all the dynamics associated with gravitational effects in a small, controlled, easily observable phenomenon.

**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

*with Newton's laws. We were now not challenging any sacred laws at all. We were sticking strictly to the rules that everyone would approve of, but getting the same result -- a force through space without a rocket.* [752]

Laithwaite demonstrated that as the angular momentum of the gyroscope diminishes below the  $1/f$  threshold point, this variable becomes so low as to require an extremely high precession rate to maintain this relationship. At that point, the rotational energy exhibited by the gyroscope is no longer capable of counteracting the force of gravity, and the gyroscope suddenly falls. Notice that the experimental results show that the gyroscope does not fall at a greater gradual velocity as its angular momentum dissipates. Rather, as the angular momentum falls below the  $1/f$  threshold, the gyroscope falls at a velocity which is fully accelerated by the gravitational field. This is consistent with the SOC-mandated behavior referred to in the literature as 'Punctuated Equilibrium,' which is always in compliance with the  $1/f$  quantum threshold requirements.

A rigorously conducted experimental verification of this interaction between masses suggests, among other things, that inertia, as a measure of the relative values resulting from the interaction between two masses, can be deliberately mitigated by the application of a suitably engineered device which employs Y-Bias and Angularity vectors to interdict the harmonic resonances [i.e., gravitational field effects] which operate between them. This is a profound insight because if it is correct, it suggests that anti-gravitational effects can be deliberately engineered in the context of Y-Bias and Angularity dynamics.

**Inertial Mass Reduction: Electro-Gravitic Devices**

It has long been held that gravitational field effects cannot be mitigated because the phenomenon known as Gravity is a primary field effect. The fact that gravitational field effects can be consistently, repeatedly mitigated in a defined locale by exercising more than a dozen experimentally validated protocols, suggests that something is fundamentally amiss with the Standard

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

Model. Such effects are specifically prohibited by the model and not accepted for publication in mainstream scientific journals, despite the fact that in the United States, the DOD has been employing electro-gravitic effects to enhance the flight performance of the B-2 Stealth Bomber for more than a decade.

Nevertheless, the phenomenon of locally mitigated gravitational field effects is now so ubiquitously recognized [even if unofficially] in mainstream scientific circles that it is time for science as a community to supply a cogent model which both explains what gravitational field effects are and demonstrates how they work. With such a model in hand, it will then become possible to not only understand how gravitational field effects operate, but to design-engineer applications which act to exert correctly structured Y-Bias vectors, at optimal angles, to produce the anti-gravitational or hyper-gravitational effects. In order to accomplish this, we must first understand what Mass is.

**Mass – What It Is****Background:**

The Standard Model fails to define what 'Mass' is. Instead, when we discuss the concept of mass, we are compelled to think about it in purely circular terms. 21<sup>st</sup> Century physics holds that Mass is a fundamental property of an object, a numerical measure of its inertia, as well as a fundamental measure of the amount of matter found in an object.[[753](#)] Justification for this kind of circular thinking is based on the assertion that Mass is such a fundamental quality of matter that it is not possible to define it without referring to its properties. The authors posit an alternative definition of Mass in terms of Y-Bias and Angularity Theory, which suggests that Mass is not an *a priori* intrinsic property at all, but rather a product of underlying scalar interactions arising from the Physical Vacuum via the Zero Point, which create the effects identified by science, in compliance with SOC rules and dynamics.



The way we apprehend this issue is not trivial. The primary conundrum encountered by the Standard Model of Physics is artfully expressed by Trefil,[754] who posits

*"...after the beginning of the particle era... there is no known process which can change the net particle number of the universe... by the time the universe was a millisecond old, the balance between matter and antimatter was fixed forever."*

### **The Big Bang Model of the universe**

If we follow this line of reasoning, it is not surprising that the Big Bang model of the universe should find widespread support. This model, as described by Nobel Laureate Steven Weinberg and others, suggests that within the first three minutes following the primary event, all matter and energy came into existence.[755] According to this model, the four 'primary field forces' existed *a priori*, as well as the field effect by which entropy is measured, called Time. The Big Bang model is predicated on three sets of observations, which include.[756]:

- The observed/suspected expansion of the universe <sup>(18)</sup>
- The 3K background radiation
- The hydrogen-helium abundance.

As of the beginning of the 21<sup>st</sup> Century, several unresolved issues have been identified which call the Big Bang model into question because it appears to suffer from a number of unsupportable, inexplicable inconsistencies, which include:

- The Antimatter Problem
- The Galaxy Formation Problem

---

<sup>18</sup> This assumption presumes that the speed of light [C] is invariant throughout the cosmos. This assumption has now been called into serious question by various investigators.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

- The Isotropy Problem
- The Flatness Problem

The four basic issues which call the sufficiency of the Big Bang model into question are all related by a single consideration – without a cogent understanding of the nature of Mass, it is not possible to resolve any of them.

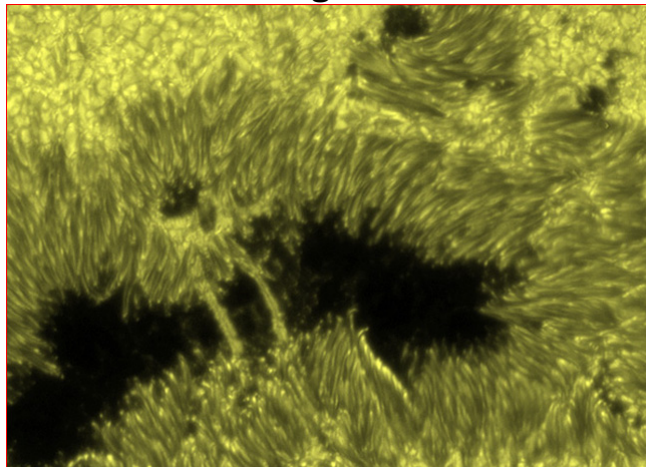
Y-Bias and Angularity Theory challenges the assertion held by the Big Bang Theory which holds that

*"... by the time the universe was a millisecond old, the balance between matter and antimatter was fixed forever."* [757]

**Sunspots – Clues to the Nature of Mass**

Alternatively, Y-Bias/ Angularity Theory posits that matter of all kinds, energy, time, all field forces and time domain polarized photons are the products of a continuous, self-sustaining, self-organizing cycle of aggregation and dissipation which erupts from the Physical Vacuum via the Zero Point to create  $L^4$ . The set of astronomical observations which bear this out can now be found in digital images supplied by Thunderbolts.org, which depict self-organizing SOC behaviors [for example] such as those found in the formation of previously unobserved structures in sun spots.[758]

**Figure 13**



*Figure 1 - Sunspots Add Exclamation Points to the 'Electric Sun'*

*[David Talbott]*

*In the extreme close-up photograph of a sunspot shown above, we observe the rope-like filaments of the penumbra, or margins of the sunspot. For many years solar physicists have claimed that these filaments were convection cells or rapidly rising columns of heated gases. But the higher-resolution details shown here, including the twin bridges across the sunspot, do not support traditional theory. All of the structure shown is consistent with the principle of anode tufting, a plasma discharge effect expected of a positively charged electric Sun. [\[Talbott\]](#)*

High-resolution images of the penumbra filaments reveal the distinctive characteristics of tornado-like charge vortices. The structures found beneath the tops of the rotating discharge columns illustrate the columns' explosive rise from below as they heat and project plasma upward into the bright photospheric granules. This phenomenon is neither accommodated nor anticipated by the Standard Model.

What is the real significance of this discovery? It speaks to the most fundamental assumptions intrinsic to our understanding of what matter is and how it is formed. To illustrate just how profound this consideration is, consider the work of the Stanford Collaboration.

### **Stanford Collaboration – Creating Mass From Light**

In the Spring of 1997, a team consisting of more than 20 scientists from half a dozen of the finest physics labs in the United States, gathered at the Stanford Linear Accelerator facility in California. Their objective was revolutionary -- they sought nothing less than to create particles of measurable mass using nothing but coherent beams of visible light.[\[759\]](#) To do so, they knew they would have to defy a fundamental tenet of mainstream particle physics. The

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

notions underlying this principle are described in Einstein's Second Postulate of the Special Theory of Relativity, made famous by the equation  $E=MC^2$ , which appears to be nullified by their work. Their work was scorned as the quintessence of scientific heresy by the organs of the physics industry. None of the mainstream scientific journals would publish their results - instead, their work was first reported by ***Discover Magazine***. Here is what they did and why it is important.

The Stanford Collaboration team succeeded in creating Electron-Positron pairs, with measurable density and particle mass, by crashing two high-intensity laser beams of monochromatic light together in a vacuum. Their experiment was not an accident – they set out to do it deliberately and kept working at it for more than six months until they succeeded. Why is this event significant? Because the conventional model of Quantum Mechanics and the Second Postulate to Einstein's Special Theory of Relativity specifically prohibit the creation of matter from nothing more than photons, in any environment, under any circumstances.[[760](#)]

In Y-Bias/ Angularity Theory, this behavior is not only accommodated but predicted. The vortex structures found in the sun spot image and the results produced by the Stanford Collaboration both demonstrate all the SOC dynamics intrinsic to the formation, attributes and behaviors of Mass, as provided for in the Y-Bias model, including the SOC nature of spinors, autopoietic structures, focused scalar intensity at the nexus, fractal orientation to self-similar structures,  $1/f$  noise threshold breaches, punctuated equilibrium and self-sustaining criticality at a macro-scale of evolution.

The behavioral dynamics found in this image are found at all scales above the Zero Point, because in each instance, at each scale, the Y-Bias/Angularity and SOC dynamics which govern the creation and dissipation of all such forces are universally consistent. What this suggests, in turn, about the nature of Mass is profoundly different than the notions iterated in the Standard Model.

**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

As Talbott rightly suggests,

*"The electric explanation of sunspots, like that of the penumbra, is rooted in the observed behavior of plasma discharge. In laboratory experiments, a torus forms above the equator of a positively charged sphere. Discharges then fly between the torus and the mid- to low-latitudes of the sphere. In the electric model, the Sun is the positively charged focal point of an electric field. And now we know that the Sun is indeed surrounded by an equatorial torus, as seen in the polar UV image of the Sun here:"*

Sunspots are the direct evidence that electric discharges punch holes in the photosphere to deliver electrical current directly to lower depths, exposing a view of the cooler interior. Nothing ever observed on the Sun supports the idea of heat transfer from inside the core, where standard theory places the nuclear fusion "furnace". In the electric model, nuclear fusion is an effect generated by Y-Bias/Angularity interactions, where the most energetic events occur, in the fierce electric tornadoes found in the sun spots.[\[761\]](#)

This 'outside to inside' behavior typifies the fundamental assumptions intrinsic to the Y-Bias/Angularity and SOC model. It demonstrates, for example, that the formation of Mass is a dynamic process, not a condition antecedent to the organization of matter or the emission of energy, light and so on, as held by proponents of the Big Bang theory. Why do sun spots exhibit the same archetypal structural dynamics as the weather patterns found on the surface of Jupiter and the Earth? Because these phenomena are products of the same underlying set of scalar and dynamic processes.

### **Mass – A Product of Tertiary Scale SOC Interactions**

According to the alternative model posited by Y-Bias/Angularity and SOC behaviors, Mass becomes physical in  $L^4$  as a product of the dynamic interaction of charge ensembles which combine at the Tertiary Scale to create Sub-Quarks.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

Sub-Quarks are the first product of SOC interactions to manifest the property referred to as 'Inertia.' The authors posit that Inertia is not a rigorously complete description of the phenomenon, because it ignores important aspects of the SOC processes by which Mass is formed.

Inertia is conventionally defined as follows:

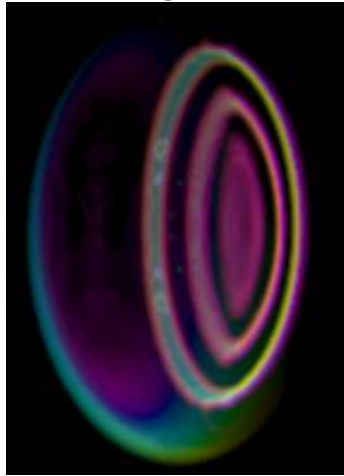
*(Physics) That property of matter by which it tends when at rest to remain so, and when in motion to continue in motion, and in the same straight line or direction, unless acted on by some external force, sometimes called vis inertiae. The **inertia** of a body is proportional to its mass.*[\[762\]](#)

This definition, provided by the 1913 edition of Webster's International Dictionary, has not changed in more than a century. It tells us what Matter, taken as an aggregation of Masses, does, how it behaves, and gives the observed phenomenon a name. In physics, the model does not explain, however, why matter behaves in this way nor does it explain why matter fails to consistently behave in this way when subjected to a variety of conditions found ubiquitously in nature. On the one hand, Mass is held to be a fundamental, *a priori* attribute of matter, but on the other is found not to be invariant.

In the context of Y-Bias/Angularity and SOC Theory, Mass is held to be a product of the dynamic interactions occurring between charge ensembles which operate to create Sub-Quarks. Below this scale, Mass is not found nor is it predicted. In quantum mechanics, Mass is characterized as an aggregation of one part Planck mass quanta and one part Planck time quanta. However, in Maxwell's Quaternions, as verified by Whittaker's formulations, Mass is found to be a product of time domain and spin-polarized interactions occurring between charge ensembles, and not a precursor to them.

In the microcosm, we find the same SOC behaviors occurring at the Tertiary Scale [e.g., as evinced in sun spots] as described by Talbott *et al.*

**Figure 14**



*Decay of a Soliton in a Bose-Einstein Condensate  
Fourth Scale manifestation of condensed mass [image credit  
NIST]*

The phenomenon demonstrated by this digital image of a Bose-Einstein Condensate, illustrates the release of negatively charged electrical energy from an equatorial torus, which then flows inward towards a spinning, positively charged center. This is an archetypal manifestation of SOC behaviors occurring at all scales above the Tertiary Scale.

As rigorously verified physical evidence illustrates, the vector values of the Y-Bias and the angle of incidence [Angularity] comprising such interactions are deterministic factors which serve to either drive punctuated equilibrium to a point of criticality, from one scale of organizational complexity to another, or cause the dissipation of previously aggregated dynamical structures to lower energy states at finer scales. This model accommodates the problem set which obviates the validity of the Big Bang model of the cosmos.

## **The Antimatter Problem**

Physicists have struggled to understand the predominance of 'matter' over 'antimatter' in the observable universe. When viewed from within the narrow confines imposed by the Standard Model, as typified in Trefil, this problem cannot be resolved so long as the underlying nature of Mass cannot be explicated. Physics holds that in order for antimatter to exist at all, a fundamental but as yet not understood asymmetry must exist. CP Symmetry, which examines violations in the decay of neutral Kaon particles, as a function of dissipation of the van der Waals force, is supposed to hold the answer. The fact that Kaons decay with an observable asymmetry in their CP Symmetry is cited as evidence that an asymmetry exists, but little progress has been made in this context to understand why this behavior occurs.

In the context of Y-Bias/Angularity and SOC Theory, however, the asymmetry phenomenon is explained as a function of the extent to which antimatter achieves self-sustaining criticality as a product of scalar Y-Bias interactions occurring among the class of time domain and spin-polarized charge ensembles which interact to create anti-matter at the Tertiary Scale. The asymmetry posited by proponents of the CP Symmetry hypothesis is a product of SOC dynamics, which operates to create a limited class of fractally defined types of matter which cannot achieve sustainable levels of criticality beyond certain scales, and which is therefore by definition restricted to a limited range of expression.

Calculations generated within this framework to describe antimatter asymmetry must be robust enough to accommodate both  $L^2$  and  $N^2L^2$  field effects, including those which are representative of the time domain polarization attributes demanded by Whittaker's formulations, as described by Bearden. The current iteration of quantum calculus cannot be relied on to adequately provide this description because the topology-leveling effect imposed by the imposition



of the Lorenz transforms ignores the role of the underlying stressors and time domain vectors which are at the root of the processes.

### **The Galaxy Formation Problem**

According to those who seek to validate the EPR model of gravitational forces by positing the existence of dark matter and dark energy, random non-uniformities in the structure of the universe are insufficient to allow for the formation of galaxies. When considered in the context of the Big Bang model of the cosmos, the gravitational attraction described in the EPR formulation of gravitational field effects is too slow for galaxies to form with any reasonable model of turbulence, as a product of the expansion of the universe itself. Trefil's response to this conundrum typifies current thinking.

*"...the question of how the large-scale structure of the universe could have come into being has been a major unsolved problem in cosmology...we are forced to look to the period before 1 millisecond to explain the existence of galaxies."*[[763](#)]

The EPR formulation of gravitational forces is an expression which demands that gravitational effects exerted by two bodies on each other must be invariant, uniform and linear. The authors posit, on the contrary, that the structure of the cosmos exhibits all the attributes of a self-organizing, open, complex system which is harmonically resonant, and therefore dynamically variant at all scales. The behaviors of the structures found in the observable universe bear testimony to the fact that the cosmos is in every respect an SOC system, which operates across vast distances to demonstrate behaviors which occur without respect to time and which are not attenuated by distance. The inability of mainstream science to recognize this fundamental shortcoming to accommodate what is undeniably occurring in the heavens is one of the most stunning of all scientific failures.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

To accommodate this fact set, the EPR formulation must be modified, as Plotnikov and Anastasovski suggest, to incorporate time domain polarization and spin polarity as scalar attributes of mass and energy, including the harmonic resonances and non-linear, non-local field effects which are evident in gravitational interactions. In the context of Y-Bias/Angularity and SOC systems, the same dynamic which operates to instantaneously convert an inert pile of sand to a self-organizing system evincing criticality also operates at all scales across the expanse of the cosmos. The A-field information exchange functions which Gisin demonstrates to accommodate externally imposed alterations of spin and charge polarity in electron-positron pairs, without respect to time or distance of separation [Simultaneity – Non-local Effects at a Distance], is the self-same information exchange mechanism predicted by Bell's Inequality and Bohm's Implicate Order. It operates to organize the structures observed in the cosmos, in real time, without respect to time and distance.

Gravitational field effects are the product of aggregated SOC interactions occurring at the primary, secondary and tertiary scales, which are found everywhere in the cosmos. Gravitational field effects are the observable product of Y-Bias interactions between masses, manifest as products of the set of SOC attributes intrinsic to each mass, which interact at angles relative to each other to cause self-organization or dissipation of their intrinsic property sets.

In this context, the structure of the cosmos exists precisely as it is predicted to be. In the absence of a singularity event such as the Big Bang, the Y-Bias/Angularity model suggests that the universe should be asymmetrically populated by evidence of SOC aggregations of matter and energy at numerous scales, evincing archetypal forms, demonstrating Fibonacci relationships, and operating in realtime as an aggregation of open, complex, self-organizing system components.

According to this model, we should find evidence at all scales of areas of little or no mass where the gravitational field effects cancel and produce

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

dissonance between masses. We should find evidence of matter aggregating into stars, solar systems, galaxies, meta-galaxies, and so on, with great expanses of nothingness between. We should find SOC systems deconstructing from stars to lesser energy state configurations, black holes of varying sizes which conform to the power laws, neutron stars with extremely high mass densities, quasars, RF and X-ray emitting stars, and a variety of other stellar configurations which fill out all the fractally-defined probabilities which SOC aggregations of matter and energy can potentially and sustainably exhibit.

We should find evidence of the existence of black holes so large as to consume or deconstruct entire areas of the universe. We should find evidence of stellar bodies exhibiting internal temperatures so high that nothing but a plasma of undifferentiated information survives. We should find that all these classes of observable phenomena can be mapped in terms of their logarithmic relationships with each other, in terms of their intensity, magnitude, frequency and fractal distribution throughout the universe.

In fact, this mapping exercise has already become substantially complete. Long term studies conducted by teams of certifiably competent scientists around the globe provide ample, rigorously reported evidence that the SOC model of the cosmos is precisely on target with respect to its presumptions about how Nature works. [764]

The forms of autopoietic organization predicted by the Y-Bias Model are neither accommodated nor anticipated by mainstream science but are in widespread evidence nevertheless. And as a final act of heresy, the Y-Bias/Angularity model predicts that we must find stellar formations which demonstrate velocities in excess of  $C$ . [765] While this evidence is specifically prohibited by GTR and STR, the interpretation of reality-as-it-is provided by the GTR Model is so severely flawed as to become meaningless at the finest and largest scales. Indeed, extensive astronomical studies performed by teams of

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

Russian scientists, directly sponsored by the Russian Academy of Sciences during the 80's and 90's, document numerous instances of superluminal trajectories exhibited by massive stellar objects and entire galactic systems.[[766](#)]

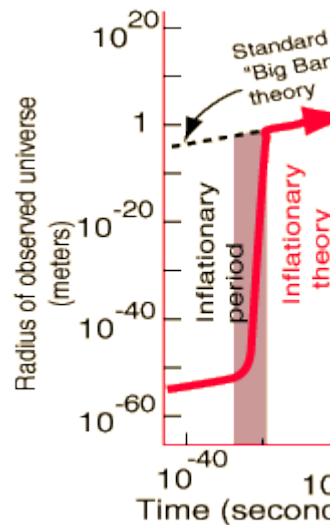
One important item of interest should be noted here. The methodology employed by the Russian Academy of Sciences to determine relative velocities demonstrated by astronomical bodies involved the design-engineering and production of a class of sensors which are referred to in the literature as 'scalar interferometers.' These devices measure the A-field attributes exhibited by specific bodies or aggregations of bodies in the heavens to determine where they are now, in realtime, as opposed to where they used to be [which is what is determined by mapping the astronomical locations provided by light detection methods]. This is problematical for Western scientists because (1) the ubiquitous existence of the A-field is not accepted in the Standard Model, and (2) all information about the heavens is by definition limited to information transported at the speed of light.

In a comical twist of events, agents acting on behalf of the Russian Academy of Sciences have undertaken a vigorous campaign in the West to discredit any research published by anyone who was not directly involved in the Russian Astronomical Inventory Studies. While the political implications of such an initiative go far beyond the scope of this treatment, it is nevertheless interesting to note that what is accepted as scientific 'fact' has almost as much to do with who discovered, experimentally verified and reported it as it does with the value of the fact itself. The imposition of cultural and political agendas to skew public perception of what is 'true' and 'not true' about scientific matters is a tactic we observe occurring with greater frequency and more catastrophic results than anyone would have predicted. The authors deplore this trend because it serves only to prevent everyone from understanding how Nature really works by preserving the special interests of those who prefer to protect their elite status. .

## The Isotropy Problem

The recent discovery that background radiation in the microwave range is isotropic within 0.01%, across a radius of 20 thousand million light years, has been interpreted as evidence that the universe we now observe is a product of a Big Bang event, postulated to have occurred perhaps 20 billion years ago. This interpretation is problematic, however, since it is also held that in order for thermal equilibrium to occur uniformly throughout the cosmos, the vast expanses of space would have to be able to somehow 'communicate' this information from one region of space to another almost instantaneously, without respect to distance. Since the GTR specifically prohibits information transport velocities at a rate in excess of  $C$ , isotropic thermal equilibrium is also specifically prohibited. Clearly, the data and the model are in substantial conflict here.

In an effort to salvage the integrity of the Standard Model, and in support of the Big Bang model of cosmological forces, Alan Guth developed what has come to be known as the 'Inflationary Hypothesis.' [767] This theory suggests that an extraordinary inflationary phase occurred  $10^{-36} - 10^{-32}$  seconds after the Big Bang event. This is a greater rate of expansion than in the entire 14 thousand million years since the supposed event. Guth suggests, further, that the inflationary epoch may have expanded the size of the universe by  $10^{20}$  or  $10^{30}$  times in this incredibly brief time. The inflationary hypothesis offers a way to deal with the isotropy problem and the flatness problem found in current cosmological models by specifically violating the rules held by the Standard Model, in an effort to preserve it.

**Figure 15**

In a popular article written for Time Magazine[768], Lemonick and Nash describe inflation as an "amendment to the original Big Bang" as follows:

*"...when the universe was less than a billionth of a billionth of a billionth of a second old, it briefly went through a period of supercharged expansion, ballooning from the size of a proton to the size of a grapefruit (and thus expanding at many, many times the speed of light). Then the expansion slowed to a much more stately pace. Improbable as the theory sounds, it has held up in every observation astronomers have managed to make."*

This explanation for thermal isotropy throughout the universe presumes that we are able to observe these effects because we are 'inside' the bubble of expansion. This explanation fails, however to explain why the early stages of inflation operated at velocities far greater than the speed of light, but are now restricted to the arbitrary upper limits suggested by the Second Postulate to the Special Theory of Relativity.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

Y-Bias/Angularity Theory proposes a different solution. According to this model, the universe is an open, complex, self-organizing system. Its behaviors are consistent at all scales because SOC dynamics are both isotropic and holographic. Contrary to the litany of restrictions arbitrarily imposed by the Standard Model, the Y-Bias model holds that the following conditions are ubiquitously applicable throughout the cosmos:

- Complementarity is a fundamental attribute of Minkowski 4-Space  $[L^4]$ . This means that wherever local-linear field effects are found to be operative, we must also find non-local/non-linear field effects, at all scales.
- The cosmos is self-referential, both fractally [local-linear] and holographically [non-local/non-linear] at all scales.
- $C$  is not the upper limit to information transport velocities, nor is it the only means by which information can be transported in  $L^4$ .
- Simultaneity [non-local effects at a distance] occurs at all scales and across the infinite expanse of the universe without respect to  $\Delta T$ .
- With respect to the total potential energy available via the Physical Vacuum, the cosmos is always in perfect equilibrium.
- With respect to SOC dynamics operating at each locale and at each scale in the cosmos, all SOC sub-systems within the cosmos exhibit compliance with the requirements of criticality, and are therefore in a condition approaching criticality and punctuated equilibrium, which is by definition asymmetric.
- All forms of matter, energy, time, light and field forces are constantly being organized and annihilated at the Zero Point, as a manifestation of the organizational imperative [negentropy] arising from the Physical Vacuum.

Taken in the aggregate, this set of dynamical considerations leads to a fundamentally different set of conclusions about the nature of the cosmos than that which is currently in vogue. According to the Y-Bias model, there is no

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

need for a singularity event such as the Big Bang to explain the beginnings of the universe. If the Y-Bias model is correct, there is no beginning and no end to the cosmos. Taken to its logical extensions, for example, the Y-Bias model suggests that while there may have been a catastrophic avalanche event which involved the entire observable universe at some far distant time [14-20 thousand million years in the past], it is equally likely that this event was but one of a series of such events which have repeatedly occurred across the vast, infinite expanse of time. As D. Wilcock aptly points out, this is yet another universally observable example of the harmonic, oscillating behaviors predicted by Whittaker.

The Y-Bias model further posits that rather than coming from 'nothing' [as the Big Bang model suggests], what we may be observing now is what happens at the business end of a black hole of such cosmic proportions that it literally disaggregated all the matter and energy found in a prior iteration of the cosmos, into a single point of infinite compression. That such an event could happen is inconsistent with the dictates of current thinking, but it is thoroughly consistent with the Y-Bias model and observed phenomena. This is a fundamentally different model than the Big Bang model because it operates according to an entirely different set of underlying dynamics, including but certainly not limited to the conditions cited above.

In the Y-Bias model, thermal isotropy is a mandatory, defining condition of every self-organizing system, regardless of its size. This phenomenon is accommodated by recognition of the fact that simultaneity is an intrinsic attribute of all SOC systems. It has now been irrefutably established by impeccable scientific rigor that information transport is not limited to the speed of light, as found in GTR and the STR. The real challenge of this interpretation of past events is the requirement that science develop a more robust means of expressing SOC dynamics and describing how they operate at the Zero Point and through the various scales of increasingly complex organization. This will



require the development of a differential calculus capable of accommodating  $\mathbf{Z} \rightleftharpoons \mathbf{Z}^2 + \mathbf{C}$  rather than  $\mathbf{E}=\mathbf{MC}^2$ .

### **The Flatness Problem**

It has become fashionable among physicists at the beginning of the 21<sup>st</sup> Century to suggest that the amount of matter found in the universe is less than 1/10<sup>th</sup> the critical amount needed to mitigate the observed expansion of the universe. This thinking suggests that the universe is either barely open or very nearly closed. This 'flatness' is problematical to cosmologists because it is interpreted to mean that there is insufficient matter in the universe to mitigate an infinite rate of expansion across the infinite expanse of the cosmos, as the EPR formulation of gravitational forces demands.

In Y-Bias Theory, however, this 'problem' is taken as evidence that the Standard Model is so fundamentally flawed as to be essentially useless as a predictive tool in a cosmological context. The observable universe is not finite. If the Hubble Telescope has taught us anything, it is this: regardless of how powerful our best telescopes may become, we will never find the end of the universe. All the evidence generated by observational science suggests that this is a valid, rational and supportable assumption. According to the Y-Bias model, what we observe in the heavens through a telescope, and at the fundament of L<sup>4</sup> through the most powerful microscopes, is evidence of the same set of dynamic behaviors operating with consistent uniformity across all the various scales in Nature.

Contrary to the dictates of Cartesian thinking, we are not impartial, detached observers of Nature. We are 'inside' the hologram which constitutes the cosmos and cannot in any meaningful sense presume to observe it with detachment. In this regard, the Maharishi model of the universe is quite correct.[769] Using the rigors of scientific inquiry, even though the community of science has long known how to locally access information embedded in the

hologram, we have chosen, for reasons which are beyond the scope of this discussion, to deny the existence of the hologram itself. As a result, as a community of scientists, we have developed mathematical formulations which attempt to explain the artificially limited amount of information we have retrieved from the observable universe in ways which are equivocal, arbitrary and culturally limited.

### **The Flaw of A Priori Effects**

The notion that there is insufficient matter in the cosmos to mitigate an infinite rate of expansion is an unsupportable conclusion drawn from a faulty assumption. The EPR formulation of gravitational field effects holds that gravitational force is an *a priori* condition, that it is invariant, that it is local/linear with respect to masses but infinite in its propagation, and that it operates without respect to other field effects because it is primary and mutually exclusive. In the context of this model, it is inevitable that an inventory of the amount of matter found in the observable cosmos should prove insufficient to cause it to behave as it should. Therefore, it is held, there must be some additional, mysterious, previously unobservable quotient in existence throughout the universe which somehow acts to hold the cosmos together. Accordingly, instead of fixing the model, scientists are now fecklessly looking for dark matter and dark energy, along with evidence of the ghostly particle called the 'Graviton', which is somehow supposed to carry out the functions attributed to gravitational forces across the universe.

Y-Bias holds that gravitational field effects are not *a priori* but are, rather, derivative effects produced by scalar SOC behaviors occurring at increasingly finer scales. It holds that gravitational field effects are not invariant, but rather operate according to SOC mandated dynamics which are themselves the product of Y-Bias interactions, which in turn demonstrate measurable variance across a scale of potential outcomes, as a function of the angularity of the interactions between them. Y-Bias holds that gravitational field forces are not linear and invariant, but rather produce observable effects as a function of the

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

extent to which masses exert field effects on each other, which are more or less harmonic and resonant.

According to this model, just as we find that the interference patterns produced by intersecting laser beams can be used to produce 3-D images in free space, gravitational field effects exerted by masses on each other produce areas of massive concentration and areas of virtual nothingness. We see evidence of this harmonic resonance at all scales in the cosmos, including the structure of galaxies, meta-galaxies and high density electron charge clusters. If the Y-Bias model correctly reflects the underlying dynamics which operate ubiquitously throughout the cosmos, there is no such thing as Dark Matter, Dark Energy or any such thing as a particle like the Graviton. Such things are inventions designed to accommodate the flaws extant in the model at the expense of discovering how Nature really works. From this analysis, we move up the evolutionary ladder to the Fifth Scale.

**Fifth Scale Dynamics:**

The Fifth Scale is the scale at which hadrons, leptons and fermions are formed. At this sub-atomic level, quantum mechanics and the standard model begin to find traction but are unable to predict behaviors within any except the most nominal limits. Much has been written to date about interactions occurring at the Fifth scale. Santilli's reformulation of Hadronic Mechanics explains why, for example, Quantum Mechanics as presently constituted fails to predict or accommodate fifth scale interactions within nominal probability limits of more than 70% [770]. Quantum mechanics prohibits interactions which are now clearly known to operate at this scale, including the splitting of Electrons into constituent waveform and particle components [Maris etal], over-unity photon emissions arising from electron plasma discharge in Hydrogen pumps [Langmuir, Naudin etal], and the SOC aggregation of electrons in a plasma to form toroidal high density charge clusters [Shoulders, Jin *et al*].

## High Density Charge Clusters [EVO]

Notwithstanding the fact that phenomena such as EVO's are specifically prohibited by the Standard Model, all of these rigorously reported phenomena are accommodated by Y-Bias and Angularity Theory. For example, Shoulders *et al.* has demonstrated that when Leptons [in the form of clouds of free Electrons] interact at an optimal angle and with sufficient angular momentum and vectored velocities to breach the  $1/f$  SOC-mandated noise threshold, stable clusters of Leptons automatically self-organize themselves to form toroidal clusters, measuring one micron in diameter [771]. It is not coincidental that we find evidence of this archetypal form at all scales above the third scale, as demonstrated by the figures which follow.

### Experimental/ Observations:

Shoulders has been awarded two patents by the USPTO during the past 15 years for his work in what has come to be known as the phenomenon of high density charge clusters [772]. Shoulders, Jin and others have subsequently developed both the experimental protocols and mathematical formulations which describe these interactions. As far as Quantum Mechanics and the Standard Model are concerned, such things are simply not possible. If Dr. Frank Goldner of DOE is to be believed, such things Low Energy Nuclear Remediation using high density charge clusters are specifically prohibited, both scientifically and politically. Nevertheless, high density electron charge clusters [referred to in the recently published paper by Shoulders as Extraordinary Voltage Objects, or EVO's] are not only known to exist, but have been produced in repeated experimental protocols in the US, China and the CIS [773], as well as in the laboratories of S-X Jin and Shoulders himself. Images of EVO's follow in a later section.

S-X Jin, once ranked as the most important particle physicist in the People's Republic of China [before he escaped to work in the US], has pioneered techniques for experimental verification and charting of the EVO interactions in

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

solutions containing radioactive Thorium 227, an isotope of Thorium which is known to emit high levels of beta electrons in its oxalate form. After bombarding a 40% solution of Thorium 227 suspended in distilled water, Jin repeatedly and consistently remediated radioactive emissions to ambient levels of electron [beta] and gamma emission using only EVO propagation driven by a high voltage, low amperage circuit.[774] Photographs and a detailed explanation of the photographic results obtained with the use of a tunneling Electron microscope can be evaluated at Dr. Shoulder's web site, found at <http://www.svn.net/krscfs/>.

**Figure 16**

*Fig. 5 Pinhole Camera Side View of Dual EVO Flight Through Vacuum*

Coming from the EVO source at the lower portion of the pinhole camera image, the EVO is seen to follow a helical pattern of motion and decomposing into the individual electrons as it moves at a rate of 1/10 the velocity of light to the top of the photo. The length of the EVO run in this photo is approximately 0.1 inches. This type of charge motion produces a chirped spectrum of radiation sweeping from higher to lower frequencies. [775]

The importance of this increasingly robust experimental protocol is that it demonstrates compelling evidence supporting the predictions made by Y-Bias and Angularity Theory. The EVO toroids generated by Shoulders and Jin et al are self-organizing across at least three specific scales [1 micron, 20 microns, 50 microns], are stable across significant distances, and can be used to perform deliberately engineered work functions [e.g., remediation of radioactive

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

emissions resulting from spent nuclear fuels and radioactive isotopes] at far lower levels of energy consumption than can be accommodated by quantum mechanics.

In a linear particle accelerator, for example, upwards of 3.5 million electron volts [shown as 3.5 MeV] are required to propel a Proton [1,835 times more dense than an electron] to a velocity of 10% C, the speed of light. In sharp contrast to this level of energetic expenditure, clusters of electrons measuring one micron [one millionth of a meter] in diameter, containing  $6.02 \times 10^{23}$  electrons [Avogadro's number], can be propelled at the same velocity by exciting the field with 2.5 thousand electron volts [shown as 2.5 KeV], which is 1,000 times less than that which is required to accelerate Protons to the same velocity in a linear accelerator. What is remarkable about this phenomenon is that when propelled through a Proton-rich environment [e.g., Deuteride gas] toward a positively charged target, EVO's are known to attract and capture 1 Proton for each 100 million Electrons. Positively charged Protons are mathematically shown to be held in the negatively charged center of the toroid formed by the self-organizing electrons and propelled at the same rate as the cluster itself without requiring additional input of energy. [776]

This phenomenon is borne out by repeated experimental validation and predicted by Y-Bias and Angularity Theory, despite the fact that it is specifically prohibited by the Second Law of Thermodynamics, as currently held. Accordingly, when the millions of Protons held in the center of the EVO charge cluster impact the nuclei of the atoms making up the target material, the cumulative kinetic effect exerted by the Protons on the nuclear particles is sufficient to temporarily break the weak nuclear force. However, at this velocity [.1 C] the kinetic energy exerted by the Protons at the point of impact is not sufficient to cause a fully catastrophic fission event because, by design, it fails to totally breach the  $1/f$  threshold imposed by the van der Waals nuclear force. What happens instead, as predicted by Y-Bias/Angularity Theory, and as demonstrated in the extensive work performed by Shoulders, Jin and others, is

that the nuclear particles temporarily form a plasma, a disorganized 'soup' of nuclear particles in the locale where the nucleus used to be.

**Figure 17**



*EVO Plasma Discharge [Jin][777]*

In this instant, prodigious amounts of energy are liberated as a result of the impact of the protons against the nuclear target material, estimated to be in the range of up to nine times the energies required to accelerate the EVO in the first place. Light, in the form of photons, and heat, in the form of liberated electrons, as well as some Neutrons and gamma rays, are emitted as the plasma is formed. In the few nanoseconds following the collision, however, the nuclear particles re-organize themselves into smaller, more energetically stable nuclear configurations, each manifesting a demonstrably lower steady state than that of the original atoms found in the target material. The half-life of radioactive actides have been reduced by 50% by this method in controlled laboratory experiments [Hoagy *et al*].

By definition, this alteration of the configuration of atomic nuclear structure constitutes transmutation. That is, the creation of another kind of matter, exhibiting a different atomic number, from the basic building blocks which originally comprised the target material, which was impacted by the Proton-bearing EVO's. Jin's experimental results demonstrate the presence of a

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

number of atomically pure elemental materials in the EVO residue after such an impact which were not present in any of the original target materials, as verified by a gas diffusion mass spectrometer, prior to the procedure.

**Figure 18**



*Edge View of Multiple EVO Strikes in Air on an Aluminum Foil Coated with SiC and Epoxy Mix*

*The multiple EVO strikes [shown in Shoulder's Fig. 18] are caused by an induction coil driven electrode being scanned along the top side of the foil with a spacing of about .75 inch. In some regions the EVO penetrates the 0.02 inch thick coating and 0.001 inch thick foil carrying the fluid out the back side showing as a flare in the photo. In other cases, the EVO penetrates the coating and foil and then reverses direction carrying the fluidized SiC out the entry direction with high velocity.*

*The ability to penetrate is tied to having an electrical impedance match for the EVO upon emergence into the space beyond the foil. Deep penetration of the materials depends upon having a form of impedance match between the EVO and the material being bored. The EVO matches the impedance of earth and concrete structures. It does not match highly conductive metals. [Shoulders, 29 June 2005][[778](#)]*

The implications of this rigorously demonstrated technology are profound, particularly for those who seek to remediate radioactive emissions emanating



from spent nuclear fuels. What this work suggests is that radioactive emissions may be mitigated to ambient background levels with the application of a carefully engineered stream of EVO's in a controlled, proton-rich environment, without the risk of precipitating catastrophic fission events or generating dangerous alpha particles and gamma ray emissions. If developed by competent design-engineering and applications management protocols, devices based on this phenomenon could be employed to safely, permanently resolve the waste nuclear fuel problem on a global scale.

What is more important, however, is the suggestion that materials of one kind or another can be deliberately engineered to form other elemental or isotopic materials, using Y-Bias and Angularity Theory as a context. Using this approach, it should be possible [for example], to fundamentally alter many of the assumptions intrinsic to materials science, including the design-engineering and production of meta-materials exhibiting super-conductive properties. Y-Bias/Angularity techniques should be applicable to research initiatives which seek to create Meisner Fields in conductive metals, produce super-magnetic attributes in alloyed ceramics, and produce transparent aluminum. The notion that a recurring archetypal form of autopoietic organization can be employed at various scales to deliberately engineer our own reality [in a material sense] is both compelling and onerous.

### **Maris – Splitting the Electron**

Much has been written about prohibited phenomena occurring at the scale of sub-atomic particles, but perhaps no subject has created as much consternation in the citadels of 21<sup>st</sup> Century physics as the work of Scottish physicist Humphrey Maris, professor of physics at Brown University. [779] In a paper published August 1, 2000, in the Journal of Low Temperature Physics, Maris proposed that under suitable conditions electrons can undergo a form of fission. He has also discovered there is a significant amount of experimental evidence to support his theory.

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

Physicists consider that matter in the world is composed of a large number of elementary particles. Some of these particles, such as the electron and the proton, are shown to carry an electric charge, while others, including the neutron and neutrino, are electrically neutral. Although some elementary particles can decay into other particles, it has been regarded as a general principle of physics that an elementary particle cannot be broken into two pieces. Thus, for example, although a neutron can decay into a proton plus an electron and a neutrino, the Standard Model holds that it can never be broken into two half-neutrons.

According to quantum theory, the state of a particle is described in terms of its wave function. The probability that the particle will be found in any position with respect to the nucleus is proportional to the square of the wave function at that point in space. Maris' theory considers what happens to electrons when they are immersed in liquid helium at a temperature of one degree above absolute zero. This is the same set of assumptions which were used to verify and photograph the structure of the Bose-Einstein Condensate. Previous experiments have shown that an electron in helium becomes trapped in a bubble approximately 100-billionths [ $10^{-10}$ ] of an inch in diameter. The bubble drifts through the liquid with the wave function of the electron confined inside it.

Maris shows that when the bubble is illuminated with infrared light, the bubble can divide into two smaller bubbles, each containing a part of the wave function of the electron. These two bubbles can then move independently through the liquid and become separated from each other.

In the 1970s, researchers at Bell Laboratories and the University of Michigan performed experiments on the effect of light on electrons in liquid helium. These researchers were unable to explain their surprising results. Maris realized that these old experiments, together with more recent measurements made at the University of Lancaster, could be understood in

terms of his theory and provided support for his ideas. Further experiments to test the theory are under way at Brown University in work supported by the National Science Foundation.

Again, while specifically prohibited by the Standard Model of physics, this phenomenon nevertheless demonstrates that Leptons are almost certainly constituted of finer aggregations of information. This insight has resulted in a race among particle physicists around the world to prove the existence of what has come to be known as the Leptoquark – the Quark which combines with other Quarks of complementary attributes to form electrons [as negatively charged particles] and neutrinos [as neutrally charged particles]. Contrary to the proscriptions imposed by the Standard Model on such interactions, Y-Bias and Angularity Theory predicts and explains how and why this phenomenon occurs.

Again, the implications of this insight are profound. Virtually every aspect of the modern world depends on the production, propagation and consumption of electrical energy in one form or another. If Y-Bias/Angularity Theory is correct, Maris' insight comports specifically with the enigmatic applications developed by Tesla to produce electrical power from the Zero Point and transport it without wires to far-distant, location-specific destinations. That he could accomplish this feat is no longer the subject of any conjecture. How he accomplished it is no longer known, since all his notes, logs and records were stolen at the time of his death and mysteriously disappeared.

### **Sixth Scale & Beyond**

This is the scale at which atoms of 116 varieties and their various isotopes are formed from the basic components generated at the first five scales. This is the scale at which the Lorentz Transforms, Quantum Electrodynamics, Quantum Mechanics and Galileo's Geometries first become reliably applicable.

**Archetypal Forms – Vortexes, Toroids and Solitons**

Experimental observation spanning three centuries provides unequivocal evidence that Self-Organizing Criticality is a universal, scalar phenomenon. That the processes are fundamental and universally consistent is borne out by a series of images which span the observable spectrum from the Tertiary Scale to the Tenth. Images which illustrate the scalar uniformity of SOC processes provide important clues to the fundamental role played by the dynamics identified in Y-Bias and Angularity Theory as  $L^4$  becomes increasingly complex in its organization. The following illustrations show, with equal poignancy, that these processes operate to deconstruct SOC structures from the Tenth Scale back to the Zero Point. The shapes evidenced by these dynamic phenomena manifest physical and energetic characteristics which are archetypal.

**Dynamics:**

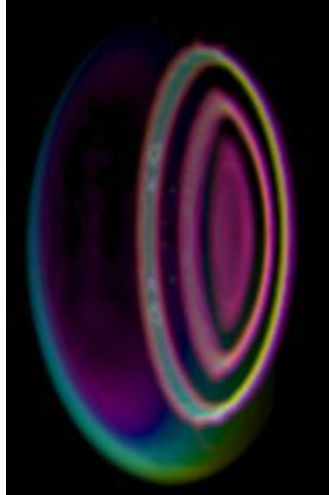
The authors illustrate that self-organizing phenomena at the Galactic and Interplanetary scales consistently exhibit fine scale SOC behaviors. Low temperatures created in the laboratory have been successfully employed to replicate conditions found elsewhere in the cosmos. Extremely low temperatures introduce several ancillary effects, including super-conductivity and a suitable environment for standing wave [Soliton] phenomena. At the Fourth Scale, we find the torus of a Soliton, demonstrated by the collapse of a Bose-Einstein Condensate:

This digital image, provided courtesy of the National Institute for Science and Technology, is extraordinary for a number of reasons, not the least of which is that we are able to have access to such images at all. The phenomenon of the standing wave Soliton has been observed since the beginning of Man's experience on the planet. Smoke rings of varying sizes have always fascinated us. The importance of the discovery that this specific, archetypal shape is found as an attribute of the most fundamental forms of matter, at the finest scales, cannot be over-emphasized.

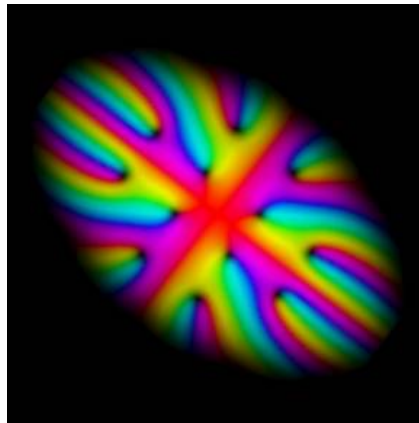
As we examine this image, we discover several important things about the way it is constructed. First, the rings which surround the center are spaced relative to each other in precise accordance with the Fibonacci relationships. Second, the collapse of the standing wave produces a new topology, which can only be described as the beginning of a vortex. Third, while the Soliton itself does not demonstrate angular momentum or 'spin,' it is clear that each of the rings surrounding the center accretion disk are energized and oscillating in one direction or the other around the center. In this case, Zero is not nothing. If ever we needed to observe the dynamics of self-organizing criticality in action, this image perfectly illustrates the fact that even at this fine scale, the Y-Bias, Angularity and SOC rules of organization, motion and interaction are already well developed in a stable, archetypal form.

#### **Fourth Scale: Bose-Einstein Condensate**

The Bose-Einstein Condensate [BEC] only occurs at temperatures of less than .5° Kelvin, which is .5 degree K above absolute zero. This extraordinary image, produced by NIST, demonstrates several critical attributes predicted by Y-Bias Theory. First, we note that the most stable conformation of the BEC is exhibited in the form of a standing wave or Soliton. Second, we observe that the inert focal point at the center is surrounded by a series of energetic rings, each of which appears to be stabilized at the requisite Fibonacci distance from the center, and all of which are clearly energized by underlying stresses. Third, and most interestingly, we observe that this stable form constitutes the springboard from which various other mutually exclusive and distinct masses instantly emerge when the temperature is allowed to increase above the  $1/f$  quantum noise threshold. This behavior occurs all at once and not gradually, as the standard physical incorrectly predicts.

**Figure 19***Decay of a Soliton in a Bose-Einstein Condensate [NIST et al]*

In Figure 20 we observe the stunning resemblance between the intrinsic architecture of the BEC and the interference fringe patterns produced by intersecting beams of laser light in a hologram [e.g., Hait et al]. That this phenomenon is intrinsic to the very nature of matter, as a scalar attribute of SOC dynamics, is borne out by evidence of similar structures found at successively higher scales.

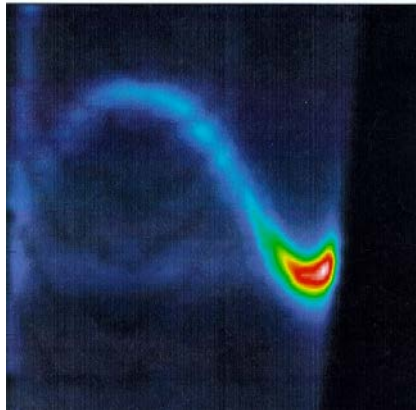
**Figure 20***Twelve-vortex array in a rotating Bose-Einstein Condensate*

### **Fifth Scale: Rotons – Hadron Dissipation in a Plasma Discharge**

At the Fifth Scale, where Neutrons, Protons and other sub-atomic particles are formed, we find evidence of similarly prototypical Y-Bias behaviors,

exhibiting the same archetypal shapes and dynamics, as those found in the Third and Fourth scales and at all subsequent scales. Note that the data path exhibited by the Roton is a vortex rather than a straight line. This archetypal behavior suggests that this fifth scale component is responding to a Y-Bias effect generated by other masses present in the medium in which it was generated.

**Figure 21**



*The 'Roton', a strange excitation which demonstrates vortical behavior at the Fifth Scale.*

*The image in Figure 21 shows raw inelastic neutron scattering data recorded with the use of an IRIS high resolution spectrometer at the [ISIS](#) facility at the Rutherford-Appleton Laboratory in the United Kingdom. This data exhibits neutron scattering from helium in 90% porosity silica aerogel. The phonon-maxon-roton portions of the dispersion curve are clearly identifiable and similar to [those found in] the bulk liquid (qualitatively).[[780](#)]*

### **Sixth Scale - Shoulder's EVO's**

At the Sixth Scale, where free electrons emitted by a highly energized probe form a plasma, toroids measuring 1 micron in diameter are propelled towards a target material. Figure 21 was developed from a film image of an EVO captured

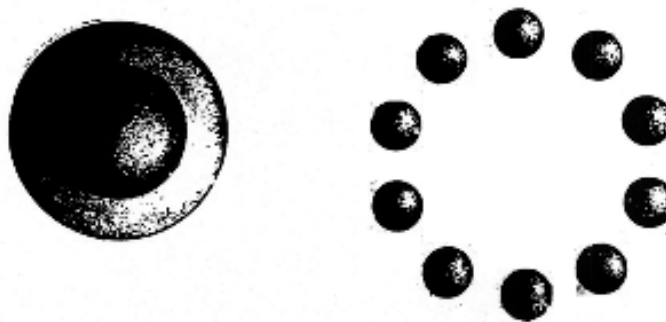
*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

by a tunneling electron microscope. This figure demonstrates the dissipation of the EVO as it spins through a Fibonacci series of vector values.

**Figure 22**

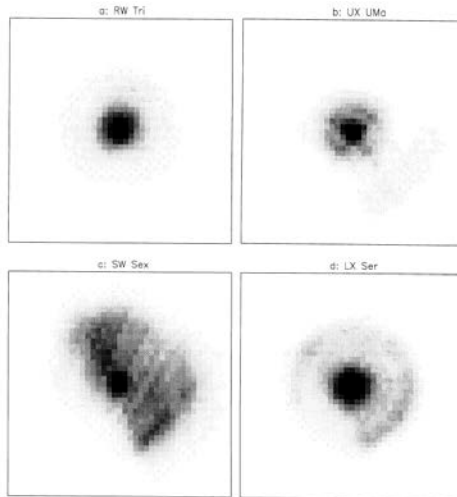
*Vortex Trail left by dissipation of EVO  
After point of impact [Shoulders, etal]*

At the Sixth Scale we find the archetypal forms demonstrated in the form of Shoulders' EVO's [at 1  $\mu\text{m}$ , 20  $\mu\text{m}$ , and 50  $\mu\text{m}$  diameters]. These images were recorded using a scanning, tunneling electron microscope.

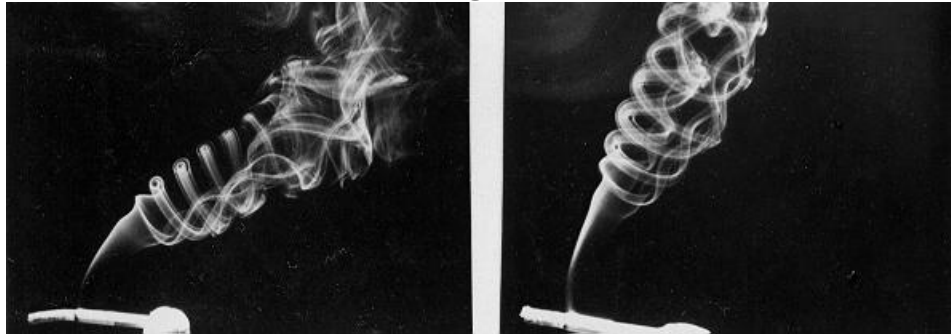
**Figure 23****Figure 1: (a) EV & (b) EV Chain****Shoulders Figure 1: (a) EV & (b) EV Chain**

At the Sixth Scale we find the same archetypal phenomena in the form of disk accretions surrounding ionized atoms, as illustrated by the images produced in a scanning, tunneling electron microscope.



**Figure 24***Maps of electron accretion disks at 4410 Å [NIST Archive]***Seventh Scale - Smoke Rings & Vortexes**

At the Seventh Scale, where atoms combine to form complex molecules, the behavior of the Soliton as an SOC expression of the Fibonacci Series is again found in abundance.

**Figure 25***Positively Bouyant Jet [cig998.jpg]*

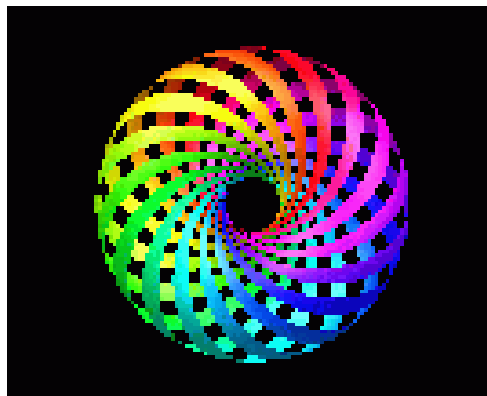
In a dramatic series of images produced by photographers who witnessed the recent eruption of Mount Etna, we find Solitons measuring 200 meters in diameter.

**Figure 26**

*Smoke Rings of Mount Etna [200 m. dia.]*

The dynamics which operate to create Solitons measuring 200 meters in diameter, as well as the vortexes which similar phenomena spawn in the form of tornados, hurricanes and water spouts, are consistent across all scales in  $L^4$ , regardless of the scale at which they operate. With Y-Bias and Angularity-based formulas, we are able to integrate these dynamics to create images which are striking in their resemblance to naturally-occurring phenomena.

The net effect of the mathematical formulations developed by Bak *et al.*, when supplied with optimal Y-Bias values, results in the creation of a virtual Soliton, a fractally defined torus displaying all the attributes associated with the evolution of this archetypal form. This is precisely the shape described by Shoulders and Jin in their widely published writings on EVO's.

**Figure 27**

*T. Banchoff – Flat Torus in 3-Sphere [781]*

This image was produced by T. Banchoff and his colleagues at the University of Illinois, in concert with N. Thompson at Brown University and D. Banks of the University of North Carolina and Langley Research Center. It is of no small interest to the authors that this figure was produced with Y-Bias and Angularity data as an expression of a topological model.

### **Tornados – Eighth Scale Toroids**

Figure 28 is a photograph of Hurricane Katrina, a Force 5 hurricane which recently devastated New Orleans [2005] and surrounding areas of the Gulf region. At the Eighth Scale, where complex systems interact to create entire families of architecturally similar phenomena [e.g., weather systems], the archetypal shapes found at all finer scales are also in evidence.

**Figure 28**



Pinwheel Hurricane [Katrina September 2005, NOAA]

While many other similarly constructed weather phenomena could be included in the lexicon of photographic images to illustrate this point, suffice it to say that the point is clearly made. What makes this point important is the fact that the entire range of phenomena represented by this event comport with the fundamental rigors found in the rules of Self-Organizing Criticality. Primary among these rules is the requirement that SOC systems are driven by fractal

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

geometries, which are in turn defined by the Fibonacci Series relationships occurring in the Y-Bias and Angularity of the interactions.

Figure 29 is a fractally generated image which demonstrates how significant this insight is. In this image we find precisely the same information-based organizational features which typify the organization and deconstruction of Solitons and vortexes at all scales.

**Figure 29**



*Underwater Vortex – Fractal Image  
Generated by Y-Bias/Angularity Functions*

The architectural similarity between this virtual vortex and the attributes exhibited by the ascending column of smoke found in Figure 25 is not coincidental. In fact, when water spouts, as shown in Figure 30, are analyzed, the same self-organizing dynamics found in the Soliton structures illustrated in the virtual image appear.

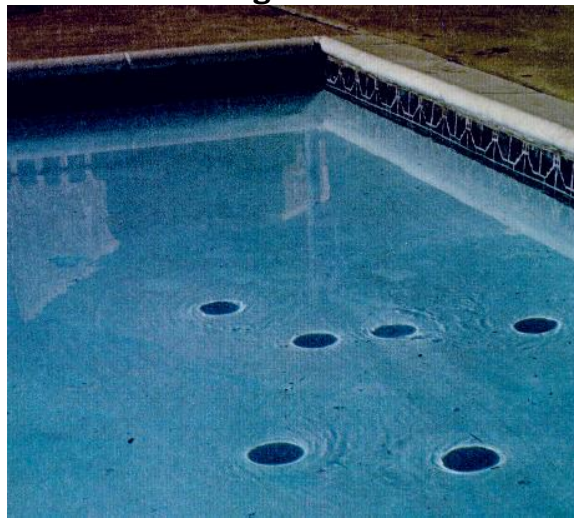
**Figure 30**



*APOD 2005 Jan 20 – Waterspout off the Florida Keys  
[image credit NOAA]*

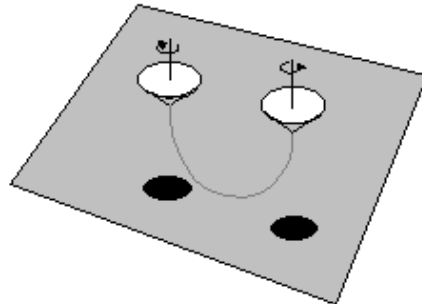
Even more importantly, we find incontrovertible evidence that Soliton dynamics do not operate in isolation, but are manifestations of self-organizing systemic attributes which are scalar and archetypal. In Falaco Solitons, for example, we find a phenomenon which exhibits fourth scale attributes at the eighth scale of organization.[782]

**Figure 31**



*Falaco Solitons [image credit CSDC, Inc.]*

Falaco Solitons are topological defects in a discontinuous surface. [Kiehn (1986)]. The phenomenon is easily reproduced by placing a half-submerged circular disc (e.g., a Frisbee) in a swimming pool, then stroking the plate slowly in the direction of its oblate axis. At the end of the stroke, extract the plate from the water, imparting kinetic energy and distributed angular momentum to the fluid in the form of a pair of Rankine Vortices. In a few seconds, in bright sunlight, the concave Rankine depressions, with visible spiral arm caustics, will decay into a pair of convex dimples of negative Gauss curvature, which can be observed via their Snell projections as black spots on the bottom of the pool. In a few tries you can become expert at this technique, and the spots will persist for many minutes in a still pool.

**Figure 32****Dimpled indentations in free surface****Black Spots Refracted on Pool Floor****Figure 2. The Falaco Soliton**

Falaco Solitons are long lived topological defects which operate in a discontinuity-free environment such as the surface of water. They have remarkably long life times and will persist for 15 to 30 minutes. The black disks seen in Figure 32 are created from the Snell refraction of a surface of rotational symmetry with negative Gauss curvature.

The surface distortion appears as a pair of dimple-like depressions of a few millimeters diameter. Unseen to the eye is a one dimensional defect or string that appears to connect the pair of surface two dimensional defects at their vertices. The stable shape of the connecting string is in the form of a circular arc. The 1-dimensional defect, or string, is made visible by injecting dye drops near a dimple vertex. The dye drop executes helical transverse wave motion about the thread which acts as a guiding center. The dynamic of this vortex is driven by the same Y-Bias effects which create the action of 'whistler waves' of charged particles demonstrating helical motion along the earth's magnetic field line. A drop of dye is observed to go down, then back up, a number of times until finally the transverse helical motion sweeps out the entire circular arc connecting the two vertices. If the string is dynamically severed, as with the confinement problem for hadrons, the two surface defects (which are analogues

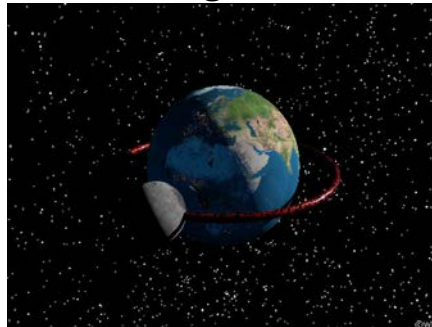
of Quarks at a higher scale of complexity in their development) cannot be separated. They disappear with a non-diffusive pop.

### **Ninth Scale: Solar Systems, Moons & Accretion Rings**

At the Ninth Scale, where massive bodies interact to form planets with moons, solar systems and accretion rings, we find ample evidence of the operation of self-organizing criticality at work. Figure 33 illustrates how the same set of organizing rules work to create planets with moons and accretion disks, solar systems and other similar astronomical architectures.

As with other planets in our own solar system, the earth and its single moon interact to produce a dynamic Soliton – a standing wave in which the less massive object orbits around the greater mass. The interaction between the planet and its moons, accretion disks and other objects qualifies as a Soliton because (1) it is formed by the same dynamics which form the Soliton exhibited by the Bose-Einstein Condensate, and (2) the combination of planet and objects operates in  $L^4$  as a single, self-organized unit.

**Figure 33**



*The Earth and Moon interact as a single Soliton*

In the same way, and in compliance with the same set of self-organizing principles, Saturn and Uranus demonstrate how Soliton behaviors operate between masses to create accretion disks consisting of more finely particulated matter.

**Figure 34**

*Accretion disks formed around Uranus and Saturn illustrate  
SOC-driven Soliton behaviors*

When viewed in this perspective, the solar system of which earth is a member demonstrates compliance with the same set of organizational rules. When viewed in the context of SOC system development, it is instructive to note that the relative distances of the planets from the sun demonstrate a vivid example of planetary compliance with SOC-mandated Fibonacci relationships. The solar system currently operates within a tolerance of 0.00043 degrees of variance from the ideal Fibonacci Series.

**Figure 35**

<b>Plan et</b>	Mean distance in million kilometers per <a href="#">NASA</a>	<b>Relativ e mean distance where Mercury=1</b>
<b>Merc ury</b>	<b>57.91</b>	<b>1.0000 0</b>
<b>Venu s</b>	<b>108.2 1</b>	<b>1.8685 9</b>
<b>Eart</b>	<b>149.6</b>	<b>1.3825</b>



<b>h</b>	<b>0</b>	<b>0</b>
<b>Mars</b>	<b>227.9</b> <b>2</b>	<b>1.5235</b> <b>3</b>
<b>Cere</b> <b>s</b>	<b>413.7</b> <b>9</b>	<b>1.8155</b> <b>2</b>
<b>Jupit</b> <b>er</b>	<b>778.5</b> <b>7</b>	<b>1.8815</b> <b>4</b>
<b>Satur</b> <b>n</b>	<b>1,433</b> <b>.53</b>	<b>1.8412</b> <b>3</b>
<b>Uran</b> <b>us</b>	<b>2,872</b> <b>.46</b>	<b>2.0037</b> <b>7</b>
<b>Nept</b> <b>une</b>	<b>4,495</b> <b>.06</b>	<b>1.5648</b> <b>8</b>
<b>Pluto</b>	<b>5,869</b> <b>.66</b>	<b>1.3058</b> <b>0</b>
<b>Total</b>		<b>16.187</b> <b>36</b>
<b>Aver</b> <b>age</b>		<b>1.6187</b> <b>4</b>
<b>Phi</b>		<b>1.6180</b> <b>3</b>
<b>Degree of</b> <b>variance</b>		<b>(0.000</b> <b>43)</b>

The average of the mean orbital distances of each successive planet in relation to the one before it approximates phi.[783] We sometimes forget about the asteroids when thinking of the planets in our solar system. Ceres, the largest asteroid, is nearly spherical, comprises over one-third the total mass of

all the asteroids and is thus the best of these minor planets to represent the asteroid belt. (Insight on mean orbital distances contributed by Robert Bartlett.)

### **Tenth Scale: Galaxies, Meta-Galaxies and Black Holes**

At the Tenth Scale, we find examples of self-organization in open, complex systems in galactic formations such as the 'Sombrero Galaxy' and the wonderful side-on shot of a galaxy within a galaxy called 'Hoags Object'. Figures 36 and 37 are illustrative of the widespread evidence found in the infinite reaches of the cosmos of the same set of autopoietic dynamics which serve to create matter, energy and field effects at the Zero Point. NASA's Hubble Image Galleries contain hundreds of high resolution images of star systems, star fields, galaxies, meta-galaxies and other astronomical formations which provide extraordinarily consistent evidence that self-organizing criticality operates universally throughout the visible cosmos. In these images, we find evidence of SOC processes in every stage of evolution which has been predicted by Y-Bias and Angularity Theory, ranging from creation of the most primary structures to the catastrophic deconstruction of every sort of archetypal architecture.

**Figure 36**



**Hoag's Object [784]: A Wheel Within a Wheel**

*Image Credit: NASA and The Hubble  
Heritage Team (STScI/AURA)*

A nearly perfect ring of hot, blue stars pinwheels about the yellow nucleus of an unusual galaxy known as Hoag's Object. This image from NASA's Hubble Space Telescope captures a face-on view of the galaxy's ring of stars, revealing more detail than any existing photo of this object. The image may help astronomers unravel clues on how such strange objects form. [785]

This unusual galaxy was discovered in 1950 by astronomer Art Hoag. Hoag thought the smoke-ring-like object resembled a planetary nebula, the glowing remains of a Sun-like star. But he quickly discounted that possibility, suggesting that the mysterious object was most likely a galaxy. Observations in the 1970s confirmed this prediction, though many of the details of Hoag's galaxy remain a mystery. The galaxy is 600 million light-years away in the constellation Serpens. The Wide Field and Planetary Camera 2 took this image on July 9, 2001.

**Figure 37**



*Hubble Mosaic of the Majestic Sombrero Galaxy  
Image Credit: NASA and The Hubble Heritage Team  
(STScI/AURA)*

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

NASA's Hubble Space Telescope captured the image shown in Figure 37 of one of the universe's most stately and photogenic galaxies, the Sombrero galaxy, Messier 104 (M104). The galaxy's hallmark is a brilliant white, bulbous core encircled by the thick dust lanes comprising the spiral structure of the galaxy. As seen from Earth, the galaxy is tilted nearly edge-on. We view it from just six degrees north of its equatorial plane. This brilliant galaxy was named the Sombrero because of its resemblance to the broad rim and high-topped Mexican hat. [786]

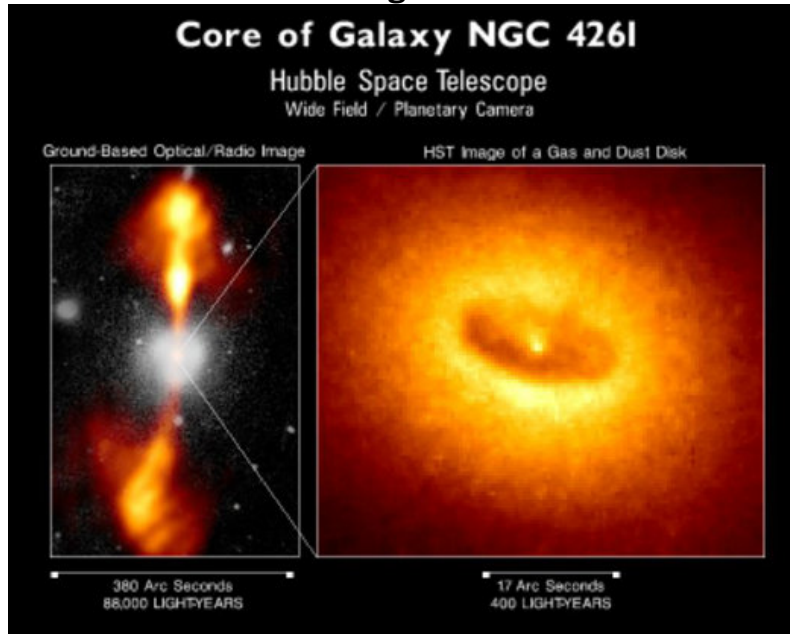
At a relatively bright magnitude of +8, M104 is easily seen through small telescopes. The Sombrero lies at the southern edge of the rich Virgo cluster of galaxies and is one of the most massive objects in that group, equivalent to 800 billion suns. The galaxy is 50,000 light-years across and is located 28 million light-years from Earth.

Hubble easily resolves M104's rich system of globular clusters, estimated to be nearly 2,000 in number -- 10 times as many as orbit our Milky Way galaxy. The ages of the clusters are similar to the clusters in the Milky Way, ranging from 10-13 billion years old. Embedded in the bright core of M104 is a smaller disk, which is tilted relative to the large disk. X-ray emission suggests that there is material falling into the compact core, where a 1-billion-solar-mass black hole resides.

The Hubble Heritage Team took these observations in May-June 2003 with the space telescope's Advanced Camera for Surveys. Images were taken in three filters (red, green, and blue) to yield a natural-color image. The team took six pictures of the galaxy and then stitched them together to create the final composite image. One of the largest Hubble mosaics ever assembled, this magnificent galaxy has an angular diameter of nearly one-fifth the diameter of the full moon.

Also at the Tenth Scale we find evidence of black holes of gargantuan proportions such as NGC 4261.

**Figure 38**



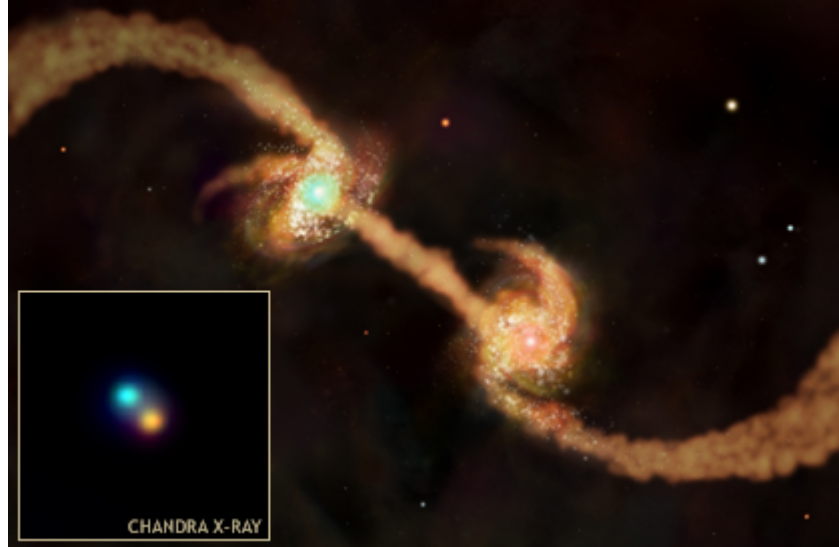
*Elliptical Galaxy NGC 4261 [787]*

Figure 38 is a Hubble Space Telescope Image of NGC 4261, a giant disk of cold gas and dust which fuels a black hole at the core of the galaxy. Estimated to be 300 light-years across, the disk is tipped enough (about 60 degrees) to provide astronomers with a clear view of the bright hub, which presumably harbors the black hole. The dark, dusty disk represents a cold outer region which extends inwards to an ultra-hot accretion disk within a few hundred million miles from the suspected black hole. This disk feeds matter into the black hole, where gravity compresses and heats the material. Hot gas rushes from the vicinity of the black hole's creating the radio jets. The jets are aligned perpendicular to the disk, like an axel through a wheel. This provides strong circumstantial evidence for the existence of black hole "central engine" in NGC 4261.

As Bak and Prigogine/Stengers predicted, the same dynamics which serve to organize matter and energy to create increasingly complex architectures also serve to deconstruct such structures. In Figure 39 we find striking evidence

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

that the same forces which combine to create tornados and hurricanes also operate to create new stars and galaxies.

**Figure 39**

*Sub-millimeter Galaxies in the Chandra Deep Field-North  
(SMG 123616.1+621513): Era of Galaxy and Black Hole Growth  
Spurt Discovered*

*Credit: X-ray: NASA/CXC/IoA/D.Alexander et al.;  
Illustration: NASA/CXC/M.Weiss*

The illustration shows two young galaxies in the process of merging. The merger has triggered a prodigious burst of star formation and is providing fuel for the growth of the galaxies' central super-massive black holes. The inset shows an image from the Chandra Deep Field-North of two central black holes in merging galaxies (known as SMG 123616.1+621513). Although the black holes appear to be very close in this image, they are actually about 70,000 light years apart. The different colors in the image are due to differences in X-ray absorption by gas and dust around the black holes with blue indicating more absorption than red.

In Figure 40 we find evidence of the bi-directional nature of time and the operation of the dissipative structures which serve to keep the cosmos in balance. This figure illustrates how a black hole acts to catastrophically destroy a star system.

**Figure 40**

*RXJ1242-11 System, Black Hole catastrophically destroys a star system [788]*

Thanks to two orbiting X-ray observatories, astronomers now have the first strong evidence of a super-massive black hole ripping apart a star and consuming a portion of it. The event, captured by NASA's Chandra and ESA's XMM-Newton X-ray Observatories, had long been predicted by theory but never confirmed.

Astronomers believe a doomed star came too close to a giant black hole after being thrown off course by a close encounter with another star. As it neared the enormous gravity of the black hole, the star was stretched by tidal forces until it was torn apart. This discovery provides crucial information about how these black holes grow and affect surrounding stars and gas.

While other observations have hinted stars are destroyed by black holes (events known as "stellar tidal disruptions"), these new results are the first strong evidence. Evidence already exists for super-massive black holes in many galaxies, but looking for tidal disruptions represents a completely independent way to search for black holes. Observations like

these are urgently needed to determine how quickly black holes can grow by swallowing neighboring stars.

### **Conclusions & Observations**

During the 50-odd man-years required to accumulate, analyze and make sense of the materials referred to in the construction of the Y-Bias model, we have stumbled upon information that appears to be universally applicable. The fact that we are human means by definition that in order to make sense of what we see, we are compelled to attribute meaning to our experiences. When we do so, we automatically limit our ability to discuss all the information actually contained in the data sets we observe and collect. This is a regrettable but irremedial result of the human need to rely on semantic languages to describe abstract ideas and concepts. It would be wonderful if a pure, unambiguous language could be created because this would make it possible to discuss the kinds of issues which have been identified during our analysis, in a way that is categorical, absolute and conclusive. Unfortunately, no such language exists.

Indeed, if we understand the nature of self-organizing criticality at all, unambiguous linguistic expressions are simply not possible in the universe we populate. Nevertheless, mathematics has long been held by its practitioners to fill this role because the notion that Nature is a clockwork mechanism still defines our thinking, despite the contributions of all the Albert Einstein's of the 19<sup>th</sup> and 20<sup>th</sup> Centuries. The fact of the matter is that (1) there is no one-to-one relationship between the symbols used to convey mathematical concepts and their correlates in Nature, (2) mathematical symbology conveys abstract concepts and is therefore subject to the rules of complementarity and ambiguity which apply to all kinds of information, and (3) high order mathematics is no less ambiguous than any other language.

However, the fact remains that mathematical expressions constitute a more or less universally recognized, and therefore convenient, set of symbolic constructs which are understandable by everyone, regardless of their linguistic



traditions. This makes it possible for us to describe  $L^4$  phenomena in a way that is generally understandable by people from a wide range of cultural backgrounds. But the issue remains problematic because in order to make sense of the mathematics, we are obliged to discuss the concepts they embody in linguistic terms. Because our ability to perceive and interpret abstract concepts is defined [and therefore limited in important aspects] by the structure of the languages we speak, all interpretations of high order mathematical expressions are bound to differ in direct proportion to the idiomatic differences between the languages used to discuss them.

This is important because it suggests several things about any conclusions we may draw from the data we have collected and evaluated. As a result, fundamentally different conclusions can be drawn from the same data sets by people using differing languages, even if the mathematics they employ are identical. This is why, for example, scientists in the former USSR were able to calculate, measure, validate and harness the attributes of non-local field effects to create seven new branches of science, twenty-seven totally new technologies never before seen in Western science, and 103 materials for which Western science has no equivalent names, during the period spanning between 1951 and 1991. Scientists supported by the USSR observed the same phenomena, collected data from the same sources, used much of the same math and had access to vastly inferior support structures and other resources as compared with their counterparts in the West. But the results were sometimes so extraordinary and unique that they might as well have come from another planet.

If this tells us anything it ought to suggest that many conclusions can be drawn from the same data sets, depending on the linguistic biases which are used to filter the meaning carried by the information itself. As we are able to 'see' patterns of the sort made possible by the development of the Y-Bias model, it should become increasingly obvious that the way we apprehend natural

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

phenomena is at least as important as the stuff we observe. If we have derived different conclusions from the same data sets relied on by mainstream science, it is not necessarily because Science and mainstream scientific interpretations of the data are wrong. Rather, it is just as likely that we are simply seeing things that were already obvious but undetected because we are looking at them through a different set of conceptual filters.

**Conclusions**

From our analysis of the data we have gathered, we believe the following conclusions about the world we live in and the universe which surrounds us are reasonable and supportable:

- The universe is not a clockwork mechanism at any scale.
- Nature operates according to a set of simple, elegant, universally applicable rules which are consistent at all scales, from the Zero Point to the infinite expanses of the cosmos. These rules include:
  1. Y-Bias effects,
  2. Angularity, and
  3. Self-organizing Criticality, as defined by
    - Power laws – logarithmic relationships between similar events
    - Punctuated equilibrium
    - $1/f$  Noise Thresholds [e.g., quantum dynamics]
    - Fractal Geometries
    - Fibonacci Relationships
- There was no 'Big Bang' to mark the beginning of the universe. The universe is infinite, boundless and timeless in  $L^4$ . If a seminal, universal phenomenon did occur 15-20 billion years ago, it was almost certainly one of a series of similar, recurring phenomena of its type which have also occurred over the eons in the past and will eventually happen again at every scale.
- The fundamental physical attributes upon which the standard physical model is based are not invariant at any scale, including:

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

1. Speed of Light [C] and photons generally
  2. Mass
  3. Gravitational Force
  4. Electromagnetic Forces
  5. Nuclear Forces
  6. Time
- No field forces, including mass or time, exist prior to the local organization of  $L^4$  at the Zero Point. Rather, all field forces, mass and time are the products of Zero Point scalar interactions of increasing complexity, which are occurring everywhere, all the time, in every address encompassed by the cosmos.
  - Non-local/non-linear field effects are complementary and operate everywhere local-linear field effects are found, at all scales.
  - The Physical Vacuum exists and evinces self-organizing criticality in measurable, quantifiable, replicable and reportable behaviors, attributes and effects.
  - The Zero Point is the gateway between the Physical Vacuum and  $L^4$ . The Zero Point is measurable, quantifiable, replicable and reportable in terms of its behaviors, attributes and effects.

**Observations**

At some point in our considerations, we are obliged to accommodate the effects exerted by the exercise of deliberate, conscious choice on the behaviors of material substances in  $L^4$ . That such phenomena have been rigorously observed, documented, repeated and independently validated by empirical methods is no longer arguable. However, the dynamics by which such interactions occur are simply not accommodated by the standard physical model.

At some point in our discussion, we are compelled to ask the fundamental question, the only one that really matters.

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

*“Is consciousness, as reflected by Descartes’ **Cogito, ergo sum**, merely a manifestation of a sufficiently sophisticated complexity in matter, or does matter arise from a causal plan, a Source, such as the one described in the ancient Hindu book of verses known as the Vedas?”*

This is not the question asked by science. Instead, science operates **a priori** on the premise that 'physical stuff' is, by definition, fundamentally distinct from what Descartes called “spirit stuff.” After three centuries of thinking and working in this way, we have inherited a deeply embedded cultural prejudice which altogether denies that physical stuff and the stuff of Consciousness are in any way related.

Before we can engage in this dialogue, it is appropriate to define our terms. As a matter of practicality, the authors have opted to define Consciousness in terms which attempt to embrace both scientific and metaphysical conceits. For the purposes of this discussion, consciousness is defined as

*“...an underlying, primary field comprised of undifferentiated information which is characterized by infinite potential, operating in a manner which is self-referential in all-where/all-time at all scales.”*

In the language of the ancient Eastern traditions, this is referred to as the One. In the language of physics, it is referred to by Maxwell and Whittaker as the primary field of infinite scalar potential. In terms of Y-Bias and Angularity Theory, the Source is referred to as the Physical Vacuum. According to this physical model of Consciousness, the authors posit that

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

- Consciousness is speciated and individuated in the same way, according to the same organizing principles, as Time, matter, light and all other aspects of Descartes' 'physical stuff' found in  $L^4$ .
- Consciousness is expressed in terms of non-local/non-linear attributes which are known to couple with the local-linear physical aspects of  $L^4$  via known coupling constants.

If these findings approach a reasonable level of correctness, it is consistent to posit a number of interpretations based on them.

1. The universe we see is not similar in reality to the universe described by mainstream science, as found in the standard physical model. While the standard model can be relied on to describe some phenomena occurring above the fourth scale of organization, it is fundamentally limited by its reliance on a number of unsupportable presumptions.
2. The source of potential energy available in any locale in the cosmos from the Physical Vacuum, via the Zero Point, is accessible and absolutely unlimited.
3. Understanding how the fabric of  $L^4$  is woven makes it possible to engineer the derivative SOC effects we have defined as matter, energy, field effects and time by harnessing the Y-Bias, Angularity and other principles embodied in Self-organizing criticality, as they operate in  $L^4$ , to create and deconstruct the cosmos, as part of an infinite, never-ending cycle, to satisfy our own requirements.

**Implications**

The implications arising from these insights are profound. What difference does our view of physics make with respect to how we live and what we are able to do? For one thing, it frames how we view our relationships with each other and the planet in a context so fundamentally different than the one we rely on now that the results may scarcely be recognizable. Here are some of the areas where the Y-Bias/Angularity model can be applied immediately to enlighten the practice of science and enhance the human experience:

1. **Energy:** According to the Y-Bias/Angularity model, energy in the form of heat and light is literally pumped from the Physical Vacuum via

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

the Zero Point to fuel the myriad SOC interactions which characterize the increasingly complex organization of matter and energy which constitutes  $L^4$ , at every locale, throughout all the scales of evolution found in the universe. As Bearden rightly points out, the amount of energy produced by scalar interactions is rigorously observed to be limitless. Feynman knew it and so did Einstein, so this is not a new insight. But if this assessment is correct, why is the human community still held hostage to energy producing technologies which contaminate the environment and endanger the equilibrium of the entire planet?

In the closing years of the 19<sup>th</sup> Century, Irving Langmuir demonstrated conclusively that the amount of energy liberated by recombinant mono-atomic Hydrogen atoms is at least 20 times greater than the amount of energy required to break the nuclear forces which bind Hydrogen atoms together to form molecules of Hydrogen gas [ $H_2$ ]. After more than a century, no one has yet provided a cogent explanation, in the context of the standard physical model or any other model, that describes how and why this happens. Today, we know that water molecules can be separated into constituent elements using inert permanent magnets with life expectancies of more than a hundred years, with no additional input of energy. The resultant Hydrogen which arises from this interaction is mono-atomic. As mono-atomic Hydrogen atoms recombine with other Hydrogen atoms to form Hydrogen gas, enormous quantities of energy in the form of heat and light are produced.

On his internet web site, eminent French scientist Jean-Louis Naudin lists more than two dozen techniques currently being investigated, which have demonstrated over-unity energy production in controlled trials. One of these, the MAHG Project [Nicholas Moller's Atomic Hydrogen Generator], is accompanied by laboratory test data which demonstrates over-unity energy production ranging from 1.2 to 21 times input energy. The device has not been perfected and does not operate at an over-unity

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

level consistently or for long periods. Nevertheless, the reason this device is important is that it demonstrates conclusively that it is quite possible to produce prodigious amounts of net electrical power by efficiently tapping the perpetual energy pump provided by the Physical Vacuum, without combusting fuels and without emitting exhaust into the environment.

What does this mean for the human experiment? For one thing, it means there is no longer any reason to burn fossil fuels, dam rivers, or create more nuclear fuel waste materials to produce the energy needed to support human endeavors.

2. **Medicine:** In the 21<sup>st</sup> Century, modern medical science is based almost entirely on the same presumptions which support the standard physical model. Indeed, physicians pride themselves on their right to don the mantle which permits them to claim they are scientists. The physical stuff of our biology is considered in the same scientific framework as Descartes' "physical stuff". In the 240 years since the birth of modern science, the 'spirit stuff' which makes us what we are has been fundamentally excluded from modern medical treatment protocols because medical schools have excluded it from their curricula. The body and its functions are still viewed as clockwork mechanisms, characterized by chemical interactions at various scales, which can be broken down into their primary, indivisible physical components, and manipulated by pharmaceutical preparations, surgical procedures or irradiation with nuclear substances. "The body as a test tube" model still reigns supreme in the medical sciences, virtually devoid of any understanding about what constitutes Consciousness or how it couples and interacts with our "physical stuff".

It is almost unimaginable that medical schools still teach burgeoning young physicians that the body is comprised of separate and distinct organs, tissues, and other physical components which have little or no

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

relationship to each other. Surgeons still remove organs without regard for the effect their removal will exert on other parts of the human system. It was not until 1991 that the first generally accepted medical texts were produced for use in medical schools, showing that the organs of the body had any direct, systemic relationship with the immune systems. Despite the discovery of neuropeptides and the explicit scientific evidence that they are the physical components of human emotional responses, medical schools still do not include this information in their curricula.

Indeed, except for the kinds of studies which are permitted within the rigorously defined framework of medical science, research designed to investigate the nature of Consciousness is not just discouraged by the medical establishment. Medical practitioners who persist in such research are commonly ridiculed, ostracized, stripped of their professional credentials, prevented from publishing the results of their research, deprived of essential resources and, in some cases, actually imprisoned. As a result, the range of medical modalities currently available in the West are almost entirely restricted to the 'cut, burn and poison' techniques which have come to typify modern medicine.

What difference would it make to the practice of modern medicine if physicians really understood the nature and dynamics of naturally occurring non-local, non-linear field effects in human biology? How would an informed paradigm about Consciousness affect the way we treat disease, injury, genetic defects and illness? If the Y-Bias Model is correct, the practices of modern medicine can be changed in ways which are largely unimaginable to most of us. When viewed as an organized aggregation of information sets, which operate in compliance with SOC principles, the human condition presents us with alternatives which have simply never been considered by medical science, much less put into practice. A perfect example is the impeccably documented work of French physician, engineer and scientist Antoine Priore`.



During the decade of the 70's, Dr. Priore` designed, built and tested an apparatus which was shown to repeatedly cure the most noxious and malignant of diseases, correct genetic errors in DNA coding, heal physical injuries and eliminate a wide variety of viral and bacterial illnesses. There are those who dismiss Dr. Priore`s work as nothing more than a carefully crafted scam, but no one who has examined the voluminous files created by his laboratory team has ever concurred in this assessment. His work was supported by the French Academy of Science because it adhered to the disciplines of the best of modern science. All the records associated with his undertakings were impeccably documented and filed by certifiably competent people.

How did his treatment system work? It was the essence of simplicity. He recognized that the human body and its functions constitute an information system whose form and functions are governed by the ultimate software engine – DNA. He recognized the role and importance of non-local field effects on the way the human body functions, and came to understand how the local-linear [chemo-synaptic] functions interface with the non-local/non-linear field effects produced by each coil of DNA found in every cell of the body. The Russian Academy of Sciences and Dr. Vladimir Poponin independently verified this aspect of Priore`s research, as reported in their seminal paper which refers to this phenomenon as the 'Phantom DNA Effect.'

His device did nothing more than produce non-linear/non-local field effects in the presence of carefully engineered electromagnetic fields, which served to override the data errors which are the causative factors in illness and disease. He learned how the master fractal works in the human condition and was able to devise a way to override data errors found in the body and replace them with corrected data sets. He

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

developed a technique for erasing viruses of all kinds by identifying and canceling their energy signatures. Although rejected out of hand by mainstream science, when examined in the context of Y-Bias Theory, Dr. Priore's treatment modality is perfectly understandable. It probably constitutes the most important advancement in the identification and treatment of disease, illness, injury and genetic defects in the entire history of medical science.

Why isn't anyone using this system? Because so many companies are making so much money by capitalizing on the treatment of illness, injury, disease and genetic defects that no one is willing to give up their territorial imperative to profits in order to really heal their patients. As a consequence, modern medical science does not heal or cure – it 'treats' illness, disease, injury and genetic defects. The technology needed to relieve pain and physical suffering in the human experience has been immediately available for more than 30 years, but colleagues of ours who have attempted to reconstruct Priore's methodology and commercialize it have been murdered, professionally assassinated or driven to the brink of despair by those who are intent upon preventing any technology from replacing their death grip on the marketplace. At the risk of appearing overly dramatic, this suicidal behavior typifies the enlightened practice of science and medicine in the 21<sup>st</sup> Century.

3. **Communications:** Einstein's famous formula  $E = MC^2$  insists that nothing can travel through  $L^4$  at a higher velocity than the speed of light. All the technologies we currently use to provide communications links are engineered with this concept as their prime directive. The only problem with this notion is that it is based on a number of false conclusions. Even though Maxwell's quaternions and Whittaker's proofs provide categorical evidence that non-local effects are everywhere naturally operative in the universe, unaffected by any known forms of matter or field effects, we still build our communications links on the

basis of a lexicon of modern electrodynamic derivatives which would have been unrecognizable to Maxwell and which geniuses like Tesla and Bose rejected altogether.

The categorical prohibition of any naturally-occurring non-local/non-linear field effects, as a fundamental precept of the standard physical model, eliminates even the conceptual possibility that point-to-point communications can occur at any rate faster than the speed of light. Consequently, every communications link in the world is engineered in a way that subscribes to this arbitrarily imposed dictum. As a result, we cannot 'see' what is happening at great distances or communicate across the vast distances of space without waiting for light-speed radio waves to travel back and forth. The limitations imposed by this approach on our ability to communicate with each other are self-evident.

What difference would it make if we could communicate instantaneously across the infinite distances of space, with no time delays, without bandwidth restrictions, and with absolute safety and security? For one thing, we wouldn't need to send humans out into space to explore far distant worlds or investigate interesting physical phenomena unless/until we had already established a scientifically cogent baseline using remote controls. Nor would we need to worry any longer about whether we are alone in the cosmos. What if we could communicate anywhere in the world at any time with unlimited bandwidth, without stringing wires or raising antenna towers, under the oceans and through any kind of materials? Has anyone ever done this? How could such a thing even be possible?[[789](#)]

If the Y-Bias model is correct, the attributes, dynamics and mechanics associated with the use of non-local fields as communications links becomes clearly understandable. What do we know about this already? We know the Soviets successfully conducted non-local

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

communications experiments in 1982 by sending Morse Code through 22 kilometers of solid mountain, from a transmitter to a receiver located in a cave, which was isolated behind 30 meters of steel-reinforced concrete, and surrounded by multiple layers of Faraday cage EMF protective fields. We know how they did it because that information is publicly available from the archives of the Russian Academy of Sciences. Now that we have a model which explains how to engineer applications to harness this insight for the benefit of everyone, why haven't we seen evidence of it in the marketplace?

4. **Transportation:** All transportation technologies are designed to accommodate the notion that gravitational field effects can neither be escaped nor mitigated. Contrary to the edicts embodied in the standard physical model, inertia, mass, resistance, and their interactive products are all derivative effects generated by scalar Y-Bias interactions. If we know how these interactions operate, if we understand the dynamics, mechanics and implicit rules which interact to produce them, what prevents us from engineering devices, enabling technologies and strategies to mitigate these effects?

What difference would it make if Y-Bias and Angularity theory were successfully applied to unwind the scalar interactions which combine to create gravitational field effects? Everything we think about in terms of transportation applications would be fundamentally different than they are now. If reliance on the standard model is allowed to prevent us from engaging in this kind of design-engineering, we will always find ourselves held hostage to energy and fuel shortages. However, if recent discoveries by dedicated scientists and technicians can be augmented by a liberal application of Y-Bias principles, there is no scientific or technological reason why zero-gravity applications cannot be quickly engineered and ubiquitously distributed for the benefit of everyone. We know it is possible, and that such technologies have been successfully developed by others, because we have hard physical evidence and detailed research

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

reports amassed by hundreds, if not thousands, of disciplined scientists over the past century to consider.

Laithwaite's magnetic levitation technologies are just the tip of the iceberg. As with most other advancements involving the application of important insights in the fundamental sciences, this area of consideration is the bastion of political and economic rather than scientific prerogatives. We know how to do the science now. Will we be permitted to do so? If the death of Dr. Gene Mallove is any indication, we need to look very hard at the political realities which surround this area of investigation before we make any hard commitments.

Nevertheless, it is clear that gravitational force can be locally mitigated with predictable, consistent results, using simple technologies and materials. Viktor Schauberger's Implosion Vortex technologies were successfully employed by the engineers of Albert Speer's Third Reich Technical Works to power heavier than air machines by mitigating gravitational forces. Since that time, for more than 60 years scientists in the US and elsewhere have been working assiduously to develop electro-gravitic devices for use in all sorts of applications.<sup>[790]</sup> They are succeeding, despite the resistance and interference mounted by agencies of government and powerful private interests, who wish to prevent these technologies from appearing in the public markets.

The Y-Bias model provides the essential insights which are needed to make this kind of technological development a straightforward applications-engineering exercise. Now that we understand how and under what conditions gravitational forces are created, now that we understand what gravitational forces are and how they work, and now that the mystery about what matter is and how it operates to exert gravitational and magnetic effects on other masses has been solved,

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

there is absolutely no scientific reason why engineers equipped with this information cannot develop applications to step beyond the local limitations imposed by Einstein's formulation of gravitational field effects.

5. **Politics:** At its core, politics is the human behavior which serves to engineer societies and conserve power in the hands of the controlling classes. In our opinion, particularly in the West, political control over human affairs has evolved as the result of the ways in which three scarce commodities are distributed to satisfy increasing levels of demand throughout the world.

Viewed in this context, the Y-Bias model is a fundamentally disruptive innovation. Any technology which facilitates the removal of energy production from the social engineering equation, by making it so ubiquitously available and inexpensive that it is not economically viable to even meter its distribution, threatens to turn the entire supply and demand equation on its head. This is true because a technological breakthrough which provides energy to everyone, outside the control of a small group of elitists, could be used to facilitate the elimination of all other kinds of scarcity in the world by definition as well.

It therefore precipitates what is described in self-organizing criticality theory as the potential for a truly catastrophic 'avalanche' event, the annihilation of the financial and political power structure by an act of punctuated equilibrium. This is consistent with everything we know about self-organizing criticality, so we ignore this verity at our own risk. In political terms, then, we are presented with an irreconcilable conundrum: if we possess the knowledge to solve any of the primary scarcity problems which political institutions have been formed to manage for human societies, how do we implement the enabling technologies in a way that does not create a bigger problem than it

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

solves? Can this be accomplished by any means without precipitating a catastrophe?

6. **Science:** In the lexicon of mainstream Science we find only vague hints about what really causes Nature to function as it does. The only way genuine innovation finds its way into the lexicon of mainstream science in the 21<sup>st</sup> Century is when enabling technologies based on new discoveries become so essential to commerce that they cannot be resisted. When this happens, science as an institution simply realigns itself by claiming that the new discoveries are not new at all, but were actually known all along. We have witnessed this cycle for more than 200 years as scientists competing for fame, recognition and capital rewards have battled with each other to establish intellectual territories which are then vigorously defended despite new breakthrough discoveries. History is replete with examples of this phenomenon. Consider for example, the history of heavier than air flight and the seminal breakthroughs in 'impossible technologies' achieved by the Wright Brothers.

What this suggests to us is that one certain way for the Y-Bias model to become fully integrated into mainstream science is to develop enabling technologies based on its findings which are so irresistible that they simply cannot be ignored. This happened when Linus Pauling developed the polio vaccine. It happened when Edison invented the electric light bulb. It happened when Tesla developed alternating current and it happened when Fritz Diesel developed the revolutionary fuel which still bears his name.

While the consequences for humanity resulting from these discoveries have been largely positive, both Tesla and Diesel died as a result of their work. Tesla's work was confiscated and secreted away while he was totally and deliberately deprived of the means for survival. He died penniless and abandoned, a broken, discredited man. Fritz Diesel's body was found floating in the English channel scarcely two months after he

***Endnotes, Comments, References, Hyperlinks & Suggested Reading***

introduced his new fuel at the World's Fair. Their stories are not unique and should temper our enthusiasm for developing disruptive innovations to the marketplace. This can be a dangerous undertaking.

Candace Pert's discovery of the role of neuropeptides in human biology and Vladimir Poponin's discovery of the organizing effects of the non-local fields propagated by DNA still have not exerted any meaningful effect on either mainstream science or the practice of medicine, but one day they may. And in the meantime, if engineers, scientists and technicians succeed in their efforts to improve, refine and re-introduce Priore's medical technologies to the marketplace, we may be privileged in our own lifetimes to witness the eradication of HIV/AIDS, polio, malaria, influenza and any number of other illnesses, diseases, genetic defects, cancers and so on.

This, in turn, may serve to improve the adequacy of the standard physical model and alter human history, but it will not relieve us of the ultimate responsibility to decide and govern our own affairs in the context of moral and ethical choices. In the final analysis, neither science nor technology can answer the ultimate questions for us. And as long as we continue to arrogate to ourselves the right to ultimately decide who lives and who dies, we will always be faced with imponderable, irreconcilable choices.





---

## **Endnotes, Comments, References, Hyperlinks & Suggested Reading**

### **SECTION ONE**

#### **CHAPTER ONE**

<sup>1</sup> Capra, F. *The Tao of Physics: An Exploration of the Parallels Between Modern Physics and Eastern Mysticism*, Third Edition, Updated, Shambala Press, Boston (1991) ISBN:0-87773-594-8.

<sup>2</sup> Stapp, H. "The Copenhagen Interpretation," *American Journal of Physics* **40** 1098 (1972).

<sup>3</sup> The search for Dark Matter is being conducted with three different varieties of technologies: (1) microlensing, (2) neutrino detection and (3) WIMP detection. References to research can be found on the Web at [http://lyoinfo.in2p3.fr/manoir/web\\_eng.html](http://lyoinfo.in2p3.fr/manoir/web_eng.html).

<sup>4</sup> Buckey Balls are referred to as Carbon 60. They represent the first commercially viable products arising out of the new science of atomic engineering. For a full explanation of Buckey Balls and the techniques, technologies and markets which are related to them, check the Web at <http://www.ill.fr/dif/3D-crystals/>.

<sup>5</sup> Bak, Per, *How Nature Works*, Springer-Verlag (New York @ Copernicus) 1996.

<sup>6</sup> United States Patent Number 5,093,802, March 3, 1992. "Optical Computing Method Using Interference Fringe Component Regions."

<sup>7</sup> Tatterson K.G., "Boom! From Light Comes Matter. *Photonics Spectra*, November 1997, page 31. The experimental results have been replicated thus far at Stanford University, the University of Rochester at Rochester, New York; Princeton University in Princeton, New Jersey, and the University of Tennessee at Knoxville.

<sup>8</sup> Kafatos, M., Nadeau, R., *The Conscious Universe*, by, (1990) Springer-Verlag New York, Inc. See also Alred Korzybsky, *Science and Sanity: an Introduction to Non-Aristotelian Systems and General Semantics* (1995) 5<sup>th</sup> Edition, Institute of General Semantics. See also J. Campbell, *Grammatical Man: Information, Entropy, Language and Life*, Simon & Schuster, New York (1982).

<sup>9</sup> Gell-Mann, M., *The Quark and the Jaguar: Adventures in the Simple and the Complex*. Reprint edition (October 1995), W.H. Freeman & Co. ISBN 07 16727250; see also, "*Inclusive Jet Cross Section in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.8\text{TeV}$* ," F. Abe et al., The CDF Collaboration, FERMILAB-PUB-96/020-E. Submitted to Phys. Rev. Lett. January 24, 1996 -- Abstract, Paper; see also, **FERMILAB MEDIA ADVISORY 2/7/96, CDF Results Raise Questions on Quark Structure**. An article to appear in the February 9 issue of Science describes results contained in a paper submitted to *Physical Review Letters* by the 450-member Collider Detector at Fermilab collaboration. The CDF paper reports results that appear to be at odds with predictions based on the current theory of the fundamental structure of matter. The paper, submitted January 21, reports the collaboration's measurement of the probability that the fundamental constituents of matter will be deflected, or will "scatter," when very high energy protons collide with antiprotons, according to CDF spokesmen William Carithers and Giorgio Bellettini.

<sup>10</sup> Poole, R., "*Score One (More) For the Spooks*," *Discover*, January 1998 page 53. Dr. Gisin and his team borrowed fiber optic phone lines running from Geneva to two

nearby villages. In Geneva, they shone photons into a potassium-niobate crystal, which split each photon into a pair of less energetic photons, traveling in opposite directions – one north toward Bellevue and the other southwest to Bernex. At these two destinations, nearly seven miles apart, each photon was fed into a detector. When the attributes of one positron were altered at the point of detection by an electromagnetic field, the other positron instantaneously adjusted its characteristics to accommodate it. This experiment, which has been successfully repeated thousands of times, proves beyond question two important things: First, we live in a quantum realm, where common sense cannot be relied on to interpret data and, second, that there is an interpenetrating field which conveys information at least  $10^9$  times faster than the speed of light everywhere in the known Universe.

- <sup>11</sup> Alain Aspect, Jean Dalibard, Gerard Roger, "Experimental Test of Bell's Inequalities Using Time-varying Analyzers," *Physical Review Letters* **49** 1804 (1982).
- <sup>12</sup> John Archibald Wheeler & Wojciech Hubert Zurek, *Quantum Theory and Measurement* ed. Princeton, N.J., Princeton University Press (1983).
- <sup>13</sup> G. Nimtz, *Superluminal Signal Velocity*, *Annalen der Physik* **7**, 618 (1998); see also G. Nimtz, W. Heitmann, *Superluminal Photonic Tunneling and Quantum Electronics*, *Progress in Quantum Electronics*, vol. 21, 81 (1997); see also, A. Enders, G. Nimtz, "Photonic Tunneling Experiments," *Physics Review*, B 47, 9605 (1993) *regular paper*; see also, A. Enders, G. Nimtz, *On Superluminal barrier Transversal*, *Journal of Physics (France)*, vol. 2, at pp. 1693 (1992); see also, G. Nimtz, A. Enders, H. Spieker, *Photonic Tunneling Experiments: Superluminal Tunneling*, Trani Workshop, 24-30 September 1992, Waves and Particles in Light and Matter. A.v.d. Merwe and A. Garuccio (eds.), Plenum Press, NY (1994). See also, B. Ramsay, H. Fox, *Superluminal Velocity of Gravity Waves*, *Journal of New Energy*, vol 3, no. 2/3, Proceedings of the INE Symposium on New Energy, August 14-15, 1998. ISSN 1086-8259.
- <sup>14</sup> A. Akimov et al, "*Heuristic Discussion of the Problem of Finding Long Range Interactions, EGS-Concepts*," *Journal of New Energy News*, Winter 1997, Vol.2, No. 3-4, pages 59-80, including 177 studies, references and suggested readings; see also, M. Talbot, *The Holographic Universe*, HarperCollins, NY (1991). ISBN: 0-06-092258-3.
- <sup>15</sup> D. Yurth, *The Anthropos Files* (unpublished report of the sciences, materials, technologies developed at the Institute For Problems of Materials Sciences, Kiev, L'vov, Chernovitsky, Republic of Ukraine, from 1951-1991); see also, Anastasovski, P.K, Benson, T.M., *Quantum Mass Theory Compatible With Quantum Field Theory*, Nova Science Publishers, Inc. (1995) ISBN: 1.56072-157-X.
- <sup>16</sup> Z. Sitchin, *Genesis Revisited: Is Modern Science Catching Up With Ancient Knowledge?* Avon Books, NY (1990) ISBN: 0-380-76159-9; see also, Z. Sitchin, *The Earth Chronicles: Book I [The 12<sup>th</sup> Planet], Book II [The Stairway to Heaven], Book III [The Wars of Gods and Men], Book IV [The Lost Realms], Book V [When Time Began]*, Avon Books, NY.
- <sup>17</sup> Bak, Per, *How Nature Works*, Springer-Verlag (New York @ Copernicus) 1996.
- <sup>18</sup> P. Lemesurier, *The Great Pyramid Decoded*, Element Books, Ltd. Great Britain (1977); see also, P. Tompkins, *Secrets of the Great Pyramid* (with an appendix by Livio Catullo Stecchini), Harper & Row, Publishers, NY (1971) ISBN: 06-014327-4; see also, G. Hancock, *Fingerprints of the Gods: The Evidence of Earth's Lost Civilization*, Crown Trade Paperbacks, NY (1995) ISBN: 0-517-88729-0.
- <sup>19</sup> Krishnamurti, J. *The Awakening of Intelligence*, Harper San Francisco (1973).
- <sup>20</sup> Campbell, J. *Grammatical Man: Information, Entropy, Language and Life*, Simon & Schuster, New York (1982).

- 
- <sup>21</sup> Korzybsky, A. **Science and Sanity: an Introduction to Non-Aristotelian Systems and General Semantics** (1995) 5<sup>th</sup> Edition, Institute of General Semantics.
- <sup>22</sup> Martin, R. **Out of Silence: A Journey Into Language**, Henry Holt & Co., NY (1994) ISBN: 0-8050-1998-7.
- <sup>23</sup> *ibid.*
- <sup>24</sup> **The Conscious Universe**, loc. cit.
- <sup>25</sup> Wilhelm, R. **The I Ching or Book of Changes**, Princeton, N.J., Princeton University Press (1967).
- <sup>26</sup> Capra, F. **The Tao of Physics: An Exploration of the Parallels Between Modern Physics and Eastern Mysticism, Third Edition, Updated, Shambala Press, Boston (1991) ISBN:0-87773-594-8.**
- <sup>27</sup> Vogel, M., Pringsheim, P. **Luminescence of Liquids and Solids and Its Practical Applications**, Interscience Publications, NY (1943).
- <sup>28</sup> Gupta, M., **Jagadis Chandra Bose, A Biography**, Chaupatty, Bombay; Bharatiya Vidya Bhavan (1964); see also, Acharya Jagadis Chandra Bose, (Transactions of the Bose Research Institute, Calcutta), Calcutta (1958); see also, D. M. Bose, J.C. Bose's Plant Physiological Investigation Relating to Modern Biological Knowledge, Transactions of the Bose Research Institute, Calcutta (1947-48); see also, J.C. Bose, Izbrannye Proizvedeniya po Razdrazhimosti Rastenii, I.I. Gunar (editor), 2 volumes, Moscow: Isdatel'stvo Nauka (1964); see also, P. Tompkins/C. Bird, The Secret Life of Plants, Avon Books 1990 (1973).
- <sup>29</sup> I recommend selected reading into the works of Alain Aspect and his team at the University of Paris. See A. Aspect, P. Grangier, G. Roger, **Physical Review Letters**, 1981, **47**, p. 460 et al.
- <sup>30</sup> Wheeler, J.A. **Einstein's Vision**, Springer-Verlag, 1968, page 112. See also A. Dolgov, Yu. Zel'dovich, M. Sazhin, **Cosmology of the Early Universe, MGU Publ.**, Moscow 1988, page 200 (in Russian). See also M. Lavrent'ev et al, **On Remote Action of Stars on Resistor, Doklady AN SSSR**, 1990, vol 314, no 2, page 352 (in Russian). See also A. Pugach, A. Akimov, "Astronomical Observations by N. Kozyrev's Methodology: Preliminary Results," in the press (in Russian).
- <sup>31</sup> See Endnote #6.
- <sup>32</sup> McCarthy, Kieren. "Boffins Make Real-Life Tractor Beam." The Register 12 May 2001, found at <http://www.theregister.co.uk/content/2/18604.html>
- <sup>33</sup> Mitchell Waldrop, **Complexity: The Emerging Science At The Edge of Order and Chaos** (1992) Simon & Schuster, New York.
- <sup>34</sup> J.C. Bose, "Live Movements in Plants," *Transactions of the Bose Research Institute*, vols. 1-6. New York: Longmans, Green & Co., 1918-1931; see also, C. Muses, A.M. Young, (editors), **Consciousness and Reality: The Human Pivot**, Outerbridge and Lazard, Inc., NY (1972).
- <sup>35</sup> I. Hunt, W.W. Draper, **Lightning in His Hand: The Life Story of Nikola Tesla**. Sage Books, Denver (1964).
- <sup>36</sup> H. Collins, T. Pinch, **The Golem: what everyone should know about science**, Cambridge University Press (1993) ISBN: 0-521-35601-6.
- <sup>37</sup> C.W. Leadbeater, **The Monad**, Adyar, Madras, India: Theosophical Pub. House (1947).
- <sup>38</sup> S.M. Phillips, **Extra-Sensory Perception of Quarks**, The Theosophical Publishing House, Wheaton, Illinois, USA 1980. ISBN 0-8356-0227-3.
- <sup>39</sup> Phillips *ibid.*
- <sup>40</sup> **"Inclusive Jet Cross Section in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.8\text{TeV}$ ," F. Abe et al., The CDF Collaboration, FERMILAB-PUB-96/020-E. Submitted to *Phys. Rev. Lett.* January 24, 1996 -- Abstract, Paper.**
- <sup>41</sup> Perhaps the most compelling work of this kind was written by Dr. Ken Hashimoto, Chief of Research and Development at Fuji Electronics Industries. His book,

---

**Introduction to ESP**, now in its 60<sup>th</sup> printing, established the basis under which plants have become regularly used as truth detectors in the Japanese criminal court system. His second book, **Mysteries of the 4<sup>th</sup> Dimensional World**, now in its 80<sup>th</sup> printing, provides a voluminous catalog of carefully documented, often publicly repeated experimental results, which clearly demonstrate that nothing in this physical world operates without being effected at a fundamental level by human consciousness. Dr. Hashimoto's books were printed in Japan in Japanese and are currently out of print. However, copies can be acquired by contacting <http://www.iuniverse.com/>. Additional information can be obtained from the Library of Congress, either by direct correspondence or online.

<sup>42</sup> Aspect, *ibid*.

<sup>43</sup> Wheeler, *ibid*.

## CHAPTER TWO

<sup>44</sup> Santilli, R. **The Physics of New Clean Energies and Fuels According to Hadronic Mechanics**, *Journal of New Energy* Vol. 4, No. 1, (Summer 1999) ISSN: 1086-8259; see also R.Santilli, **Ethical Probe on Einstein's Followers in the USA: An Insider's View [Il Grande Grido - A Cry in the Wilderness]**, Alpha Publishing, 1984. This work contains an exhaustive review of the assumptions Galileo relied on to construct his geometrical equations.

<sup>45</sup> Newton, I. **The Principia: Mathematical Principles of Natural Philosophy**, a new translation by Bernard Cohen, Julia Budenz and Anne Whitman, (July 1999) Univ. California Press. ISBN 0520088166.

<sup>46</sup> Descartes, R. **Principles of Philosophy**, Part I, principle 26, in **Philosophical Works**, translated by Haldene and Ross (Cambridge, Mass: Harvard University Press, 1911).

<sup>47</sup> Gell-Mann, M. **The Quark and the Jaguar: Adventures in the Simple and the Complex**. Reprint edition (October 1995), W.H. Freeman & Co. ISBN 07 16727250

<sup>48</sup> Bishop, J.E., and Waldholz, M. **Genome: The Story of Our Astonishing Attempt to Map All the Genomes in the Human Body** (1990) Touchstone/ Simon & Schuster. NY. ISBN: 0-671-67094-8; see also Shapiro, R., **The Human Blueprint: The Race to Unlock the Secrets of Our Genetic Script** (1991) St. Martin's Press, NY. ISBN: 0-312-05873-X.

<sup>49</sup> Gribbin, J., and Davies, P. **The Matter Myth: Dramatic Discoveries That Challenge our Understanding of Physical Reality** (1992) Simon & Schuster, NY. ISBN: 0-671-72840-7.

<sup>50</sup> Santilli, R., **Il Grande Grido [A Cry in the Wilderness]**, *ibid*.

<sup>51</sup> "Inclusive Jet Cross Section in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.8\text{TeV}$ ," F. Abe et al., The CDF Collaboration, FERMILAB-PUB-96/020-E. Submitted to Phys. Rev. Lett. January 24, 1996 -- Abstract, Paper

<sup>52</sup> Prime examples of this behavior can be found in the treatment by mainstream scientists of such revolutionary, newly discovered phenomena as Cold Fusion, High Density Charge Clusters and over-unity energy generating systems.

<sup>53</sup> **FERMILAB MEDIA ADVISORY 2/7/96, CDF Results Raise Questions on Quark Structure**. An article to appear in the February 9 issue of Science describes results contained in a paper submitted to **Physical Review Letters** by the 450-member Collider Detector collaboration at Fermilab. The CDF paper reports results that appear to be at odds with predictions based on the current theory of the fundamental structure of matter. The paper, submitted January 21, reports the collaboration's measurement of the probability that the fundamental constituents of matter will be

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

- 
- deflected, or will "scatter," when very high energy protons collide with antiprotons, according to CDF spokesmen William Carithers and Giorgio Bellettini.
- <sup>54</sup> Phillips, S., "The Extrasensory Perception of Quarks," loc. cit.
- <sup>55</sup> If further experimentation can validate these preliminary results, this discovery by itself could be used to fundamentally alter the foundations of the materials sciences across the board. Even more importantly, when we have developed the ability to discriminate the identity of physical materials at this level with consistent specificity, it will become technologically feasible to transport matter non-locally in the form of discrete information packets, ala Star Trek. See D. Bouwmeester, J.W. Pan, K Mattle, M. Eibl, H. Weinfurter, A. Zeilinger, **Experimental Quantum Teleportation**, *Nature* vol. 390, 11 December 1997.
- <sup>56</sup> Tatterson K.G. "Boom! From Light Comes Matter. **Photonics Spectra**, November 1997, page 31.
- <sup>57</sup> In 1996, Anastasovski experimentally verified that under certain carefully controlled conditions, photons of real light can be shown conclusively to demonstrate properties of measurable mass. This heretical idea is explained in Anastasovski's extraordinary book. See P. Anastasovski, **Quantum Mass Theory Compatible With Quantum Field Theory**, Nova Science Publishers, Inc. (1995) ISBN: 1-56072-157-X.
- <sup>58</sup> Anastasovski P.K., Benson T.M., **Quantum Mass Theory Compatible With Quantum Field Theory**, Nova Science Publishers, Inc. (1995) ISBN: 1.56072-157-X.
- <sup>59</sup> <http://www.vedicobservatory.org/RkVedaDisplay.html>
- <sup>60</sup> Greene, B., **The Elegant Universe**, loc.cit.
- <sup>61</sup> Wilber, K., **A Unified Theory of Everything: An Integral Vision for Business, Politics, Science, and Spirituality** (2000) Shambala Press, Boston. ISBN: I-57062-724-X.
- <sup>62</sup> Kafatos, M., Nadeau, R., **The Conscious Universe**,) Springer-Verlag New York, Inc (1990. See also Alred Korzybsky, **Science and Sanity: an Introduction to Non-Aristotelian Systems and General Semantics** (1995) 5<sup>th</sup> Edition, Institute of General Semantics. See also J. Campbell, **Grammatical Man: Information, Entropy, Language and Life**, Simon & Schuster, New York (1982)
- <sup>63</sup> Gell-Mann, M. **The Quark and the Jaguar: Adventures in the Simple and the Complex**. Reprint edition (October 1995), W.H. Freeman & Co. ISBN 07 16727250.
- <sup>64</sup> Phillips, S.M. **Extra-Sensory Perception of Quarks**, The Theosophical Publishing House, Wheaton, Illinois, USA (1980). ISBN 0-8356-0227-3. See also, Besant A., Leadbeater, C.W. **Occult Chemistry**, 2d. ed., edited by A.P. Sennitt, Theosophical Publishing House, London, England (1919).
- <sup>65</sup> Doniger W. (editor), Wyatt, T., O'Flaherty W.D. (editor), **The Rig Veda: An Anthology: One Hundred Eight Hymns, Selected, Translated and Annotated (classic)**. Viking Press, (March 1982) ISBN 01-40444025.
- <sup>66</sup> Greene, B. **The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory** (2000) Vintage Books. ISBN: 0-375-70811-1. For a definitive description of the controversies and short comings of super string theory, see Erwin Lazlo, "**Whispering Pond**" and Santilli, Book III JNE Aug 99.

**CHAPTER THREE**

- <sup>67</sup> Wilber, K., **Theory of Everything**, loc.cit.
- <sup>68</sup> Edelman, G. **Bright Air, Brilliant Fire: On the Matter of the Mind**, HarperCollins Publishers, New York (1992)
- <sup>69</sup> Greenfield, Susan A. **The Human Brain: A Guided Tour**, HarperCollins, New York (1997).

- 
- <sup>70</sup> Varela, F.J. **The Embodied Mind: Cognitive Science and Human Experience** (1993) MIT Press, Cambridge, Mass.
- <sup>71</sup> Capra, F. **The Turning Point: Science, Society and the Rising Culture**. Bantam/Simon & Schuster, New York (1982).
- <sup>72</sup> Kafatos, M., Nadeau, R. **The Conscious Universe**, Springer-Verlag New York, Inc., (1990) in which the authors make a compelling case for this aspect of human experience – that detachment is simply not possible in the general context of the human condition.
- <sup>73</sup> Varela, F.J. **Sleeping, Dreaming and Dying: An Exploration of Consciousness with the Dalai Lama** Wisdom Publications (1997).
- <sup>74</sup> Akimov, A. et al, "**Heuristic Discussion of the Problem of Finding Long Range Interactions, EGS-Concepts**," Journal of New Energy News, Winter 1997, Vol.2, No. 3-4, pages 59-80, including 177 studies, references and suggested readings.
- <sup>75</sup> Kaznacheev, V. et al, "**Soliton-Holographic Genome with Collective Symmetrical Genetic Code**," IKEM SO AMN SSSR Pub; Novosibirsk. Preprint (1990) [in Russian].
- <sup>76</sup> Sheldrake, R. **Seven Experiments That Could Change The World: A Do-it Yourself Guide to Revolutionary Science**, Riverhead Books, Inc. NY (1995) ISBN: 1-57322-14-0. See also Bishop, J., Waldholz, M., **Genome: The Story of Our Astonishing Attempt to Map All the Genes in the Human Body**, Touchstone, Simon & Schuster, NY (1990) ISBN: 0-671-67094-8.
- <sup>77</sup> I recommend selected reading into the works of Alain Aspect and his team at the University of Paris. See A. Aspect, P. Grangier, G. Roger, **Physical Review Letters**, 1981, **47**, p. 460 et al .
- <sup>78</sup> Wheeler, J.A. **Einstein's Vision**, Springer-Verlag, 1968, page 112. See also A. Dolgov, Yu. Zel'dovich, M. Sazhin, Cosmology of the Early Universe, **MGU Publ.**, Moscow 1988, page 200 (in Russian). See also M. Lavrent'ev et al, On Remote Action of Stars on Resistor, **Doklady AN SSSR**, 1990, vol 314, no 2, page 352 (in Russian). See also A. Pugach, A. Akimov, "Astronomical Observations by N. Kozyrev's Methodology: Preliminary Results," in the press (in Russian).
- <sup>79</sup> Bohm, D. **Wholeness and the Implicate Order**, Ark Paperbacks, Routledge & Kegan Paul, plc, 1980.
- <sup>80</sup> Bell, John S. **Physics**, 1964, vol. 1, page 195.
- <sup>81</sup> Dr. Gisin and his team borrowed fiber optic phone lines running from Geneva to two nearby villages. In Geneva, they shone photons into a potassium-niobate crystal, which split each photon into a pair of less energetic photons, traveling in opposite directions – one north toward Bellevue and the other southwest to Bernex. At these two destinations, nearly seven miles apart, each photon was fed into a detector. When the attributes of one positron were altered at the point of detection by an electromagnetic field, the other positron instantaneously adjusted its characteristics to accommodate it. This experiment, which has been successfully repeated many times, proves beyond question two important things: First, we live in a quantum realm, where common sense cannot be relied on to interpret data and, second, that there is an interpenetrating field which conveys information at least  $10^9$  times faster than the speed of light everywhere in the known Universe.
- <sup>82</sup> Korzybsky Alfred, **Science and Sanity: an Introduction to Non-Aristotelian Systems and General Semantics** 5<sup>th</sup> Edition, Institute of General Semantics (1995).
- <sup>83</sup> Varela, F.J. **The Embodied Mind: Cognitive Science and Human Experience** MIT Press, Cambridge, Mass (1993).
- <sup>84</sup> Descartes, *ibid*.
- <sup>85</sup> Newton, I. **Principia**, *ibid*.
- <sup>86</sup> Wilber, K., **A Theory of Everything**, *ibid*.

<sup>87</sup> Bishop, J., Waldholz, M., **Genome: The Story of Our Astonishing Attempt to Map All the Genes in the Human Body**, *ibid.*

<sup>88</sup> Campbell, J. (1982) **Grammatical Man: Information, Entropy, Language and Life**, Simon and Schuster, New York.

<sup>89</sup> *ibid.*

<sup>90</sup> This is the reason, for example, that as mathematical expressions become more and more precise, they also become less and less relevant. The converse of this is also true - as information becomes more and more relevant, it also becomes less precise. This is an implicate attribute of all forms of human expression. The functions of information theory which seek to limit ambiguity without sacrificing relevance, have proven to be of limited value because the formulations of information theory are grounded in terms of singular absolutes which affirmatively deny the quantum nature of language.

<sup>91</sup> Bak, P. **How Nature Works**, *loc. cit.*

<sup>92</sup> Akimov, A.E., "An Heuristic Discussion of an Issue of a Discovery of New Long Distance Interactions," **EGS-Concepts. MNTC VENT**, pre-print N7A, page 63 (in Russian); Akimov, Shipov, "Torsion Fields And Their Experimental Manifestations," *Journal of New Energy*, Vol. 2, No. 2, page 68, (Summer 1997).

<sup>92</sup> Akimov, A.E. Shipov, G.I. "Torsion Fields And Their Experimental Manifestations," **J. New Energy**, vol 2, no 2, 1997. See also V. Bunin, "Latest Problems of Gravitation in the Light of Classical Physics," abstracts of papers of the 4<sup>th</sup> Astrogeological Workshop of the Geographical Society under the USSR Academy of Sciences, Leningrad, 1962, page 88 (in Russian). See also, V. Bunin, "Unified Gravitational Equations of Mathematical Physics," author's abstract of MIOP section, 1965, vol 1, no 4 (in Russian). See also V. Dubrovsky, "Elastic Model of Physical Vacuum," **DAN USSR**, vol 282, no 1, 1985 (in Russian). V. Dubrovsky, "Elastic Model of a Physical Vacuum," **DAN USSR**, vol 282, no 1, 1985 (in Russian). Maharishi Model #33

<sup>93</sup> Hagelin, J. **Is Consciousness the Unified Field? A Field Theorist's Perspective**, Maharishi International University, Fairfield, Iowa, (1989).

<sup>94</sup> Bak, P., *loc.cit.*

<sup>95</sup> Greene, B., **The Elegant Universe**, *ibid.*

<sup>96</sup> Akimov et al, "**Heuristic Discussion of the Problem of Finding Long Range Interactions, EGS-Concepts**," *Journal of New Energy News*, Winter 1997, Vol.2, No. 3-4, pages 59-80, including 177 studies, references and suggested readings.

<sup>97</sup> Kaznacheev et al, "**Soliton-Holographic Genome with Collective Symmetrical Genetic Code**," **IKEM SO AMN SSSR Pub**; Novosibirsk. Preprint (1990) [in Russian].

<sup>98</sup> Yurth, D. "**Variations on the Maharishi Model: An Integration of Consciousness and the Unified Field**," *Proceedings of the 5<sup>th</sup> Annual Symposium of the International New Energy Society, Journal of New Energy*, Vol. 4, No. 2, Summer 1999. ISSN: 1086-8259. See also, <http://www.altenergy.org/ine-99/INE.html> for access to the proceedings and video clips of the presentations.

## **CHAPTER FOUR**

<sup>99</sup> Under strictly controlled conditions in a laboratory, a finely calibrated robotic arm is used to make certain that each new grain of sand is dropped on top of the prior one from precisely the same height each time - for experimental purposes, this effectively eliminates an important variable from the equation - the effect known as ballistics, which is the effect demonstrated by mass as it is propelled into motion, remains relatively constant from one grain of sand to the next throughout the process.

<sup>100</sup> Martin, C. "Memoirs," unpublished private collection.

<sup>101</sup> Waldrop, Mitchell **Complexity: The Emerging Science At The Edge of Order and Chaos** (1992) Simon & Schuster, New York.



- 
- <sup>102</sup> Bak, Per **How Nature Works**, op.cit.
- <sup>103</sup> Wheeler, J.A., **Einstein's Vision**, Springer-Verlag, 1968, page 112. See also A. Dolgov, Yu. Zel'dovich, M. Sazhin, Cosmology of the Early Universe, **MGU Publ.**, Moscow 1988, page 200 (in Russian). See also M. Lavrent'ev et al, On Remote Action of Stars on Resistor, **Doklady AN SSSR**, 1990, vol 314, no 2, page 352 (in Russian). See also A. Pugach, A. Akimov, "Astronomical Observations by N. Kozyrev's Methodology: Preliminary Results," in the press (in Russian).
- <sup>104</sup> Sheldrake, R., **Seven Experiments That Could Change The World: A Do-it Yourself Guide to Revolutionary Science**, Riverhead Books, Inc. NY (1995) ISBN: 1-57322-14-0.
- <sup>105</sup> Capra, F., **The Turning Point: Science, Society and the Rising Culture**. Bantam/Simon & Schuster, New York (1982).
- <sup>106</sup> Waldrop, M., **Complexity: The Emerging Science At The Edge of Order and Chaos** Simon & Schuster, New York (1992).
- <sup>107</sup> Herbert, N., **Quantum Reality: Beyond The New Physics - An Excursion Into Metaphysics**, Anchor Books, Garden City, NY (1985) ISBN: 0-385-23569-0.
- <sup>108</sup> Weinberg, S., **Dreams of a Final Theory: The Search for the Fundamental Laws of Nature**, Random House, NY (1992) ISBN: 0-679-41923-3.
- <sup>109</sup> Prigogine, I., Stengers, I., **Order Out of Chaos: Man's New Dialogue With Nature**, Bantam, New York (April 1984) ISBN 0-553-34082-4.
- <sup>110</sup> Mandelbrot, B., **Fractal Geometry of Nature**, WH Freeman & Co., (August 1988) ISBN: 07 16711869.
- <sup>111</sup> Eldridge, N., **Punctuated Equilibrium: The Tempo and Mode of Evolution Reconsidered**, *Paleobiology* 3 (1977) pp.114.
- <sup>112</sup> Alvarez, L.W., Alvarez, W., Asaro, F., Michael, H.V., **Terrestrial Causes for the Cretaceous/ Tertiary Extinctions**, *Scientific American*, 208 (1980) 1095; see also, W. Alvarez, F. Asaro, **What Caused the Mass Extinction: an Extraterrestrial Impact**, *Scientific American*, 263 (1990) 76; see also, D.M. Raup, **Biological Extinction in Earth History**, *Science* 231 (1986) 1528; also with J.J.Sepkoski, **Periodicity of Extinctions in the Geological Past**. *Proceedings of the National Academy of Science, USA* 81, (1984) 801.
- <sup>113</sup> Bak, P., Tang, K., Wiesenfeld, C., **Self-Organized Criticality: An Explanation of 1/f Noise**. *Physical Review Letters* 59 (1987) 364; see also S. Maslov, M. Paczuski, P. Bak, **Avalanches and 1/f Noise in Evolution and Growth Models**. *Physical Review Letters* 73 (1994) 2162.
- <sup>114</sup> Ito, Keisuke **Punctuated Equilibrium Model of Biological Evolution is also a Self-Organized Critical Model of Earthquakes**. *Physical Review E*. 52 (1995) 3232; see also A. Sornette, D. Sornette, **Self-Organized Criticality and Earthquakes**. *Euro-physics Letters* 9 (1992) 197.
- <sup>115</sup> **Studies on Zipf's Law** (out of print) ASIN: 3883392448
- <sup>116</sup> Bak, P., ibid. pp 160-164. "Only fools, charlatans and liars predict earthquakes." Richter (father of the Gutenberg-Richter Law and the Richter Scale for measuring earthquake magnitudes).v.
- <sup>117</sup> see the endnotes in P. Bak's **How Nature Works** for an extensive list of suggested readings and original source references.
- <sup>118</sup> Raup, D.M., **Biological Extinction in Earth History**, *Science* 231 (1986) 1528; also with J.J.Sepkoski, **Periodicity of Extinctions in the Geological Past**. *Proceedings of the National Academy of Science, USA* 81, (1984) 801.
- <sup>119</sup> Lovelock, J., **Gaia: A New Look at Life on Earth**, Oxford University Press (Trade) (Dec 1987) ISBN: 0192860305; see also, J. Lovelock, **Gaia: The Practical Science of Planetary Medicine**, Trafalgar Square Pub. (Aug 1991) ISBN: 185675040X.

- 
- <sup>120</sup> Dennis, B.R., *Solar Physics*, 100 (1985) 65; see also, E.T.Lu, R.J. Hamilton, ***Avalanches and the Distribution of Solar Flares***, *Astrophysical Journal*, 380 (1991) L89; see also ***Solar Flares and Avalanches in Driven Dissipative Systems***, *Astrophysical Journal*, 412 (1993) 841..
- <sup>121</sup> Christensen, K., Fogedby, H.C., Jensen, H.J., "Dynamical and Spatial Aspects of Sandpile Cellular Automata," *Journal of Statistical Physics*, 63 (1991) 653; see also, Z. Olami, H.J. Feder, K. Christensen, ***Self-Organized Criticality in a Continuous, Nonconservative Cellular Automaton Modeling Earthquakes***, *Physical Review Letters*, 68 (1992) 1244..
- <sup>122</sup> Nagel, K, Paczuski, M., ***Emergent Traffic Jams***, *Physical Review*, E 51 (1995) 2909; see also, J. Treiterer, ***Aerial Traffic Photos***. Technical report PB 246 094., Columbus, OH: Ohio State University, 1994.
- <sup>123</sup> Bak, P., *ibid.* ***Zipf's Power Laws in Shakespeare and James Joyce***. pp 23-26.
- <sup>124</sup> Bak, P., *ibid.* ***Zipf's Power Laws in Mozart***, etc.
- <sup>125</sup> Bak, P., *ibid.* pp 160-164. "Only fools, charlatans and liars predict earthquakes." Richter (father of the Gutenberg-Richter Law and the Richter Scale for measuring earthquake magnitudes).v
- <sup>126</sup> Bak, P., *ibid.*
- <sup>127</sup> Kaufman, S.A., Johnsen, S., ***Co-evolution to the Edge of Chaos: Coupled Fitness Landscapes, Poised States and Coevolutionary Avalanches***, *Journal of Theoretical Biology*, 149 (1991) 467; see also, P. Bak, H. Flyvberg, B. Lautrup, ***Coevolution in a Rugged Fitness Landscape***, *Physical Review A* 46 (1992) 6714.
- <sup>128</sup> Collins, L. ***The Maze***, Simon & Schuster, New York (1989) pp 159-160.
- <sup>129</sup> P.Bak, *ibid.*
- <sup>130</sup> Berners-Lee, T., Fischetti, M., Dertouzos, M. ***Weaving The Web: The Original Design and Ultimate Destiny of the World Wide Web by its Inventor***, HarperCollins, San Francisco (September 1999) ISBN: 0062515861.
- <sup>131</sup> Scheinkman, J.A., Woodford, M. ***Self-Organized Criticality and Economics Fluctuations***, *American Journal of Economics*, 84 (1994) 417.
- <sup>132</sup> Clarke, A. C. ***1984: Spring: A Choice of Futures***, Del Ray Books, Published by Ballantine Books, Serendib BV (1984) ISBN: 0-345-31357-7; see also Mandelbrot at Chapter Four.

## **CHAPTER FIVE**

- <sup>133</sup> Mineshige, S., Takeuchi, M., Nishimori, H. ***Is a Black Hole Accretion Disk in a Self-Organized Critical State?*** *Astrophysical Journal*, 435 (1994) L 125; see also, W.H. Press, ***Flicker Noise in Astronomy and Elsewhere***, *Comments on Astrophysics* 7 (1978) 103.
- <sup>134</sup> ***Photonics Spectra Magazine***, August 1997, pp 30-36.
- <sup>135</sup> Bell, John S. ***Physics***, 1964, 1, page 195.
- <sup>136</sup> Rutherford, R. quoted in Ruth Moore, ***Neils Bohr: The Man, His Science and the World They Changed***, Knopf, NY (1996).
- <sup>137</sup> Weinberg, S. ***Dreams of a Final Theory: The Search for the Fundamental Laws of Nature***, Random House, NY (1992) ISBN: 0-679-41923-3. I have used Dr. Weinberg's book as the reference point for this vigorously defended bastion of the conventional model of quantum mechanics because he is both a Nobel Prize winner for his work in theoretical physics and a recognized spokesman for the institutions of Science in such matters.
- <sup>138</sup> Aspect, Alain Dalibard, Jean Roger, Gerard "Experimental Test of Bell's Inequalities Using Time-varying Analyzers,". ***Physical Review Letters*** 49 1804 (1982). See also,

- 
- M. Schmidt, F. Selleri, "Empty Wave Effects on Particle Trajectories in Triple-Slit Experiments," *Found. Phys. Lett.*, 1991, vol 4, no 1.
- <sup>139</sup> Doniger W. (editor), Wyatt, W., O'Flaherty, T.D (editor), **The Rig Veda: An Anthology: One Hundred Eight Hymns, Selected, Translated and Annotated (classic)**. Viking Press, (March 1982) ISBN 01 40444025
- <sup>140</sup> Laszlo Erwin, **The Whispering Pond: A Personal Guide to the Emerging Vision of Science**, Element Books, Inc., (1996).
- <sup>141</sup> Wheeler John Archibald & Zurek, Wojciech Hubert **Quantum Theory and Measurement** ed. Princeton, N.J., Princeton University Press (1983).
- <sup>142</sup> Wheeler, J.A. **Einstein's Vision**, Springer-Verlag, 1968, page 112. See also A. Dolgov, Yu. Zel'dovich, M. Sazhin, Cosmology of the Early Universe, **MGU Publ.**, Moscow 1988, page 200 (in Russian). See also M. Lavrent'ev et al, On Remote Action of Stars on Resistor, **Doklady AN SSSR**, 1990, vol 314, no 2, page 352 (in Russian). See also A. Pugach, A. Akimov, "Astronomical Observations by N. Kozyrev's Methodology: Preliminary Results," in the press (in Russian).
- <sup>143</sup> Gisin, N. "Simultaneity – Non-Local Effects at a Distance," loc.cit
- <sup>144</sup> Ramsay, Bill "Exploring the Aethers: Adventures Inspired by Hodowanec's Discoveries," **Proceedings of the International Symposium on New Energy**, Denver, Colorado, May 12-15, 1994.
- <sup>145</sup> Gribbin, J. (2003). **The Scientists: A History of Science Told Through the Lives of Its Greatest Inventors**. New York: Random House.
- <sup>146</sup> Bill Ramsay, **Proceedings of the International Symposium on New Energy**, Denver, Colorado, May 12-15, (1994). B. Ramsay, "Generic Gravity Wave/ Scalar Detector," **Journal of New Energy**, Proceedings of the 5<sup>th</sup> INE Symposium, Vol.4, No. 2, (Summer 1999), pp 148-150.
- <sup>147</sup> Hodowanec, G. **Hodowanec's Rhysmonic Cosmology**, a collection of notes, papers and articles authored by G. Hodowanec, reflecting some of the theoretical and experimental findings, as well as the 1985 monograph **Rhysmonic Cosmology**. Available c/o B. Ramsay Publisher, 563 29 ¼ Road #3, Grand Junction, Colo, 81504, (970)241-5863. See also Bill Ramsay, "Fixed Rate Scanning, Enigma or Research Tool?", unpublished paper August 1997. See also, Bill Ramsay, "Exploring the Aethers: Adventures Inspired by Hodowanec's Discoveries," **Proceedings of the International Symposium on New Energy**, Denver, Colorado, May 12-15, 1994.
- <sup>148</sup> Ramsay, B., Fox, H. **Superluminal Velocity of Gravity Waves**, *Journal of New Energy*, vol 3, no. 2/3, *Proceedings of the INE Symposium on New Energy*, August 14-15, 1998. ISSN 1086-8259. See also, A. Akimov et al, "**Heuristic Discussion of the Problem of Finding Long Range Interactions, EGS-Concepts**," *Journal of New Energy News*, Winter 1997, Vol.2, No. 3-4, pages 59-80, including 177 studies, references and suggested readings.
- <sup>149</sup> Kozyrev, N., Nasonov, V. "On Some Properties of Time Detected Through Astronomical Observations," **Problems of Universe Investigations**, 1980, Vol 9 pp 76 (in Russian); see also, J. Wask, et al, "Super-Luminal Resupply of Stationary Hot Spot 3G395," *Astron. Jour.*, 1985, vol 90, no 10; see also, L. Matveenko, Super-Luminal Component Separation Speeds in Extra Galaxy Objects, **UFN Publ.**1989, vol 140, no 3 (in Russian).
- <sup>150</sup> Turner, D., Hazelett, R. **The Einstein Myth and the Ives Papers – A Counter-Revolution in Physics**, The Devon-Adair Company, Publ., Old Greenwich, Conn., USA, 1979. ISBN 0-8159-5823-4 (Foreword by President Harry S. Truman); see also Hideo Moriyama, **Challenge to Einstein's Theory of Relativity**, Further Studies on X-Agent, Shoan Hygiene Institute, Japan, (1975).

**CHAPTER SIX**

- <sup>151</sup> **The English Patient**, (1996) starring Ralph Fiennes, Directed by Anthony Mingella. ASIN: 0788811363.
- <sup>152</sup> Edelman, G.) **Bright Air, Brilliant Fire: On the Matter of the Mind**, HarperCollins Publishers, New York. (1992)
- <sup>153</sup> Mandelbrot, B. **Fractal Geometry in Nature**, W.H. Freeman & Co (August 1988). ISBN: 0716711869. See also, B. Mandelbrot, **Multi-fractals and 1/F Noise: Wild Self-Affinity in Physics (1963-1976): Selecta Volume N**, Springer-Verlag (January 1999) ISBN: 0387985395. See also, **Fractals: Form, Chance and Dimension**, a film by B. Mandelbrot. ASIN: 07 16704730.
- <sup>154</sup> Scholz, C.H., Mandelbrot B., **Fractals in Geophysics** (out of print) ASIN: 0817622063.
- <sup>155</sup> Barton, C., LaPointe, P. **Fractals in Petroleum Geology and Earth Processes (The Language of Science)**, Plenum Pub Corp (Feb 1995) ISBN: 0306448688.
- <sup>156</sup> Ashby, W.R. **Designs For The Brain**, 2<sup>nd</sup> Ed., Wiley, NY (1960); see also, D. Stassinopoulos, P. Bak, "Democratic Reinforcement: A Principle for Brain Function." *Physical Review*, E 51 (1995) 5033.
- <sup>157</sup> Finlay, M., Blanton, K. **Real-World Fractals** (out of print) ASIN: 1558513078.
- <sup>158</sup> A. Rinaldo et al, "Thermodynamics of Fractal River Networks," *Physical Review Letters*, 76 (1996) 3364. See also I. Rodriguez-Iturbe, A. Rinaldo, **Fractal River Basins: Chance and Self-Organization**, Cambridge University Press (July 1997) ISBN: 0521473985.
- <sup>159</sup> Eglash, R. **African Fractals: Modern Computing and Indigenous Design**, Rutgers University Press (June 1999) ISBN: 0813526140.
- <sup>160</sup> Bak, P. **How Nature Works**, Springer-Verlag New York @ Copernicus (1996).
- <sup>161</sup> Prigogine, I. Stengers, I. **Order Out of Chaos: Man's New Dialogue With Nature**. Bantam, New York (April 1984).
- <sup>162</sup> Haines, T. **Walking With Dinosaurs: A Natural History**, Dorling Kindersley (Feb 2000) ISBN 0789451875.
- <sup>163</sup> Belding, M. **Blast Zone at Mount St. Helens - The Logger's Story**, Walden Island Publishing. ISBN: 1888744006.
- <sup>164</sup> Mezzacappa, A. (Editor), **Stellar Evolution, Stellar Explosions and Galactic Chemical Evolution: Proceedings of the 2<sup>nd</sup> Oak Ridge Symposium on Atomic and Nuclear Astrophysics**, Institute of Physics Publishing (October 1998).
- <sup>165</sup> Hirst B., Mandelbrot, B. **Fractal Landscapes from the Real World**, Distributed Art Publications (Dec 1995) ISBN: 094879724X
- <sup>166</sup> Bak *ibid*.
- <sup>167</sup> Turcotte, D.L. **Fractals and Chaos in Geology and Geophysics**, Cambridge University Press (300 pages 2<sup>nd</sup> edition - June 1997) ISBN: 0521567335.
- <sup>168</sup> Peitgen, H-O. Saupe D., Jurgens, H. **Chaos and Fractals: New Frontiers of Science**, Springer-Verlag (Aug 1992), ISBN: 0387979034
- <sup>169</sup> **Fractals and Scaling in Finance: Discontinuity, Concentration, Risk: Selecta**, Springer-Verlag (November 1997) ISBN: 0387983635
- <sup>170</sup> **Studies on Zipf's Law** (out of print) ASIN: 3883392448.
- <sup>171</sup> Schroeder, M. **Fractals, Chaos, Power Laws: Minutes From An Infinite Paradise**, WH Freeman & Co. (September 1992) ISBN: 07 16723573.
- <sup>172</sup> Copernicus, N., C.G. Wells (translator), **On the Revolutions of Heavenly Spheres (Great Minds Series)** Prometheus Books (Nov 1995) ISBN: 1573920355.

- 
- <sup>173</sup> Newton, I. ***The Principia: Mathematical Principles of Natural Philosophy***, a new translation by Bernard Cohen, Julia Budenz and Anne Whitman, (July 1999) Univ. California Press. ISBN 0520088166.
- <sup>174</sup> Wheeler, J.A. ***Einstein's Vision***, Springer-Verlag, (1968).
- <sup>175</sup> Stevens, W.K. ***The Change in the Weather: People, Weather, and the Science of Climate***, Delacorte Press (Dec 1999) ISBN: 0385320124.
- <sup>176</sup> Peitgen, H-O., Saupe, D., Jurgens H., ***Chaos and Fractals: New Frontiers of Science***, Springer-Verlag (Aug 1992), ISBN: 0387979034.
- <sup>177</sup> Eglash, R. ***African Fractals: Modern Computing and Indigenous Design***, Rutgers University Press (June 1999) ISBN: 0813526140.
- <sup>178</sup> Massoust, P.R. ***Fractal Functions, Fractal Surfaces, and Wavelets***, Academic Press (Jan 1995) ISBN: 0124788408. See also, Y. Fisher, ***Fractal Image Compression: Theory and Application***, Springer-Verlag (Jan 1995) ISBN: 0387942114.
- <sup>179</sup> ***Fractals and Scaling in Finance: Discontinuity, Concentration, Risk: Selecta***, Springer-Verlag (November 1997) ISBN: 0387983635
- <sup>180</sup> Waldrop, Mitchell ***Complexity: The Emerging Science At The Edge of Order and Chaos*** Simon & Schuster, New York. (1992)
- <sup>181</sup> Richter - "Only fools, liars and charlatans pretend to be able to predict earthquakes."
- <sup>182</sup> Kafatos, M., Nadeau, R. ***The Conscious Universe***, Springer-Verlag New York, Inc. (1990)
- <sup>183</sup> Talbot, M. ***The Holographic Universe***, HarperCollins, NY (1991). ISBN: 0-06-092258-3.
- <sup>184</sup> Radin, D. ***The Conscious Universe***, (1997) HarperCollins, San Francisco.
- <sup>185</sup> Barnsley, M.F. ***The Fractal Transform***, ASIN: 1568810032. (out of print)
- <sup>186</sup> ***Colors of Infinity*** ibid.
- <sup>187</sup> Sitchin, Z. ***The Cosmic Code: Book VI of the Earth Chronicles***, Avon Books, Inc. NY (1998) ISBN: 0-380-80157-4.
- <sup>188</sup> Laszlo, Erwin ***The Whispering Pond: A Personal Guide to the Emerging Vision of Science***, Element Books, Inc., (1996).
- <sup>189</sup> Clarke, A.C. ***The Colours of Infinity***, a production of KCTS Television, Seattle, WA. aired tuesday, December 1, 1994, at 9:30 p.m. Dr. Arthur C. Clarke, screenwriter of ***2001: A Space Odyssey*** and inventor of the concept of communications satellites (1946), chronicles the discovery by Dr. Benoit Mandelbrot of a geometrical shape which can be used to better understand the physical world. Clarke explores this discovery's impact on the world of mathematics - which has included the development of a new mathematical discipline: fractal geometry -with the help of Dr. Benoit Mandelbrot, Prof. Stephen Hawking, Dr. Michael Barnsley and Prof. Ian Stewart. Set to a musical score by David Gilmour and the rock group Pink Floyd, vibrant computer graphics help the audience visualize the M-Set and illustrate its infinite complexity. Clarke predicts that the next generation of devices, which will be built on fractal principles, will revolutionize communications, health care, the military and computer technologies.
- <sup>190</sup> Barrow, J.D., ***The Artful Universe***, Oxford University Press (1995) ISBN:0 19 853996 7
- <sup>191</sup> Hawking, S. Sagan, C. ***A Brief History of Time: From Big Bang to Black Holes***, Bantam (April 1988).
- <sup>192</sup> Planck, M., Willis, A.P. (translator), ***Eight Lectures on Theoretical Physics***, Dover Publications (Feb 1998). See also M. Planck, L.M. Brown, H. Rechenberg, ***Origin of the Concept of Nuclear Forces***, Institute of Physics Publishing (Oct 1996).

- 
- <sup>193</sup> Stewart, I. ***The Magical Maze: Seeing the World Through Mathematical Eyes***, John Wiley & Sons, ISBN: 047-19297X.
- <sup>194</sup> Barnsley, M.F. ***Fractals Everywhere***, Morgan Kaufman Publishers (June 1993) ISBN: 0120790610. M.F. Barnsley, L.P. Hurd, L.F. Anson (Illustrator), ***Fractal Image Compression***, A.K. Peters, Ltd. (Jan 1993) ISBN: 1568810008.
- <sup>195</sup> Cohen, J., Stewart, I. ***The Collapse of Chaos: Discovering Simplicity in a Complex World***, Penguin USA (paperback) (April 1995) ISBN: 0140178740.
- <sup>196</sup> Barnsley M.F., Hurd, L.P., Anson, L.F. (Illustrator), ***Fractal Image Compression***, A.K. Peters, Ltd. (Jan 1993) ISBN: 1568810008.
- <sup>197</sup> During a recent meditation, I visualized the image of an unfolding fractal set - I had just watched the film ***Colours of Infinity***, an examination of the mathematical discipline known as fractal geometry, focusing on the Mandelbrot Set, a geometric shape of infinite complexity. As my mind's eye penetrated into successive levels of the fractal image, I was struck by the fact that each level, indeed every component at each subset, contains both infinite complexity and all the information contained in the fractal itself. This is precisely what holograms do. Every subset of the hologram contains a portion of all the information contained in the whole. By its nature, the universal hologram manifests infinite complexity. The fundamental difference between fractals and holograms, I realized, is that fractals contain the record of events which have transpired in a locale over time - evolution, if you will. Holograms, on the other hand, make that information available non-locally in all-time all-where.
- <sup>198</sup> Clarke, A.C., ***Colours of Infinity***, *ibid*.
- <sup>199</sup> Volk, E., Joy, D.C., Allard, L.F. ***Introduction to Holography***, Plenum Publishing, (June 1999); see also, L.P. Yaroslavskii et al, ***Methods of Digital Holography***, Consultants Bureau Publishing, 171 pages (December 1980) ISBN: 0306 109638; see also, D.S. Falk, D.R. Brill, D.G. Stork, ***Seeing The Light: Optics in Nature, Photography, Color Vision and Holography***, John Wiley & Sons, (November 1985), ISBN: 047 1603856.

## **CHAPTER SEVEN**

- <sup>200</sup> Stapp, H. "The Copenhagen Interpretation," ***American Journal of Physics* 40** 1098 (1972).
- <sup>201</sup> *ibid*.
- <sup>202</sup> O'Shea, D.C., Rhodes, W.T. ***Introduction to Lasers and Their Applications***, Addison-Wesley Pub Co (June 1997) ISBN: 020 1055090; see also, J. Bromberg, ***The Laser In America***, MIT Press (April 1991) ISBN: 0262023180; see also, J. Hecht, ***Laser Pioneer Interviews With an Introduction to Laser History (Lasers and Applications)***, High Tech Publications, Inc. (December 1985) ISBN: 0936551003.
- <sup>203</sup> United States Patent Number **5,093,802**, March 3, 1992. "Optical Computing Method Using Interference Fringe Component Regions."
- <sup>204</sup> Gisin, N. *ibid*.
- <sup>205</sup> Akimov A .etal, "***Heuristic Discussion of the Problem of Finding Long Range Interactions, EGS-Concepts***," Journal of New Energy News, Winter 1997, Vol.2, No. 3-4, pages 59-80, including 177 studies, references and suggested readings.
- <sup>206</sup> Akimov, A.E. Shipov, G.I. "Torsion Fields And Their Experimental Manifestations," ***J. New Energy***, vol 2, no 2, 1997. See also V. Bunin, "Latest Problems of Gravitation in the Light of Classical Physics," abstracts of papers of the 4<sup>th</sup> Astrogeological Workshop of the Geographical Society under the USSR Academy of Sciences, Leningrad, 1962, page 88 (in Russian). See also, V. Bunin, "Unified Gravitational Equations of Mathematical Physics," author's abstract of MIOP section, 1965, vol 1, no 4 (in

- Russian). See also V. Dubrovsky, "Elastic Model of Physical Vacuum," **DAN USSR**, vol 282, no 1, 1985 (in Russian).
- <sup>207</sup> Imbert, Ch. "Calculation and Experimental Proof of the Transverse Shift Produced by Total Internal Reflection of a Circularly Polarized Light Beam," **Phys. Rev. D**, 1972, vol 5, no 4, page 787 (in Russian).
- <sup>208</sup> Falk, D.S., Brill, D.R., Stork, D.G. **Seeing The Light: Optics in Nature, Photography, Color Vision and Holography**, John Wiley & Sons, (November 1985), ISBN: 047 1603856.
- <sup>209</sup> Volk, E., Joy, D., Callard, L.F. **Introduction to Holography**, Plenum Publishing, (June 1999); see also, L.P. Yaroslavskii et al, **Methods of Digital Holography**, Consultants Bureau Publishing, 171 pages (December 1980) ISBN: 0306 109638.
- <sup>210</sup> Monoharan, H., Eigler, D. **Quantum Effect Might Be Used in Nanocircuits**, an online article by Alan Boyle, MSNBC, excerpted from **Nature**, February 2000. The lower part of the image shows a "corral" of cobalt atoms on a copper surface. The graph above the corral shows a steep peak where a magnetic cobalt atom was introduced - as well as a fainter peak, the "mirage" of the atom.
- <sup>211</sup> Bouwmeester, D., Pan, J.W., Mattle, K., Eibl, M., Weinfurter, H., Zeller, A. **Experimental Quantum Teleportation**, *Nature* vol. 390, 11 December 1997.

## CHAPTER EIGHT

- <sup>212</sup> Prigogine, I., Stengers, I. **Order Out of Chaos: Man's New Dialogue With Nature**, Bantam, New York (April 1984).
- <sup>213</sup> Bak, P. **How Nature Works**, Springer-Verlag (New York @ Copernicus) 1996.
- <sup>214</sup> Clarke, A.C. **1984: Spring: A Choice of Futures**, Del Ray Books, Published by Ballantine Books, Serendib BV (1984) ISBN: 0-345-31357-7.
- <sup>215</sup> Monoharan, H., Eigler, D. **Quantum Effect Might Be Used in Nanocircuits**, an online article by Alan Boyle, MSNBC, excerpted from **Nature**, February 2000. The lower part of the image shows a "corral" of cobalt atoms on a copper surface. The graph above the corral shows a steep peak where a magnetic cobalt atom was introduced - as well as a fainter peak, the "mirage" of the atom.
- <sup>216</sup> Bohm, D. **Wholeness and the Implicate Order**, Ark Paperbacks, London, Boston, Melbourne and Henley, Property of Routledge & Kegan Paul pic. (1980).
- <sup>217</sup> Descartes, R. **Principles of Philosophy**, Part I, principle 26, in **Philosophical Works**, translated by Haldane and Ross Cambridge, Mass: Harvard University Press, [1911].
- <sup>218</sup> Stapp, H. "The Copenhagen Interpretation," **American Journal of Physics** 40 1098 (1972).
- <sup>219</sup> The positron is the anti-matter counterpart of the electron, possessing a positive charge and opposite spin-polarity. When paired with an electron, the sum of the spin values and polarity values is always zero.
- <sup>220</sup> Pool, R. "Score One (More) for the Spooks," **Discover**, January 1998, page 53.
- <sup>221</sup> Tatterson, K.G. "Boom! From Light Comes Matter". **Photonics Spectra**, November 1997, page 31.
- <sup>222</sup> The experimental results have been replicated thus far at Stanford University, The University of Rochester at Rochester, New York; Princeton University in Princeton, New Jersey, and the University of Tennessee at Knoxville.
- <sup>223</sup> Yurth, D. **The Anthropos Files** (unpublished report of the sciences, materials, technologies developed at the Institute For Problems of Materials Sciences, Kiev, L'vov, Chernovitsky, Republic of Ukraine, from 1951-1991).

- 
- <sup>224</sup> Wheeler, J.A., Zurek, W.H. **Quantum Theory and Measurement** ed. Princeton, N.J., Princeton University Press (1983).
- <sup>225</sup> De Sabbata, V., Gasperini, M. "A Gauge-Variant Interaction Between a Charged Spinor Field and a Propagating Torsion Field," **Lett. Nuovo Cim**, vol. 30, no. 7, page 193, February 1981.
- <sup>226</sup> Hait, J., United States Patent Number 5,093,802, March 3, 1992. "Optical Computing Method Using Interference Fringe Component Regions."
- <sup>227</sup> Shiposky, E. **Nuclear Physics**, Moscow, GITGL Pub., 1949, vol 1, page 523, 1959 vol 2, page 728 (in Russian).
- <sup>228</sup> Baryshevsky, V., Podgoretsky, N. "Neutron Nuclear Precession," **ZhETF**, 1964, vol 47, page 1050 (in Russian); V. Baryshevsky, "Nuclear Optics of Polarized Media," Minsk, **BUG Publications**, 1976, page 144 (in Russian).
- <sup>229</sup> Santilli, R. **The Physics of New Clean Energies and Fuels According to Hadronic Mechanics**, *Journal of New Energy* Vol. 4, No. 1, (Summer 1999) ISSN: 1086-8259. See also R. Santilli, **Ethical Probe on Einstein's Followers in the USA: An Insider's View [Il Grande Grido - A Cry in the Wilderness]**, Alpha Publishing (1984).
- <sup>230</sup> Jin, S.X. "High-Density Charge Cluster Collective Ion Acceleration," **Journal of New Energy**, Vol. 4, No. 2, Summer 1999 ISSN: 1086-8259.
- <sup>231</sup> Sokolov, Yu. et al, "Optics of Nuclear States," I. Kurchatov **IAB** Publ., Scientific Council for Nuclear Energetic Processes and Technologies, Moscow, 1991, page 32 (in Russian); Yu. Sokolov, **Hydrogen Atom**, Eds. G.F. Bassani, M. Inguscio and T.W. Hausch. Springer-Verlag, Berlin, Heidelberg, 1989, page 16; Yu. Sokolov, B. Yakovlev, **Change of Lamb Shift in Hydrogen Atom (n=2)**, **JhETF**, 1982, vol. 83, no. 7, page 15 (in Russian).
- <sup>232</sup> Imbert, Ch. "Calculation and Experimental Proof of the Transverse Shift Produced by Total Internal Reflection of a Circularly Polarized Light Beam," **Phys. Rev. D**, 1972, vol 5, no 4, page 787 (in Russian).
- <sup>233</sup> Kozyrev N., "Causal or Non-Symmetrical Mechanics in Linear Approximation," **GAO AN SSSR** Publ., Pulkovo, 1958, (in Russian). See also N. Kozyrev, "Astronomical Observations by Means of Physical Properties of Time," in **Flair Stars**, International Symposium in Byurakan, 1976, Armenian Academy of Sciences Publ., Yerevan, 1977, page 209 (in Russian). See also H. Hayasaka, S. Takeuchi, "Anomalous Weight Reduction and a Gyroscope's Right Rotation Around the Vertical Axis of the Earth," **Phys. Rev. Lett.**, 1989, no 25, page 2701. See also S. Polyakov, O. Polyakov, "Introduction into Experimental Gravitonics," Moscow, **Prometei Publ.**, 1988 (in Russian). See also Imanishi Akira Mariyama, Midorikawa Shoichi, Moritomo Teruhisa, "Observations Against the Weight Reduction of Spinning Gyroscopes," **J. Phys. Soc. Japan**, 1991, vol 60, no 4, page 1150.
- <sup>234</sup> Naik, P.G., Pradhan, T. "Long-Range Interaction Between Spins," **J. Phys. A**, 1981, no 14, page 2795.
- <sup>235</sup> Wask, J. et al, "Super-Luminal Resupply of Stationery Hot Spot 3G395," **Astron. J.**, 1985, vol 90, no 10, page 1989.

### Chapter Nine

- <sup>236</sup> Radin, D. **The Conscious Universe**, (1997) HarperCollins, San Francisco.
- <sup>237</sup> Phillips, S.M. **Extra-Sensory Perception of Quarks**, The Theosophical Publishing House, Wheaton, Illinois, USA 1980. ISBN 0-8356-0227-3.
- <sup>238</sup> Kefatos M., Nadeau, R. **The Conscious Universe; Part and Whole in Modern Physical Theory**, Springer-Verlag New York, Inc., 1990.
- <sup>239</sup> Tompkins, P. Bird, C. **The Secret Life of Plants**, Avon Books 1990, 1973



- 
- <sup>240</sup> Dr. Hashimoto's books were printed in Japan in Japanese and are currently out of print. However, copies can be acquired by contacting <http://www.iuniverse.com/>. Additional information can be obtained from the Library of Congress, either by direct correspondence or online.
- <sup>241</sup> Turner, D., Hazelett, R. **The Einstein Myth and the Ives Papers – A Counter-Revolution in Physics**, The Devon-Adair Company, Publ., Old Greenwich, Conn., USA, 1979. ISBN 0-8159-5823-4 (Foreword by President Harry S. Truman).
- <sup>242</sup> Michelson A.A., Gale, H.G. "The Effect of the Earth's Rotation on the Velocity of Light," **Nature**, no 115, page 566 (1925). See also A.A. Michelson, "The Effect of the Earth's Rotation on the Velocity of Light, Part I," **The Astrophysical Journal**, no 61, pages 137-139. See also A.A. Michelson and H.G. Gale, "The Effect of the Earth's Rotation on the Velocity of Light, Part II," **The Astrophysical Journal**, no 61, pages 140-145 (1925).
- <sup>243</sup> Akimov, Shipov et al, "Torsion Fields And Their Experimental Manifestations," **J. New Energy**, vol 2, no 2, 1997.
- <sup>244</sup> Akimov, A.E., Shipov, G.I. "Torsion Fields And Their Experimental Manifestations," **J. New Energy**, vol 2, no 2, 1997. See also V. Bunin, "Latest Problems of Gravitation in the Light of Classical Physics," abstracts of papers of the 4<sup>th</sup> Astrogeological Workshop of the Geographical Society under the USSR Academy of Sciences, Leningrad, 1962, page 88 (in Russian). See also, V. Bunin, "Unified Gravitational Equations of Mathematical Physics," author's abstract of MIOP section, 1965, vol 1, no 4 (in Russian). See also V. Dubrovsky, "Elastic Model of Physical Vacuum," **DAN USSR**, vol 282, no 1, 1985 (in Russian).
- <sup>245</sup> Whittaker, E.T. "On An Expression of the Electromagnetic Field Due to Electrons by Means of Two Scalar Potential Functions," **Mathematics Annual**, vol. 1, no. 8, page 333-335, 1903.
- <sup>246</sup> Wheeler, J.A. **Einstein's Vision**, Springer-Verlag, 1968, page 112. See also A. Dolgov, Yu. Zel'dovich, M. Sazhin, Cosmology of the Early Universe, **MGU Publ.**, Moscow 1988, page 200 (in Russian). See also M. Lavrent'ev et al, On Remote Action of Stars on Resistor, **Doklady AN SSSR**, 1990, vol 314, no 2, page 352 (in Russian). See also A. Pugach, A. Akimov, "Astronomical Observations by N. Kozyrev's Methodology: Preliminary Results," in the press (in Russian)
- <sup>247</sup> Santilli, R. *Il Grande Grido: A Cry in the Wilderness* loc.cit.
- <sup>248</sup> "Inclusive Jet Cross Section in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.8\text{TeV}$ ," F. Abe et al., The CDF Collaboration, FERMILAB-PUB-96/020-E. Submitted to *Phys. Rev. Lett.* January 24, 1996 -- Abstract, Paper
- <sup>249</sup> R. Santilli, loc. cit.
- <sup>250</sup> **The New Maxwell Electrodynamics Equations: New Tools for New Technologies.** A Collection of 60 papers from the Alpha Foundation's Institute for Advanced Study. *Journal of New Energy*, Winter (1999) ISSN: 1086-8259
- <sup>251</sup> L.B. Crowell, "Quantum Electrodynamics of NonAbelian Electrodynamics in a Cavity," *Journal of New Energy*, Volume 4 No.2, page 70-81, (Summer 1999).
- <sup>252</sup> Akimov, A.E., Finogenov, V."P Experimentainiya Proyavleniya Torsionnykh Polei i Torsionnye Tekhnologii" ("Experimental Manifestations of Torsion Fields and Torsion-Based Techniques"), Moscow: **NTTs** "Informatekhnika," 1996, 68 pages, published by Sci-Tech Center "Informatekhnika." (in Russian).
- <sup>253</sup> Swartz, M.R. "Generality of Optimal Operating Point Behavior in Low Energy Nuclear Systems," **Journal of New Energy**, Vol. 4, No. 2, pp. 218-229.
- <sup>254</sup> Anastasovski, P.K., Benson, T.M. **Quantum Mass Theory Compatible With Quantum Field Theory**, Nova Science Publishers, Inc. (1995) ISBN: 1.56072-157-X.

- 
- <sup>255</sup> Trefilov, A. et al I.N. Frantsevich Institute For Problems of Materials Science, see D. Yurth's Anthropolos Files. Also find information regarding IPMS and its sciences, technologies and materials at <http://en.ipms.kiev.ua/>
- <sup>256</sup> Reed, D. "Torsion Field Research and Implications for New Physics and Energy Technologies," **Journal of New Energy**, Vol. 4, No. 2, pp 151-164 (Summer 1999).
- <sup>257</sup> Santilli, R., **Il Grande Grido**, loc.cit.
- <sup>258</sup> Akimov, A.E., "An Heuristic Discussion of an Issue of a Discovery of New Long Distance Interactions," **EGS-Concepts. MNTC VENT**, pre-print N7A, page 63 (in Russian); Akimov, Shipov, "Torsion Fields And Their Experimental Manifestations," **Journal of New Energy**, Vol. 2, No. 2, page 68, Summer 1997.
- <sup>259</sup> Dubrovsky, V. "Elastic Model of a Physical Vacuum," **DAN USSR**, vol 282, no 1, 1985 (in Russian).
- <sup>260</sup> Nimtz, G. **Superluminal Signal Velocity**, *Annalen der Physik* **7**, 618 (1998); see also G. Nimtz, W. Heitmann, **Superluminal Photonic Tunneling and Quantum Electronics**, *Progress in Quantum Electronics*, vol. 21, 81 (1997); see also, A. Enders, G. Nimtz, "Photonic Tunneling Experiments," **Physics Review**, B 47, 9605 (1993) regular paper; see also, A. Enders, G. Nimtz, **On Superluminal barrier Transversal**, **Journal of Physics (France)**, vol. 2, at pp. 1693 (1992); see also, G. Nimtz, A. Enders, H. Spieker, **Photonic Tunneling Experiments: Superluminal Tunneling**, Trani Workshop, 24-30 September 1992, *Waves and Particles in Light and Matter*. A.v.d. Merwe and A. Garuccio (eds.), Plenum Press, NY (1994).
- <sup>261</sup> Associated Press, Light Can Break Its Own Speed Limit..., July 20, 2000.
- <sup>262</sup> Bunin, V.A. "Newest Issues of Gravitation in the Light of Classical Physics," **Proceedings 4<sup>th</sup> Astro-Geological Meeting Geographical Society of AS USSR**, L. 1962, page 88 (in Russian). See also V.A. Bunin, "Unitary Electra-Gravitation Equations of Mathematical Physics," *Auto-repherates of speeches in the section entitled MOIP*, 1965, no 1, p 4 (in Russian).
- <sup>263</sup> Quantum Fields, LLC – Press Releases. Current NASA news is found at <http://www.grc.nasa.gov/Doc/news.htm>. On August 19, Quantum Fields, LLC, received word from NASA that their proposal submitted to the breakthrough propulsion physics program was selected for funding. A copy of the press release follows, along with a link to a summary of the proposal. See the URL at <http://www.quantumfields.com/EPRproject.htm>.
- (2) Jordan MacLay (Quantum Fields, LLC) Richland Center, WI) and MEMS Optical, Inc. (Huntsville, AL) proposed an experimental and theoretical study of quantum vacuum energy. The experiments will use micro-electromechanical devices to test force and energy effects by quantum electrodynamics.

#### FEASIBILITY OF COMMUNICATION USING QUANTUM CORRELATIONS

For all space missions, it is imperative to have reliable communication links to transmit data, computer codes, or other information. The current electromagnetic communications technologies (including laser, RF, X band, S. band) do not scale well as the mission distance increases. With current methods, the power, weight, cost and complexity increase rapidly with distance, while the transmission reliability decreases. We propose to explore the possibility of a revolutionary approach to communications based on recent theoretical and experimental developments in quantum physics, in particular based on quantum correlations between entangled atoms or ions (EPR pairs). Recent experiments have verified the existence of quantum correlations between entangled atoms photons, in which the polarization measurement of one photon is always correlated with the measured polarization of another, distant photon (*this is a specific reference to the work of Nicolas Gisin and his team at CERN, Geneva*). Theory indicates it is not possible to use standard quantum mechanical

measurements on entangled systems, such as polarization correlations of photons, for communications. Current theory restricts but may not deny the possibility of using quantum mechanical correlations in small movements or adiabatic perturbations of entangled atoms as a communication means. Further, if non-linear modifications to quantum mechanics suggested by Nobel Laureate S. Weinberg are present, then EPR communications is clearly allowed. If experiment verified that the use of EPR pairs was viable, it should be possible to develop an almost ideal communications system, a compact, low weight, communication architecture in which no broadcast power or antenna is required, no environmental noise is present, the signal does not fall off as the inverse square of the distance, and high data rates with complete security are possible. The purpose of this effort is to investigate the possibility of using quantum correlations in the adiabatic movements of atoms as a means of communication, to perform an initial theoretical feasibility analysis, identifying the key issues with such an approach, and to propose an experiment to resolve some of the fundamental questions.

- <sup>264</sup> Ramsay, B. "Generic Gravity Wave/ Scalar Detector," **Journal of New Energy. Proceedings of the 5<sup>th</sup> INE Symposium**, Vol.4, No. 2, Summer 1999, pp 148-150.
- <sup>265</sup> Hodowanec, G. **Hodowanec's Rhysmonic Cosmology**, a collection of notes, papers and articles authored by G. Hodowanec, reflecting some of the theoretical and experimental findings, as well as the 1985 monograph **Rhysmonic Cosmology**. Available c/o B. Ramsay Publisher, 563 29 ¼ Road #3, Grand Junction, Colo, 81504, (970)241-5863. See also Bill Ramsay, "Fixed Rate Scanning, Enigma or Research Tool?", unpublished paper August 1997. See also, Bill Ramsay, "Exploring the Aethers: Adventures Inspired by Hodowanec's Discoveries," **Proceedings of the International Symposium on New Energy**, Denver, Colorado, May 12-15, 1994
- <sup>266</sup> Fiorenza, Nick Anthony "Gravitational Wave and Planetary Correspondence," Argo Navis, Inc., 288 Bluff St. Suite 474, Boulder, Colorado, 80301, 1994. See also Alastair, "Measuring Gravity," 181 Star Route, Hana, Hawaii, 96713. See also [aquarius@t-link.net](mailto:aquarius@t-link.net) .
- <sup>267</sup> Matveyenko, L.I. "Visible Superlight Speeds of Components Scattering Extra-Galactic Objects," **UPhN**, 1989, vol. 140, no. 3, p 469 (in Russian).
- <sup>268</sup> Hameroff, S. "The Evidence for Lamarck," in **Quadrant**[March 2000] No. 364 Vol. XLIV No. 3, page 47-56.
- <sup>269</sup> Akimov, Shipov et al, "Torsion Fields And Their Experimental Manifestations," **J. New Energy**, vol 2, no 2, page 72, 1997.
- <sup>270</sup> Yurth, D. **The Anthropos Files** loc.cit.
- <sup>271</sup> Akimov, Shipov et al, "Torsion Fields And Their Experimental Manifestations," **J. New Energy**, vol 2, no 2, page 74, 1997.
- <sup>272</sup> Akimov, A.E."Torsion Communications of the Third Millennium," Papers of the International Conference "Modern Telecommunication Technologies," Moscow, May 1995 (Russian). See also A. E. Akimov, G.I. Shipov, "Torsion Fields and Their Experimental Manifestations, **Journal of New Energy**, Vol.2No2. 1997 @ page 78.
- <sup>273</sup> Akimov, Shipov et al, "Torsion Fields And Their Experimental Manifestations," **J. New Energy**, vol 2, no 2, page 72, 1997.G.
- <sup>274</sup> Convegno Internazionale: "Quale Fisica per 2000?" Bologna, 1991. See also D. Yurth, **Anthropos Files**, ibid.
- <sup>275</sup> D. Yurth, **The Anthropos Files**, loc. cit. IPMS has also perfected the use of a specially modulated torsion field device to manufacture mono-molecular powders of strategic metals. Using this revolutionary manufacturing method, metals can be stored in conventional glass containers without involuntarily generating static electricity.

- 
- <sup>276</sup> Akimov, A.E., Binghi, V. "Homeopathy, Quantum Physics and Torsion Fields," ***Proceedings of the Congress of the International Homeopathic Association***, Kiev, Sept. 25-29, 1991, page 143 (in Russian). See also V. Binghi, "Induction of Metastable States of Water within the Framework of Torsion Field Concepts," ***CISE VENT***, 1991, preprint no 3, page 35. (in Russian).
- <sup>277</sup> Harvalik, Z.V. ***The American Dowser***, 1973, vol 13, no 3, page 85, 87. See also D. Chadwic, L. Jensen, ***Utah Water Research Lab., College of Engineering, Utah State Univ.***, Logan, 1971, page 120. See also S.W. Tromp, "Experiments on the Possible Relationship Between Soil Resisting and Dowsing Zones," ***Oegatgeest***, 1956.
- <sup>278</sup> The frequency signature of the Hepatitis-C virus was mapped using infra-red spectrometry, a specially designed scalar interferometer and MRI technologies. The complex waveform which is mutually exclusive to the Hep-C virus was then fed into a desktop computer and converted to a waveform which was its phase conjugated opposite. The resulting waveform information was then fed to a torsion field generator which was used to irradiate a .5% molal solution of NaCl (Ringer's) for a period of 30 minutes. The ionic salt solution emitted a phase conjugated signal when fed into the patient's system. The solution was infiltrated into the vascular system of 15 patients diagnosed with advanced cases of Hep-C. After 30 days of three-times-per-week treatment, 14 of the 15 patients were diagnosed as being completely free of any sign of infection. The 15<sup>th</sup> patient died during treatment from complications arising from an extremely advanced, chronic case of the disease. The technology is now being tested under double blind protocols by Dr. Robert Pennington and virologists at the Baylor University Medical Center.
- <sup>279</sup> Sciama, D.W. "The Physical Structure of General Relativity," ***Rev. Mod. Phys.***, 1964, no 36, page 463. See also D. Ivanenko, P. Pronin, G. Sardanashvilli, ***Calibrating Gravitation Theory, BGU Publ.***, Moscow, 1985, page 143 (in Russian). See also Ya Zeldovich, "Interpretation of Electrodynamics as Consequences of Quantum Theory," ***Pisma v. ShETF.***, 1967, vol6 no 10, page 922 (in Russian). See also A. Sakharov, ***Vacuum Quantum Fluctuation in Curved Space and the Gravitation Theory, DAN***, 1967, no 1, page 70 (in Russian). See also V. Bellin et al, "On Quantum Gravitation Effects in Isotrope Universe," ***ZhETF***, vol 6, 1980, page 2082 (in Russian).
- <sup>280</sup> Akimov, A.E., Finogenov, V.P. "Experimentainiya Proyavleniya Torsionnykh Polei i Torsionnye Tekhnologii" (Experimental Manifestations of Torsion Fields and Torsion-Based Techniques), Moscow: ***NTTs*** "Informatekhnika," 1996, 68 pages, published by Sci-Tech Center "Informatekhnika." (in Russian).
- <sup>281</sup> *ibid.*
- <sup>282</sup> *ibid.*
- <sup>283</sup> Ivanenko, D., Pronin, P., Sardanashvilli, G. "Calibrating Gravitation Theory," ***BGU Publ.***, Moscow, 1985, page 143 (in Russian).
- <sup>284</sup> *ibid.*
- <sup>285</sup> Fox, H., Ramsay, B. "The Super-Luminal Velocity of Gravity Waves," Trenergy, Inc., Salt Lake City, Utah, 1998, 4 pages with references.
- <sup>286</sup> Obukov, Yu., Pronin, P., Yakushin, I. "On the Experimental Estimations of the Axial Torsion Mass and Coupling Constants," in the press (in Russian). See also Ch. Imbert, "Calculation and Experimental Proof of the Transverse Shift Induced by a Total Internal Reflection of a Circularly Polarized Light Beam," ***Phys. Rev. D***, 1972, vol 5, no 4, page 787 (in Russian). See also "Phantom DNA Effect" as defined by V. Poponin, *loc.cit.*
- <sup>287</sup> Zhvirblis, V.E. "Playing Bublik," ***Chemistry and Life***, no 5, 1995, pages 10-15. See also V.A. Sokolova, "Investigation of the Plant's Response to the Action of Torsion Radiation," preprint no 48, Moscow: ***VENT***, 1994, 32 pages. See also V.F. Panov, B.V. Testov, A.V. Klyuev, T.D. Afonina, "Effect of Torsion Radiation on Mammals

- Organism," in: Reports Theses, PERM State Medical Academy, Scientific Session of 1997, PERM, (Russia), thesis no 159. See also [28]
- <sup>288</sup> Kichigin, V.I., Klyuev, A.V., Kurapov, S.A., Panov, V.F., Khaldeev, G.V., Borisova, T.F. "Torsion Fields and Electrochemical Processes at Metal-Electrolyte Interface," **Journal of New Energy**, vol 1, no 2, 1996, pages 27-31. See also V.P. Mayboroda, A.E. Akimov, G.A. Maximova, V.Y. Tarasenko, V.K. Shkholniy, "Influence of the Torsion Fields in Tin Melt," **MNTP, VENT**, pre-print no 49, Moscow: 1994, 13 pages (in Russian). See also V.P. Mayboroda, A.E. Akimov, G.A. Maximova, V.Y. Tarasenko, V.K. Shkholniy, N.G. Palaguta, G.M. Moltchanovskaya, "Structure and Properties of Copper Inherited From a Melt After Applying to it a Torsion Emission," **MNTP, VENT**, pre-print no 50, Moscow: 1994, 11 pages (in Russian).
- <sup>289</sup> Akimov, A., Kurik, M., Tatasenko, V. "Effect of Spinor (Torsion) Field on Crystallization of Micellar Structures," **Biotehnologiya**, 1991, no 3, page 69 (in Russian). See also V. Zhitnikov, A. Kamenshchikov, V. Ponomarev, "Precision Gravity Measurements and New Types of Physical Interactions," Gravitational and Hypothetical Interactions, ed. By Ya. Teriletsky **UDN Publ.**, Moscow, 1989, page 3 (in Russian). See also C.I. Cheng, P. Li, K.I. Szeto, "Microscopic Detection of Spin-Dependent Long-Range Interaction," **Phys. Lett. A**, 1991, no 4-5, page 235 (in Russian).
- <sup>290</sup> Reed et al., "Super-Luminal Velocity of Gravity Waves," loc.cit.
- <sup>291</sup> Obukhov, Yu., Pronin, P. "Physical Effects in Theory of Gravitation With Torsion," Moscow: **VINITI**, 1991, page 5 (in Russian).
- <sup>292</sup> United States Patent [19] Patent Number 5,093,802, March 3, 1992. "Optical Computing Method Using Interference Fringe Component Regions."
- <sup>293</sup> Michelson, A.A., Gale, H.G. "The Effect of the Earth's Rotation on the Velocity of Light," **Nature**, no 115, page 566 (1925). See also A.A. Michelson, "The Effect of the Earth's Rotation on the Velocity of Light, Part I," **The Astrophysical Journal**, no 61, pages 137-139. See also A.A. Michelson and H.G. Gale, "The Effect of the Earth's Rotation on the Velocity of Light, Part II," **The Astrophysical Journal**, no 61, pages 140-145 (1925).

294

## Section Two

### Chapter One

- <sup>295</sup> **The Matrix** - Starring Keanu Reeves, Laurence Fishburne, Carrie-Anne Moss and Joe Pantoliano. Written and directed by Larry and Andy Wachowski. Produced by Joel Silver. A Warner Bros. release. Sci-fi. Rated R for sci-fi violence. Running time: 135 min.
- <sup>296</sup> Crussard, C., Pechiney Ugine Kuhlmann, Paris; J. Bouvaist, Pechiney Aluminum Research Center, Voreppe, **Study of Certain Seemingly Abnormal Deformations and Transformations of Metals**, A Translation of "etude de quelques de` formations et transformations de Metaux", C. Crussard & J. Bouvaist, "Memoires Scientifiques Revue Metallurgie", February 1978. Translation Reviewed and Edited by Herve de Maigret and Pamela Maigret, in cooperation with Charles Crussard of Pechiney Ugine Kuhlmann of Paris, France, with Eugene Kovalenko and David Faust of the Eyring Research Institute, Provo, Utah, November 1978, revised after final review by Charles Crussard, March 1979. From the introduction,

**Endnotes, Comments, References, Hyperlinks & Suggested Reading**


---

*"...Thus, the selection which we are presenting is the result of a lengthy and rigorous screening process. In only 20 of 150 test samples which [were] deformed or transformed in front of us or our collaborators, could we positively confirm the "abnormal" nature of the effects observed. In this report, we will describe eight of the most important cases. It must be pointed out that a majority of the tests which were eliminated were most certainly valid. We used a very strict screening process in eliminating the demonstrations which did not follow a pre-defined protocol. Other tests with extensometric gauges will be published later.*

*Thus, our concern for rigor led us to eliminate some rather remarkable observations concerning deformations at a distance, deformations of objects or test samples in the hands of observers who were above any suspicion, or those held on one side by J.P. Girard and on the other by an observer. The tests which will be described were conducted under our responsibility with the authorization of Pechiney-Ugine-Kuhlmann."*

This is the forward to the definitive report, published and prepared by the Eyring Institute, accompanied by extensive film footage taken under rigorously controlled conditions, which describes the use of human consciousness alone to deform, transform and exert other measurable effects on both metallic and non-metallic substances, at a distance. While portions of the study remain classified, the report referred to here has never been classified by the United States Government. Our thanks to David Faust for providing this publicly available information.

<sup>297</sup> Descartes, R. *ibid.*

<sup>298</sup> Kafatos M. et al, *ibid.* @ pp 178-190.

<sup>299</sup> **Super string Theory** - While I don't pretend to be conversant enough in the language to write it, I believe the concepts embodied in super-string language and its constructs can be viewed from another angle. When we have finished one of our current projects, to convert the current formulations to expressions of spin-polarity, angular momentum, vector velocities and so on, I believe we will be able to quantize such things as the mathematical expressions for gravity, electro-magnetic forces and the atomic nuclear forces, in the same expressions as those which define and describe torsion fields.

This concept is enticingly close to Hodowanec's torsion field phyton construct. In super-string spin networks, the lines of force in the finest grain of the quantum gravitational field act somewhat like the lines of magnetic force around a magnet, allowing the strings to vibrate only in certain resonant harmonic patterns.

The super-symmetrical strings, vibrating harmonically in ten-dimensional spin-networks, account elegantly and plausibly for all the various forces and particles which are known to operate at the sub-atomic level, including bosons, fermions, quarks and now sub-quarks. The current Langrangian formulation includes descriptions of the gravitational effects associated with each of them. A fully integrated theory based on spin-polarity, angular momentum and vector velocities should be able to successfully mesh the fundamental requirements of quantum mechanics with the dynamic features of gravitational force - this has always been the shortcoming of the super-string theory approach.

The challenge here requires a rather fantastic leap beyond the revised model of super-string theory to measure the Planck distance, which is the smallest realm possible. This is the minimum quantum movement, which cannot be decreased without violating the Pauli exclusion principle. With conventional experimental protocols, in

order to actually "view" events at this diameter, energy levels on the order of  $10^{19}$  GeV would be required. There is nothing even remotely close in our sciences, technologies or materials to accommodate this kind of power output requirement. This is the kind of energy which is only to be found in the heart of a supernova event at the moment of maximum compression - not likely to be found in the bottom of a test tube or anyone's laboratory.

The closest anyone has come to approximating the dynamics of this requirement is the experiment recently conducted at the Stanford Linear Accelerator, referred to in detail in Section One. Quantum mechanics and Einstein's equations clearly assert that it is not possible to create matter with nothing more than real photons, in any environment, under any circumstances. The result speaks for itself. The Second Postulate of Einstein's Special Theory appears to have been invalidated by their results. Since the results of this work cannot be denied, there must be something incomplete about the way quantum physics defines the process by which matter is continually created and destroyed at the sub-quark level.

An interesting item of note is that the concept of a torsion field detector, in effect a monopole detector of non-local events at a distance, is comfortably accommodated by super-string theory. Since conventional physicists have no concept about what this kind of device would look like, it has always been assumed that such a thing is just another impossible phenomenon - but we know differently. It is the current availability of this sort of device, which the Russians have been using for years without calling it by this name, which makes it possible to verify the existence of the Z particles - matched pairs have been predicted but only one variety of Z particle has ever been actually detected. They have also used such devices to isolate the particle referred to as the "weakly interacting massive particle," a WIMP, with a particle mass as large as that of a bacterium. The controlled use of such a device would provide the physical means by which our notions about black holes and dark matter could be experimentally investigated. In fact, this is the device which, if properly integrated into experimental instrumentation, could unlock the mystery to the conundrum currently referred to as "dark matter."

It seems to me that what is needed to integrate torsion field theory with super-string theory is to create a task force, comprised of some of the finest mathematicians and theoretical physicists from wherever we can find them, to [1] geometricize the baseline equations which describe the four primary forces, [2] bring Hodowanec's Phyton concepts into line with a similarly rigorous discipline, [3] apply these rules and disciplines to modify super-string theory to describe torsion field spin-networks in terms of angular momentum, spin-polarity and vector velocities, [4] develop predictors based on these integrations and [5] operationalize the predictions using gravimetric sensors to conduct astrological and sub-quantum investigations. It may be - I haven't had time to really think this through - that we could design an integration in conjunction with the new software-based variety of electron microscope to accommodate a gravimetric sensor device. This could perhaps be employed to provide experimental verification of certain sub-quantum predictions. I believe we have an opportunity to bring torsion field research into the forefront of conventional physics by providing a new generation of physical devices capable of supporting experimental investigation of the predictions made in super-string theory. If successful, this will capture the attention of scientists all over the world in a big hurry - it will introduce a



whole new scientific discipline which will instantly become indispensable to conventional physicists.

<sup>300</sup> **Goedel's Incompleteness Theorem** - also known as Goedel's Theorem, is actually two theorems proposed by Austrian-American logician Kurt Goedel. These theorems state that some parts of mathematics are based on ideas that cannot be proven within mathematics. Goedel's first theorem states that any consistent mathematical theory that includes the counting numbers is incomplete. Goedel's second theorem states that such a theory cannot prove its own consistency; consistency may be provable within some larger theory, but proving consistency within the larger theory would require an even bigger theory, leading to a never-ending sequence of ever-larger theories. Goedel published his theorem in 1931, around the time when German mathematician David Hilbert [invented the mathematical construct known as Hilbert Space which is part of super-string theory] proposed that every mathematical theory should be demonstrated logically. Goedel's Theorem showed that the aims of establishing completeness and consistency must fail. Later work by American mathematician Alonso Church and British mathematician Alan Turing showed that the aim of deciding whether any particular mathematical statement belongs in a theory must also fail.

<sup>301</sup> Kafatos, *ibid.* @ page 174 para 2<sup>nd</sup>.

<sup>302</sup> **The Vienna Circle**- The Verification Principle became the Central tenet of logical positivism, the body of ideas put forward in the 1920s and 1930s by a group of scientifically-minded intellectuals known (after their meeting place) as the Vienna Circle. Find additional references and analysis online at [www.browncat.demon.co.uk](http://www.browncat.demon.co.uk). The logical positivists believed that the philosopher's task was to clarify the meanings of basic concepts and assertions (especially those of science), not to attempt to answer unanswerable questions such as those that were the stock in trade of metaphysicians - the nature of ultimate reality, the definition of the Absolute, and so on. The verification principle was the circle's main weapon against metaphysics and theology. It was a sort of philosophical litmus test for meaningfulness which they maintained could be applied to any proposition. It said, in rather obscure language, that "the meaning of a statement is its method of verification." To understand what that means it is necessary to first understand what the logical positivists meant by meaningfulness. They thought there were only two classes of proposition that were meaningful - tautologies (which were true 'by definition') and verifiable empirical propositions. Anything else was nonsense. So to say that the meaning of a statement was its method of verification simply meant that we could understand the meaning of a proposition if we knew what kind of observation would verify it. For example, the proposition 'It is raining outside' could be verified by going outside with a dry coat on, then returning inside and seeing whether the coat was now wet. The trouble with metaphysical and theological propositions, said the logical positivists, was that there were no tests, actual or conceivable, that could be applied to them to test their truth or falsity. So they were, by the standards of the logical positivists, literally meaningless.

<sup>303</sup> **Rudy Rucker**-online home page @ <http://www.mathcs.sjsu.edu/faculty/rucker/biography.htm>.

<sup>304</sup> Kafatos, M. *ibid.* @ pp 179.

<sup>305</sup> Merriam Webster's dictionary definition of consciousness.

<sup>306</sup> **Erwin Schroedinger** - Born 1887 in Austria, was awarded the Nobel Prize in Physics in 1933 for the discovery of new productive forms of atomic theory. He is considered one of the founders of quantum theory. During his career, he wrote broadly on the relationships he observed between the ancient Hindu traditions as



expressed in The Vedas and wrote prodigiously. For more information online, see <http://www.nobelprizes.com/nobel/physics/1933a.html>.

- <sup>307</sup> **Eugene Wigner** - Born in 1902 in Budapest, Hungary. Was awarded the Nobel prize in Physics in 1963 for his contributions to the theory of the atomic nucleus and the elementary particles, particularly through the discovery and application of fundamental symmetry principles. Wigner was professor emeritus at Princeton University in Princeton, New Jersey.
- <sup>308</sup> **Nick Herbert**, *Quantum Reality: Beyond the New Physics*, Doubleday pub., New York. ISBN: 0385335690.
- <sup>309</sup> B. Moyers et al, *Healing and the Mind*, Bantam Doubleday Dell Publishing Group, Inc. NY (1995) @ pp.189. ISBN: 0-385-46870-8.
- <sup>310</sup> **Chandra Bose** - Sir Jagadish Chandra Bose was the first Indian to achieve international reputation in experimental science during the British rule. A Physicist by training and profession, later turned into a plant physiologist, J.C. Bose made great contributions to physical science by his work on electromagnetic radiation and verifying the laws of reflection, refraction and polarization of electromagnetic waves. Sir J. C. Bose first demonstrated communication through microwaves, one of the technologies that benefit the human race most, in the year 1895, two years before Marconi's patent. In later years, he concentrated his research on understanding the open problems involving life and non-life. His works on the response of living cells under external stimuli are pioneering. Hence he is considered to be the earliest biophysicist. Sir J. C. Bose devised several methods to illustrate the physical basis of memory using ferromagnetic properties of matter. He invented many delicate and sensitive instruments, such as his crescograph for recording plant growth, which magnifies a small movement as much as 10,000 times. Sir Jagadish Chandra Bose was the founder director of Bose Institute in 1917. For information online, see <http://202.141.148.19/Founder.html>.
- <sup>311</sup> Encyclopedia Britannica on Bose - see Encarta Online @ <http://202.141.148.19/Founder.html>.
- <sup>312</sup> While Marconi in Bologna was still trying to transmit electrical signals through space without wires, a race he was to win officially against similar efforts by Lodge in England, Muirhead in the United States and Popov in Russia, Bose had already succeeded. In 1895, the year before Marconi's patent was issued, at a meeting in the Calcutta town hall, presided over by Sir Alexander Mackenzie, the lieutenant-governor of Bengal, Bose transmitted electric waves from the lecture hall through three intervening walls - and Mackenzie's portly body - to a room seventy-five feet away, where they tripped a relay which threw a heavy iron ball, fired off a pistol and blew up a small mine.
- <sup>313</sup> Gupta, M. *Jagadis Chandra Bose, A Biography*, Chaupatty, bombay; Bharratiya Vidya Bhavan (1964).
- <sup>314</sup> Bose ascribed to the affected sections some kind of lingering memory of the treatment. In potassium he found that the power of recovery was almost totally lost if it was treated with various foreign substances; this seemed to parallel the reactions of muscular tissues to poisons.
- <sup>315</sup> The congress was "bouleverse" by Bose's earth-shaking suggestion that the gulf between the animate and inanimate might not be as broad and unspannable as generally believed; its secretary declared himself "stunned."
- <sup>316</sup> J. Lovelock, *The Ages of Gaia*, ibid.

What is the hypothesis of Gaia ? Stated simply, the idea is that we may have discovered a living being bigger, more ancient, and more complex than anything from our wildest

**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

---

dreams. That being, called Gaia, is the Earth. The hypothesis holds that about one billion years after its formation, our planet was occupied by a meta-life form which began an ongoing process of transforming this planet into its own substance. All the life forms of the planet are postulated to be part of Gaia. In a way analogous to the myriad different cell colonies which make up our organs and bodies, the life forms of earth in their diversity are said to co-evolve and contribute interactively to produce and sustain the optimal conditions for the growth and prosperity not just for themselves, but for the larger whole, Gaia. The composition and structure of the atmosphere, seas and terrestrial crust are held to be the result of radical interventions carried out by Gaia through the evolving diversity of living creatures.

Encountering the Earth from space, a witness would know immediately that the planet was alive. The atmosphere would give it away. The atmospheric compositions of our sister planets, Venus and Mars, are: 95-96% carbon dioxide, 3-4% nitrogen, with traces of oxygen, argon and methane. The earth's atmosphere at present is 79% nitrogen, 21% oxygen with traces of carbon dioxide, methane and argon. The difference is Gaia, which transforms the outer layer of the planet into environments suitable to its further growth. For example, bacteria and photosynthetic algae began some 2.8 billions of years ago extracting the carbon dioxide and releasing oxygen into the atmosphere, setting the stage for larger and more energetic creatures powered by combustion, including, ultimately, ourselves.

That is how James Lovelock discovered Gaia; from outer space. In the 1960's, during the space race which followed the launching of Sputnik, he was asked by the Jet Propulsion Laboratory and NASA to help design experiments to detect life on Mars. The Viking Lander gathered and tested some Martian soil for life with no results. Lovelock had predicted as much, by analyzing the atmosphere of Mars: it is in a state of dead equilibrium. By contrast, the atmosphere of Earth is in a "far from equilibrium" state- meaning that there was some other complex process going on which maintained such an unlikely balance. It occurred to him that if the Viking Lander had landed on the frozen wastes of Antarctica, it might not have found any trace of life on Earth either. But a sure giveaway would be a complete atmospheric analysis... which the Viking Lander was not equipped to do. Lovelock's approach was not popular at NASA because NASA needed a good reason to land on Mars, and the best was to look for life. Viking found nothing on Mars, but Lovelock had seen the Earth from the perspective of an ET looking for evidence of life. And he began thinking that what he was seeing was not so much a planet adorned with diverse life forms, but a planet transfigured and transformed by a self-evolving and self-regulating living system. By the nature of its activity, it seemed to qualify as a living being. He named that being Gaia, after the Greek goddess which drew the living world forth from Chaos.

*The name of the living planet, Gaia, is not a synonym for the biosphere-that part of the Earth where living things are seen normally to exist. Still less is Gaia the same as the biota, which is simply the collection of all individual living organisms. The biota and the biosphere taken together form a part but not all of Gaia. Just as the shell is part of the snail, so the rocks, the air, and the oceans are part of Gaia. Gaia, as we shall see, has continuity with the past back to the origins of life, and in the future as long as life persists. Gaia, as a total planetary being, has properties that are not necessarily discernable by just knowing individual species or populations of organisms living together... Specifically, the Gaia hypothesis says that the temperature, oxidation state, acidity, and certain aspects of the rocks and waters are kept constant, and that this*

---

*homeostasis is maintained by active feedback processes operated automatically and unconsciously by the biota.*

Even the shifting of the tectonic plates, resulting in the changing shapes of the continents, may result from the massive limestone deposits left in the earth by bio-forms eons ago.

*You may find it hard to swallow the notion that anything as large and apparently inanimate as the Earth is alive. Surely, you may say, the Earth is almost wholly rock, and nearly all incandescent with heat. The difficulty can be lessened if you let the image of a giant redwood tree enter your mind. The tree undoubtedly is alive, yet 99% of it is dead. The great tree is an ancient spire of dead wood, made of lignin and cellulose by the ancestors of the thin layer of living cells which constitute its bark. How like the Earth, and more so when we realize that many of the atoms of the rocks far down into the magma were once part of the ancestral life of which we all have come.*

The root question posed by Gaia's critics, and a central point in his theory, concerns the difference between a planetary environment which might only be the aggregate result of myriad independent life forms coevolving and sharing the same host, and one which is ultimately created by life forms deployed, so to speak, to accomplish the purpose of the larger being.

*Is the idea of Gaia only a romantic and dramatized description of the terrestrial biosphere and its effects, or is there a planetary being, whose life cycle must be counted in the billions of years, which spawns these evolving life forms to suit the purpose of its being?*

Lovelock points out that Gaia, being ancient and resourceful enough to have carried out these successive changes of the planet in spite of asteroid collisions and other setbacks, is herself probably not endangered by the relatively momentary depredations of the human species, as it befouls and cripples the bio-dynamics of its environment. Rather, the danger is to the human race, not only from our own actions, but also by Gaia's reaction to them.

Lovelock first exposed his idea in his 1979 book, ***Gaia, a New Look at Life on Earth***. The science behind the hypothesis was still sketchy, and it provoked a storm of criticism. It also provoked a lot of research, and the resulting body of information has encouraged Lovelock to publish this second book, a more confident and complete exposition of the Gaia hypothesis. ***The Ages of Gaia*** is easily readable for the educated layperson, but includes plenty of scientific depth. Courtesy, Stephen Miller, 1989. [All quotes from James Lovelock, taken from ***The Ages of Gaia***.]. For online information, see <http://erg.ucd.ie/arupa/references/gaia.html>

<sup>317</sup> Capra, F. ***The Turning Point***, *ibid.* See also M. Kafatos et al, ***The Conscious Universe***. Recently Fritjof Capra has attempted to make the case that a fundamental paradigm shift is in progress, in the form of what he calls "an ecological world view."

*On the most fundamental level, ecological awareness is a deeply religious awareness in which the individual feels connected with the whole, as in the original root meaning of the word religion from the latin "religare," meaning to "bind strongly."*

The ecological world view (or social paradigm) is distinguishable in terms of five related "shifts" in emphasis. Capra's categories are entirely consistent with the current level

**Endnotes, Comments, References, Hyperlinks & Suggested Reading**

of understanding of physical reality revealed in modern physics. The are briefly summarized as follows:

Shift from the Part to the Whole The properties of the parts must be understood as dynamics of the whole;

Shift from Structure to Process Every structure is seen as the manifestation of an underlying process, and the entire web of relationships is understood to be fundamentally dynamic;

Shift from Objective to "Epistemic" Science Descriptions are no longer viewed as objective and independent of the human observer and the process of obtaining knowledge. Thus this process, which Kafatos and Nadeau define as the "new epistemology," must be included explicitly in any description of reality-as-it-is;

Shift from "Building" to "Network" This is a new metaphor for knowledge. Since phenomena exist by virtue of their mutually consistent relationships, any physics which describes phenomena must meet the requirement that components be consistent with one another as well as themselves. Thus, knowledge can no longer be viewed as "built" upon unchanging foundations, and must be viewed rather as an interconnected network of relationships founded on self-consistency and general agreement with facts;

Shift from Truth to Approximate Descriptions Since Nature is an interconnected, dynamic web of relationships, the identification of patterns as objects depends upon the process of knowledge and human observation. This means that the true description of any object is a web of relationships associated with concept and models, and that the whole which constitutes the entire web of relationships cannot be represented in this necessarily approximate description.

<sup>318</sup> Bohm, D. **Wholeness and the Implicate Order**, ibid.

<sup>319</sup> Bak, P. **how nature works**. ibid.

<sup>320</sup> Aspect A. ibid..

<sup>321</sup> Wheeler J.A. ibid. - see references.

<sup>322</sup> Radin D. @ pp108-109.

<sup>323</sup> Carl Sagan on Radin's work, ibid.

<sup>324</sup> Recommended reading in Radin

<sup>325</sup> Laszlo, **The Whispering Pond**, @ pp 97.

<sup>326</sup> Radin D. ibid.

<sup>327</sup> This suggests that the aggregation, organization and migration of cells occurs in a fractal pattern, which organizes itself non-locally.

<sup>328</sup> This is consistent with the unpredictability of local phenomena or "avalanches" in any complex, self-organizing system.

<sup>329</sup> Individuation is a fractal function - the form, functional attributes, architecture and chemistry of all "minds" is essentially the same. The identity of each local aggregation or individual is, however, distinct and mutually exclusive in its particulars from all others. This is an essential manifestation of the rules which govern self-organizing criticality.

<sup>330</sup> Edelman describes the essential attributes of the feature appearing in all SOC systems which we have referred to as background noise, which is expressed by the mathematical form  $1/f$ .

<sup>331</sup> Edelman, G. [2004]. **Wider Than The Sky: The Phenomenal Gift of Consciousness**. Yale University Press

<sup>332</sup> G. Edelman, **Bright Air**... ibid.

<sup>333</sup> Edelman's *Morphology and the Mind* ([Neural Darwinism](#), 1987)[*Topobiology: an introduction to molecular embryology*, 1988][*The Remembered Present: a biological theory of consciousness*, 1989]

<sup>334</sup> When he was still a student, Richard Feynman hinted at a career to come as a scientific wonderer when he wrote: "I wonder why. I wonder why. / I wonder why I wonder / I wonder why I wonder why / I wonder why I wonder!" Such wondering, and meta-wondering, takes us to the heart of what geneticist-cum-neuroscientist Francis Crick (who would know) calls "the major unsolved problem in biology"--explaining how billions of neurons swapping chemicals give rise to such subjective experiences as consciousness, self-awareness, and awareness that others are conscious and self-aware.

The body of literature attempting to solve this problem is extensive, and getting one's mind around the field is a herculean task successfully executed by psychologist Susan Blackmore in her delightful introduction, *Consciousness*. Presented as a textbook, it is so highly engaging that I recommend it for general readers, too. In many ways, the book is structured like a brain, with loads of independent modules (boxes and sidebars featuring profiles, concepts and activities) tied together by a flowing narrative and integrated into a conceptual whole. The easy problem, Blackmore says, is explaining each of the functional parts of the brain, such as "the discrimination of stimuli, focusing of attention, accessing and reporting mental states, deliberate control of behavior, or differences between waking and sleep."

In contrast, the hard problem in consciousness studies "is experience: what it is like to be an organism, or to be in a given mental state." Adding up all of the solved easy problems does not equal a solution to the hard problem. Something else is going on in private subjective experiences--called qualia--and there is no consensus on what it is. Dualists hold that qualia are separate from physical objects in the world and that mind is more than brain. Materialists contend that qualia are ultimately explicable through the activities of neurons and that mind and brain are one. Blackmore, uniquely qualified to assess all comers (she sports multihued hair, is a devotee of meditation, and studies altered states of consciousness), allows the myriad theorists to make their case (including her own meme-centered theory) so that you can be the judge.

Making a strong case for the materialist position is Gerald M. Edelman's latest contribution, *Wider Than the Sky*, offered as a "concise and understandable" explanation of consciousness "to the general reader." Concise it is, but as for understandable, Edelman understates: "It will certainly require a concentrated effort on the part of the reader." As director of the Neurosciences Institute in La Jolla, Calif., a Nobel laureate and author of several books on consciousness (*Neural Darwinism*, *The Remembered Present* and *Bright Air, Brilliant Fire*), Edelman has impeccable credentials. But science writing for a general audience involves more than expunging scholarly references and providing a glossary of technical terms as a substitute for clear exposition. To wit, on memory Edelman writes that "it is more fruitfully looked on as a property of degenerate nonlinear interactions in a multidimensional network of neuronal groups." Such prose is common throughout the book, which is a shame because Edelman is a luminously entertaining conversationalist, and his theory that the brain develops in a Darwinian fashion of neuronal variation and selection, and that consciousness is an emergent property of increasingly complex and integrated neuronal groups, has considerable support from neuroscience research.

An ideal combination of exquisite prose and rigorous science can be found in California Institute of Technology neuroscientist Christof Koch's *The Quest for Consciousness*. A rock climber adorned with a tattoo of the Apple Computer logo on his arm, Koch takes

an unabashed neurobiological approach, the natural extension of what his longtime collaborator Francis Crick started in 1994 when he wrote in *The Astonishing Hypothesis* "that 'you,' your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules."

To me, the most astonishing aspect of this theory is that it is astonishing to anyone. Where else could the mind be but in the brain? Nevertheless, finding the neuronal correlates of consciousness (NCC) has proved elusive, so instead of concocting a grand unified theory, Koch and Crick undertook a very specific research program focusing on the visual system, to understand precisely how photons of light striking your retina become fully integrated visual experiences. Koch and his colleagues, for example, discovered a single neuron that fires only when the subject sees an image of President Bill Clinton. If this neuron died, would Clinton be impeached from the brain? No, because the visual representation of Clinton is distributed throughout several areas of the brain, in a hierarchical fashion, eventually branching down to this single neuron. The visual coding of any face involves several groups of neurons--one to identify the face, another to read its expression, a third to track its motion, and so on.

This hierarchy of data processing allows the brain to economize neural activity through the use of combinatorics: "Assume that two face neurons responded either not at all or by firing vigorously. Between them, they could represent four faces (one face is encoded by both cells not firing, the second one by firing activity in one and silence in the other, and so on). Ten neurons could encode 210, or about a thousand faces.... It has been calculated that less than one hundred neurons are sufficient to distinguish one out of thousands of faces in a robust manner. Considering that there are around 100,000 cells below a square millimeter of cortex, the potential representational capacity of any one cortical region is enormous." Given that the brain has about 100 billion neurons, consciousness is most likely an emergent property of these hierarchical and combinatoric neuronal connections. How, precisely, the NCC produce qualia remains to be explained, but Koch's scientific approach, in my opinion, is the only one that will solve the hard problem.

<sup>335</sup> Edelman *ibid.* our "first language must have been a spoken language."

<sup>336</sup> I would prefer to argue the ethics of this sort of thing *before* the deed is actually attempted, but in light of what we know about the nature of self-organizing complexity and the human proclivity to *do* first and *ask* later, it is not likely that we will enjoy that opportunity. Even if we do, it is less likely that having the argument will have any material effect on the outcome of the process.

<sup>337</sup> Sheldrake, R. - morpho-genetic fields

<sup>338</sup> Sheldrake, R. - ***Seven Experiments*** *ibid.*

<sup>339</sup> Sheldrake, R. ***Seven Experiments...*** @ pp 107.

<sup>340</sup> Laszlo, E. - ***The Whispering Pond*** *ibid.*

<sup>341</sup> For further reading on this subject, in the context of Edelman's work and its applicability to our considerations, I suggest you read the not inconsiderable work of Dennett and Hofstadter.

<sup>342</sup> Chalmers, David ***The Conscious Mind: In Search of a Fundamental Theory***, Oxford University Press. ISBN: 0-19510553-2. D.J. Chalmers, ***The Conscious Mind: In Search of a Fundamental Theory (Philosophy of Mind Series)***, Oxford University Press (1997) ISBN: 0-195-5117-89-1; see also John R. Searle, ***The Mystery of Consciousness***; Jonathon Shear (Editor), ***Explaining Consciousness: The Hard Problem***; Ned Joel Block (Editor), ***The Nature of Consciousness: Philosophical Debates***; Owen Flanagan, ***Consciousness Reconsidered***.

- <sup>343</sup> Santilli, R. ***Il Grande Grido***, ibid. See also, *Journal of New Energy*, vol. 4, no. 1, Summer (1999).

### **Chapter Three**

- <sup>344</sup> David Felton, M.D., Ph.D., is Professor of Neuroimmunology and Anatomy at the University of Rochester School of Medicine He and his wife Suzanne Felton, Ph.D., have discovered nerve fibers that physically link the nervous system and the immune system. Dr. Felton was the recipient of a MacArthur Foundation Prize Fellowship in 1983 and is Associate Editor of the journal *Brain, Behavior and Immunity*.
- <sup>345</sup> Moyers, B. ***The Mind/Body Connection***, Doubleday (1995) ISBN: 0-385-46870-9.
- <sup>346</sup> Dr. David Felten, ***The Mind/Body Connection***, @ page 218.
- <sup>347</sup> Dr. Candace Pert, Ph.D., is Visiting Professor at the Center for Molecular and Behavioral Neuroscience, Rutgers University, and a research consultant with Peptide Research in Rockville, Maryland. She was formerly Chief of the Section on Brain Biochemistry of the Clinical Neuroscience Branch at the National Institute of Mental Health. She is credited with the discovery of the opiate receptor and many other peptide receptors in the brain and in the body, which led to an understanding of the chemicals which travel between the mind and the body.
- <sup>348</sup> Non-locality is also referred as simultaneity. It is the phenomenon which demonstrates that information is transported between remote localities in a way which is truly instantaneous, without regard to time or distance.
- <sup>349</sup> Comparing that to the speed with which modern computers process information is like comparing the speed of a man walking to that of a Ferrari at full speed. Computers are much faster at processing individual bits of information than the brain is. However, each of the brain's individual neurons can reasonably be compared to a computer's central processing unit. Most computers have just one. Some have as many as five or six. The brain has fifteen billion and they all operate non-locally, holographically and, therefore, simultaneously. This gives the brain a parallel processing capacity that is so much greater than that of any computer ever conceived of that we simply cannot make a meaningful comparison.
- <sup>350</sup> Pert, Candace ***The Mind/Body Connection***, @ page 177-181.
- <sup>351</sup> ibid.
- <sup>352</sup> ibid.
- <sup>353</sup> ibid.
- <sup>354</sup> ibid.
- <sup>355</sup> ibid.
- <sup>356</sup> Hebb, Donald O. - (b. 1904, Chester, Nova Scotia, Canada, d. 1985, Ph. D. Psychology, Harvard University, 1936). Hebb spent most of his academic career at McGill University in Montreal, where he became an influential theorist concerned with the relation between the brain and behavior. His most important book, *The Organization of Behavior* (1949), was influential in the development of connectionism. Hebb spent most of his academic career at McGill University in Montreal, where he became an influential theorist concerned with the relation between the brain and behavior. His most important book, *The Organization of Behavior* (1949), was influential in the development of connectionism. Hebb took a biological approach to psychology and became one of the first brain theorists of modern times. He combined behavioral and neurophysiological approaches to psychology. His ***A Textbook of Psychology*** promoted his psychobiological position and was eventually translated into 11 languages.

<http://www.artsci.wustl.edu/~philos/MindDict/hebb.html>.



- 
- <sup>357</sup> Edelman, G. Tonori, G. ***The Universe of Consciousness: How Matter Becomes Imagination***. See also G. Edelman, ***Bright Air, Brilliant Fire: on the matter of the mind***.
- <sup>358</sup> Clarke, A.C., ***2001: A Space Odyssey***, starring Keir Dullea, Gary Lockwood, directed by Stanley Kubrick. ASIN: B00005ASUM
- <sup>359</sup> Campbell, J. ***Grammatical Man***, *ibid*.
- <sup>360</sup> Under the title ***John Lilly and Physics***, Jack Sarfatti's web site posts an illustration developed by S. Hameroff which is the closest thing I have found to a cogent representation of the concepts described in this part of the chapter. The notion of a "caged electron qubit" is, however, completely off the mark. In a recent correspondence with Mr. Sarfatti, I suggested he carefully consider the model developed in our research as a more viable alternative:
- <sup>361</sup> The non-local field effect discovered by Vladimir Poponin and his colleagues at the Russian Academy of Sciences, called the DNA Phantom Effect, provides a perfectly calibrated validation of this notion. More information about this phenomenon can be found at <http://www.subtle-energy.com/>.
- <sup>362</sup> See also Sarfatti, J. <http://www.stardrive.org/>.
- <sup>363</sup> Campbell, Jeremy ***Grammatical Man: Information, Entropy, Language and Life***, Simon & Schuster, New York,(1982), page 122-124. "***Nature As An Information Process - Something Rather Subtle***," describes the astonishingly clever adaptation in a virus known as ØX174. This virus stores information by means of a DNA text so cunningly comprised as to tax the ingenuity of a master anagrammist.
- <sup>364</sup> For a definitive description of the controversies and short comings of super string theory, see Erwin Lazlo, "***Whispering Pond***" and Santilli, Book III ***JNE*** Aug 99.
- <sup>365</sup> Varela, Francisco et al, *ibid*.
- <sup>366</sup> Sheldrake, R. ***Morphogenetic Fields***, *ibid*.
- <sup>367</sup> Sagan, C. ref/

### **Chapter Four**

- <sup>368</sup> The idea was to develop a remote sensor system which would give a tactical advantage to negotiators sitting at a bargaining table. The ability to detect an opponent's emotional state without his being aware of it would create an enormous negotiating advantage.
- <sup>369</sup> Named ***Operation Sleeping Beauty***, this project was funded by the Central Intelligence Agency. It focused on providing devices which could control hostage situations remotely by employing a field to effect perceptual distortion in hostage takers, diminishing their threshold of awareness, rendering them less capable of effective defense or impairing their judgment; also, temporarily incapacitating the hostage takers to expedite hostage rescue by friendly forces. Terrorist situations would be handled by disrupting the heart rhythms of the terrorists at a distance, effecting perceptual distortion as in (1) above or disrupting the terrorist's brain's information processing capacity, and incapacitating the terrorist(s) either permanently or temporarily. Hostile crowds would be controlled by effecting mass perceptual distortion and disrupting physiological processes in some or all of the people in the crowd.
- <sup>369</sup> Mind Control is no longer science fiction. On the Discovery channel on December 29, 1997, a program entitled "Non lethal weapons Shoot Not to Kill", electromagnetic weapons were demonstrated that can paralyze and disorient a terrorist, or be used against a crowd or in a siege. Since the 1960s, there have been allegations that the U.S. and other governments have been experimenting on people without their consent in a highly classified weapons testing program, intended to control the mind using electromagnetic technology.



These weapons work on the hypothesis that electromagnetic signals from outside sources can mimic the mind and body's electromagnetic signals. Most scientists have agreed that mind control is theoretically possible in this lifetime and many sign national security oaths which prevent them from discussing their research in this area, but they will discuss the logical implications of the research into mind control.

In one of many articles about mind control from the *New York Times Magazine*, November 15, 1970, "Brain Researcher Jose Delgado Asks-'What Kind of Humans Would We Like To Construct?'" Delgado said; "The human race is at an evolutionary turning point. We're very close to having the power to construct our own mental functions, through a knowledge of genetics (which I think will be complete within the next 25 years); and through a knowledge of the cerebral mechanisms which underlie our behavior."

In the same article Dr. Morton Reiser, chairman of the Yale department of psychiatry stated; "there are probably some frightening potentials in Delgado's work. If you can use computer technology to send an unmanned space satellite to the moon, then it doesn't seem utterly impossible that one day our computers will be sophisticated enough to be used to put thoughts into people's heads. ...Suppose, for instance, there was someone with uncontrollable rage reactions which were due to something detectable in the nervous system. The computer could send back a stimulus to inhibit that response. I don't think that's science fiction..." There is ample evidence that the U.S. government has funded behavior control research for intelligence purposes.

This related quote is from ***Journey Into Madness, The True Story of Secret CIA Mind Control and Medical Abuse*** by Gordon Thomas, Bantam Books (1989). Mr. Thomas is a former producer for the BBC, a veteran foreign correspondent and investigative journalist who has reported from many hot spots around the world. "Dr. Gottlieb and behaviorists of ORD [Office of Research and Development, CIA, Central Intelligence Agency] shared [Dr.] Jose Delgado's views that the day must come when the technique would be perfected for making not only animals but humans respond to electrically transmitted signals."

Like Dr. Delgado [Yale University], the neurosurgeon (Dr. Heath of Tulane University) concluded that ESB [electronic stimulation of the brain] could control memory, impulses, feelings and could evoke hallucinations as well as fear and pleasure. It could literally manipulate the human mind-at will."

<sup>370</sup> In one of many articles about mind control from the *New York Times Magazine*, November 15, 1970, "Brain Researcher Jose Delgado Asks-'What Kind of Humans Would We Like To Construct?'" Delgado said; "The human race is at an evolutionary turning point. We're very close to having the power to construct our own mental functions, through a knowledge of genetics (which I think will be complete within the next 25 years); and through a knowledge of the cerebral mechanisms which underlie our behavior."

In the same article Dr. Morton Reiser, chairman of the Yale department of psychiatry stated; "there are probably some frightening potentials in Delgado's work. If you can use computer technology to send an unmanned space satellite to the moon, then it doesn't seem utterly impossible that one day our computers will be sophisticated enough to be used to put thoughts into people's heads. ...Suppose, for instance, there was someone with uncontrollable rage reactions which were due to something detectable in the nervous system. The computer could send back a stimulus to inhibit that response. I don't think that's science fiction..." There is ample evidence that the U.S. government has funded behavior control research for intelligence purposes.

This related quote is from ***Journey Into Madness, The True Story of Secret CIA Mind Control and Medical Abuse*** by Gordon Thomas, Bantam Books (1989). Mr. Thomas

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

is a former producer for the BBC, a veteran foreign correspondent and investigative journalist who has reported from many hot spots around the world. "Dr. Gottlieb and behaviorists of ORD [Office of Research and Development, CIA, Central Intelligence Agency] shared [Dr.] Jose Delgado's views that the day must come when the technique would be perfected for making not only animals but humans respond to electrically transmitted signals."

Like Dr. Delgado [Yale University], the neurosurgeon (Dr. Heath of Tulane University) concluded that ESB [electronic stimulation of the brain] could control memory, impulses, feelings and could evoke hallucinations as well as fear and pleasure. It could literally manipulate the human mind-at will."

<sup>371</sup> Schnabel, J. **Remote Viewers: The Secret History of America's Psychic Spies**, Dell, New York (1997). See also, Swann, Ingo. **Remote Viewing**, found at <http://www.biomindsuperpowers.com/Pages/Superpowers.html>

<sup>372</sup> Gorightly, Adam, "The Journal of Possible Paradigms." Issue 4, Summer 1996, found at <http://www.elfis.net/elfol4/e4pkdomc.html>.

"The Unicorn"--as he was known to friends and fellow researchers--was none other than Ira Einhorn, a prominent figure in the new age counterculture of the late sixties and seventies. Phil and Ira became acquainted through the auspices of Co-Evolution Quarterly, later renamed The Whole Earth Review, a by-product of former Merry Prankster Stewart Brand's revolutionary brainchild, The Whole Earth Catalog. Within the letter section of CoEvolution Quarterly, Dick and Einhorn initiated a dialogue on Soviet psychotronics & mind control, and its far reaching implications. Shortly afterwards, Einhorn's girlfriend and fellow researcher Holly Maddux's dismembered body parts were discovered in a steamer trunk in Einhorn's Philadelphia apartment, and Einhorn charged with her murder.

In PKD, The Unicorn and Soviet Psychotronics I presented what at that time was nothing more than a visceral theory which posited that Einhorn might've been set up to take the rap of Holly's murder to silence him at a time when he was bringing to the forefront Tesla's hidden technologies, and the profound impact these technologies would have upon humankind if they were to ever become widely known. Now, just recently, an affirmation of my gut feeling/theory has been seconded by Walter Bowart in a revised and updated edition of his classic *Operation Mind Control* (OMC), recently reissued by Flatland.

In Chapter 29: *Invisible Warfare*, Bowart discusses areas of mind control that--at the time of the first printing of OMC in the late seventies--were just beginning to come to the attention of cryptocracy/conspiracy researchers. A more advanced technology of mind control--according to Bowart--had taken the place of such traditional covert *modus operandi* as mind altering drugs and hypnosis, supplanting them with the insidious use of various psychotronic technologies such as ELF waves, microwaves and other forms of electromagnetic manipulation, whereby waves tuned to a certain frequency could induce a subject to become more prone to auto-suggestion, and perhaps even induce depressive or overly aggressive ASCs. (Some of these weapons have been referred to as Non-Lethal in recent military literature.) Besides affecting the human mind and body, some have suggested, certain forms of electromagnetic waves could also effect weather patterns from great distances.

One of the chief proponents in exposing the use of these covert technologies is Lt. Colonel Thomas Beardon, USAF (Ret.), a close friend and former associate of the aforementioned "Unicorn". A former military intelligence officer, Beardon publishes *Specula*, a magazine devoted to "psychotronics" and "bio-energetics". In the mid eighties, Bill Jenkins hosted a radio program on AM KFI in Los Angeles which on a weekly basis dealt with subjects of the paranormal. The first time I tuned into Jenkin's show his guest was none other than Col. Beardon, who spoke of a mysterious "woodpecker" signal, which during that era had become quite the hot topic

among ham operators around the world. The so-called "woodpecker" signal could be replicated by tapping a pencil on a table between eight and fourteen times each second. Beardon claimed this signal emanated from the Soviet Union and had been traced to an alleged "Tesla Generator" in the cities of Riga and Gomel, and that the "woodpecker" signal was responsible for weather modification wars covertly waged upon an unsuspecting United States citizenry by the wily and unscrupulous Russians. These manipulations of U.S. weather patterns created a drought in the western states which ostensibly caused severe effects on farming and the economy in 1976, the same year the infamous "woodpecker" signal was first discovered. Such discoveries as these--shared with, and dispersed by, The Unicorn--are what many believe led to his subsequent fall from grace, when the figurative horn fell from his head as he shed his Unicorn identity, sinking into the shadows of anonymity to escape the dragnet of Big Brother.

<sup>373</sup> *Adies Syndrome* - Abstract Adies Syndrome is a rare neurological disorder affecting the pupil of the eye. In most patients the pupil is dilated (larger than normal) and slow to react to light on nearby objects. In some patients, however, the pupil may be constricted (smaller than normal) rather than dilated. Absent or poor reflexes are also associated with this disorder. Adie Syndrome is neither progressive nor life threatening, or disabling. [www.stepstn.com/cgi-win](http://www.stepstn.com/cgi-win).

<sup>374</sup> In the tradition of Ayurvedic medicine, the Amygdala is associated with the planet Mars, whose energetic signature in vedic medicine is rage.

<sup>375</sup> A Canadian researcher named Penfield placed electrodes into these areas during surgery and produced in his patients remarkably detailed memories of events his patients had completely forgotten.

<sup>376</sup> For more information, see: "**Handbook of Atmospheric Electrodynamics, vol. I**", by Hans Volland, 1995 published by the CRC Press. Chapter 11 is entirely on Schumann Resonances and is written by Davis Campbell at the Geophysical Institute, University of Alaska, Fairbanks AK, 99775. There is also a history of this research and an extensive bibliography. <http://image.gsfc.nasa.gov/poetry/ask/q768.html>.

<sup>377</sup> This varies from time to time in what appears to be a direct response to the cycle of sun spots. For a fascinating tour of the relationships between the position of the planets, the timing, frequency and intensity of sun spot cycles, and the cumulative effects, see Nelson, J.H., **The Propagation Wizard's Handbook: Coping With Our Occult Sun and its Meddlesome Satellites**, 73 Inc., Peterborough NH 03458 (1978).

<sup>378</sup> A Coulomb is described in physics as a function of Faraday's Laws of Electrolysis. The first law of electrolysis states: The mass of element formed by electrolysis is proportional to the quantity of electrical current passing through an electrolyte. The unit by which quantities are measured in the meter-kilogram-second system is the *coulomb*. One coulomb of electricity will form 0.001118 grams of metallic silver when passed through a solution containing a silver compound. By Faraday's first law, two coulombs of electricity would produce twice that amount and, in general, X coulombs will produce 0.001118 grams of silver for each of x coulombs. There is a vertical current flow between the ground and the ionosphere of  $1-3 \times 10^{-12}$  Amperes per square meter. The resistance of the atmosphere is 200 Ohms. The voltage potential is 200,000 Volts.

<sup>379</sup> Volland, op.cit. for extensive references and annotated bibliography.

<sup>380</sup> Volland, op.cit., Schumann Resonance follow-up studies, references.

<sup>381</sup> Dobrin, R., "Proceedings of the **Electro/78** Electronic Show and Convention," Hynes Veteran's Auditorium/ Sheraton Boston Hotel, May 23-25, entitled *New Electronic Methods for Medical Diagnosis and Treatment Using the Human Energy Field: A New Beach-head for Scientific Discovery*, sponsored by IEEE and ERA. This fascinating report contains the following papers:

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

- 
- Conaway, B., Dobrin, R. Pierrakos, J., “Historical Indications of the Existence and Function of the Human Energy Field, Institute for the New Age, New York, N.Y.
  - Dobrin, R., Conaway, B., Pierrakos, J., “Instrumental Measurements of the Human Energy Field, Institute for the New Age, New York, NY.
  - Edison, W., Faust, D., Kyler, H., Pehek, J., “Kirlian Photography: Myth, Fact and Applications, Drexel University, Philadelphia, PA. Also supported by Gary K. Poock, U.S. Naval Post Graduate School, Monterey, CA.
  - Tiller, W., “The Scientific Foundations of Kirlian Photography as a Medical Diagnostic Tool, Stanford University, Stanford, CA.

<sup>382</sup> (IEEE, see The Historical Indications of the Existence and Function of the Human Energy Field and the booklet which accompanies it)

<sup>383</sup> Evidence for this conclusion is found in the long term work supported by the Soviet Academy of Sciences. One of the principle researchers, David Faust has made the following illuminating observations.

What is very interesting about the Drexel observation, beyond the reporting of **Philadelphia Magazine** is the understanding that the experimental design was responsive to either a rotation of polarization of the laser beam, a “field” interaction on the polarizing crystals, a “field” interaction with the plasma oscillations within the laser cavity or a “field” interaction with the electron avalanche process of the photomultiplier detector tube. These are four experimental interface points where a conventional view of human physiology does not suggest there should be any interaction at a distance.

The system was mechanically isolated and monitored for air movement and sonic interactions, yet the slow (extra low frequency – ELF) oscillating movements of the human subject registered instantaneously on the apparatus and correlated with the movement of the subject. Seconds after movement, air turbulence was detectable along the laser beam’s axis but it did not correlate with the strong beam interactions. The visualization of a human observer (cite personal recollection of DLF about Barbara Conoway, aka Barbara Brennan and cite her book, *Hands of Light*, the introduction that carries a Drexel reference), trained to see the human field, and the intensity variations of the laser beam. The rigor of the Drexel experimental design along with the nature of the detectors makes a case for this being a non-local field observation.”

Faust, a co-principle investigator for the project was responsible for the instrument design. He points out that all “human field” investigations he was aware of as of 1978 relied on motionless sensors and a motionless human subject. The experimental designs presumed that the human subject emitted some form of energy that was expanded or intensified by the will or physiological state of the subject. In the Drexel experiment the focus was on a detection system whose energy (the laser beam) was modified by the movement of the human field “envelope” relative to the stationary sensor system. The initial observations that empirically developed the experimental design lead to a speculation that the effect was non-local. In fact, evidence developed during the tests that the emotionally charged state of the test subject and the two testing “coaches” could be “registered” on the apparatus when they were located in another room but “focused” on the sensor system.

What is clear about this experiment is that the effect on the laser beam was not an extra low frequency (ELF) electromagnetic phenomenon, due to the nature of the subject, the shielding and configuration of the system’s components. The “effect” was on an energized system which was modulated. More recent work released from the former Soviet Union suggests that the Drexel experiment was “right on the money” for

the detection of a non-local effect propagated by a torsion field. Akimov's work on torsion field detection in fact stated many years later that non-local torsion field effects are detected by Kirlian Effect apparatus and detectors such as those employed in the Drexel demonstration. One should, however, point out that the Drexel work also indicated that the true Kirlian apparatus differed dramatically from the western experimental devices which employed Polaroid film and simple spark generators to take still photographs.

<sup>384</sup> Laszlo, E. *ibid.*

<sup>385</sup> *ibid.*

<sup>386</sup> Varela, F. *ibid.*

<sup>387</sup> Kemeny, Dr. Margaret ***Healing and the Mind***, pp. 195-211.

<sup>388</sup> Hyper-Light-Speed Antenna, Patent No. 6,025,810 (15Feb2000) by David L. Strom, 1615 Geneva Street, Aurora, Colorado 80010. The Abstract reads, in part: "A method to transmit and receive ... generating a communications signal ... at a speed faster than light." Mr. Strom has characterized the patented device as a propagator of electromagnetic waves because the US Patent and Trademark Office will not accept patent applications which refer to torsion field dynamics. An careful analysis of the patent makes it clear, however, that the device is a torsion field generator. For further information regarding the construction, functional dynamics and operational attributes of torsion fields and active torsion field generators of (4) different types, see A. E. Akimov, "Heuristic Discussion of the Problem of Finding Long Range Interactions, EGS-Concepts", ***Journal of New Energy***, " Vol 2 No ¾ , pages 55-80, including 177 references to original research and experimental results. This scientific journal can be obtained by contacting Dr. Hal Fox at (801)466-8680 or online at <mailto:halfox@slkc.uswest.net>.

<sup>389</sup> Hagelin, J.S. "Is Consciousness a Unified Field? A Field Theorist's Perspective", Maharishi Open University, Fairfield, Iowa. Abstract:  
"Progress in theoretical physics during the past decade has led to a progressively more unified understanding of the laws of nature, culminating in the recent discovery of completely unified field theories. The parallel discovery of a unified field of consciousness raises fundamental questions concerning the relationship between the two. Following a general introduction to unified quantum field theories, we consider the proposal due to Maharishi Mahesh Yogi that the unified field of modern theoretical physics and the field of "pure" consciousness are identical. We show that the proposed identity between consciousness and the unified field is consistent with all known physical principles, but requires an expanded physical framework for the understanding of consciousness. Such a framework may indeed be required to account for experimentally observed field effects of consciousness and phenomenological aspects of higher states of consciousness."

## **Chapter Six**

<sup>390</sup> For a rigorous discussion of this important concept, there is no better presentation than the one provided by Kafatos and Nadeau in their watershed work ***The Conscious Universe***.

<sup>391</sup> In their new publication entitled ***The Non-Local Universe***, Kafatos and Nadeau explore the implications of the work of Alain Aspect and Nicolas Gisin by demonstrating with impeccable construction and logic that the Universe cannot be non-local at one scale and fail to demonstrate non-locality at all scales.

In their watershed book "***The Non-Local Universe***," Kafatos and Nadeau have hit upon a key ingredient in the study of the non-linear functions and relationships which cause living organisms to function as they do. Their findings support our own conclusions, as embodied earlier in Section One, Chapter Five, entitled ***The***

**Holographic Universe: Implicate Non-locality.** The fundamental argument is this - the universe operates non-locally and therefore holographically at all scales and distances.

Kafatos and Nadeau have come under strenuous criticism from a number of university level professors of quantum physics since the publication of their latest work. The criticism arises from the long held and erroneous notion that while non-locality may be demonstrated under extraordinary circumstances, such as the arbitrary and deliberate separation of positron-electron pairs through fiber optical cables, the world is still subject to Newtonian linearity at all levels, except as demonstrated by quantum mechanics at the sub-atomic level of matter. Bowling balls and water drops make that unmistakably clear, so they say.

The very notion that the universe is non-local at its core, and therefore at all scales and distances, is so apposite to the conventional model that until something extraordinary happens to compel scientists to think differently about it, it is unlikely that significant institutional progress will be made here.

<sup>392</sup> Kafatos, M., Nadeau, R. ***The Non-Local Universe***, loc. cit.

<sup>393</sup> **Faraday Cage** The name given to a device that shields its inside from [electric fields](#) generated by [static electricity](#). Usually a complete [conductive](#) shell, it collects stray [charges](#) and, because like charges repel, stores them on the outside surface (where they can be further apart than on the inside). The electric fields generated by these charges then cancel each other out on the inside of the cage. Often used to protect sensitive radio equipment.

<sup>394</sup> Lisitzin, V. light coupling constant - The first preliminary set of experiments carried out in Moscow and Stanford have allowed us to reliably detect the phantom effect. However, more measurements of the light scattering from the DNA phantom fields are necessary for a more precise determination of the value of the EMF-DNA phantom field coupling constant.

<sup>395</sup> Poponin, V.P. Modeling of NLE dynamics in one dimensional anharmonic FPU-lattice. Physics Letters A. (in press).

<sup>396</sup> Eidson, W., et al "Kirlan Photography: Myth, Fact and Applications", Proceedings of the Electro/78 Electronic Show and Convention, loc.cit.

<sup>397</sup> The information transfer rates supporting this set of phenomena exceed all known chemo-synaptic models by several orders of magnitude.

<sup>398</sup> Kafatos, M., Nadeau, R. ***The Non-Local Universe***, loc. cit.

<sup>399</sup> ***Autobiography of a Yogi***, ibid.

<sup>400</sup> Boyd, D. ***Swami*** loc.cit.- levitation

<sup>401</sup> Boyd, D. ***Swami*** loc.cit - sleepless saints

<sup>402</sup> Boyd, D. ***Swami*** loc.cit - bilocation

<sup>403</sup> Boyd, D. ***Swami*** loc.cit - raising the dead

<sup>404</sup> Boyd, D. ***Swami*** loc.cit - materialization of physical matter

<sup>405</sup> Boyd, D. ***Swami*** loc.cit - sustaining life without food

<sup>406</sup> Boyd, D. ***Swami*** loc.cit - healing physical ailments

<sup>407</sup> D. Boyd, ***Swami: Encounters With Modern Mystics***, Himalayan Institute Press (1995), originally by Random House (1976), Pocket Books (1977) and Paragon Press (1990). ISBN: 0-89389-142-8.

<sup>408</sup> Swami Rama was born in 1925 in Northern India. He was raised from early childhood by a Bengali yogi who lived in the foothills of the Himalayas. In his youth, he practiced various disciplines of yoga, science and philosophy in the traditional monasteries of the Himalayas and studied with many spiritual adepts, including Mahatma Gandhi, Sri Aurobindo and Rabindranath Tagore.



He pursued higher education at Prayag, Varansai and Oxford University in England. At the age of 24 he was appointed Shankaracharya of Karvipitham in South India, which is the highest spiritual position in all of India. During his term, he exerted a substantial impact on the spiritual customs of the time: He dispensed with useless formalities and rituals, made it possible for all segments of Indian society to worship in the temples, and encouraged the instruction of women in meditation. He resigned from his position in 1952 and returned to the Himalayas to continue his yogic practices.

After completing an intensive series of meditations in the cave monasteries, he emerged with a determination to serve humanity, particularly to bring the teachings of the East to the West. With the encouragement of his master, he began his task by studying Western philosophy and psychology. He worked as a medical consultant in London and assisted in parapsychological research in Moscow. He then returned to India, where he established an ashram in the village of Rishikesh. He completed his degree in homeopathy at the medical college in Darbhanga in 1960, came to the United States in 1969 and began his work with the Meninger Foundation.

Swami Rama came to the US under the sponsorship of Dr. Elmer Green of the Meninger Foundation, as a consultant in a research project designed to investigate the voluntary control of involuntary states. He participated in experiments which helped to revolutionize scientific thinking about the relationships between body and mind, amazing scientists by demonstrating precise conscious control of autonomic physical responses and mental functions, under strictly controlled laboratory protocols.

Swami Rama founded the Himalayan International Institute of Yoga Science and Philosophy, the Himalayan Institute Hospital Trust in India, and many similar centers throughout the world. He authored numerous books on health, meditation and the yogic scriptures. He died in November of 1996.

<sup>409</sup> **Rik Veda**/Maharishi Text, loc.cit.

<sup>410</sup> Greene, B. **The Elegant Universe**, op.cit.

<sup>411</sup> Ref: Profile of John Hagelin, Ph.D

[http://www.issues2000.org/Profile\\_John\\_Hagelin.htm](http://www.issues2000.org/Profile_John_Hagelin.htm)

<sup>412</sup> A case in point: at the time of this writing. A message delivered by a spokesman for the Russian Academy of Sciences was posted on the Internet on the web site maintained by Keeley.Net. It announced the outlawing of any continuing research in the area of non-local field effects by any scientists accredited by the Russian Academy of Sciences. The announcement includes references to a legislative initiative passed by the Russian Duma, prohibiting the use of any public monies administered through the Russian Academy of Sciences for such research, and threatens the censure and expulsion of any scientists caught engaging in continued research in these areas. The announcement also specifically sanctions the two leading physicists in the world who have developed the body of research data which brought the existence of such fields to our attention, Anatoly Akimov and Genady Shipov. The message cautions the world to beware of the "scam" they are perpetrating on the scientific community.

Such announcements are becoming more frequent and strident as research into the mechanics of non-local fields becomes more sophisticated and precise. I find this a troubling trend since it suggests that the scientific community's relationship with political counterparts is being used to actively suppress the kind of advanced research which holds the only realistic promise of saving the planet from mindless pollution and intrusion.

<sup>413</sup> Crussard, C., Pechiney Ugine Kuhlmann, Paris; J. Bouvaist, Pechiney Aluminum Research Center, Voreppe, **Study of Certain Seemingly Abnormal Deformations and Transformations of Metals**, A Translation of "etude de queleques de` formations

---

et transformations de Metaux", C. Crussard & J. Bouvaist, "*Memoires Scientifiques Revue Metallurgie*", February 1978. Translation Reviewed and Edited by Herve de Maigret and Pamela Maigret, in cooperation with Charles Crussard of Pechiney Ugine Huhlmann of Paris, France, with Eugene Kovalenko and David Faust of the Eyring Research Institute, Provo, Utah, November 1978, revised after final review by Charles Crussard, March 1979.

<sup>414</sup> *ibid.*

<sup>415</sup> *ibid.*

### **Chapter Seven**

<sup>416</sup> Moyers, B. *Healing and the Mind*, *ibid.*

<sup>417</sup> Eisenberg, Dr. David *Encounters With Chi - ref:*

<sup>418</sup> Laszlo, E. *The Whispering Pond*, *ibid.*

<sup>419</sup> *ibid.*, page 118.

<sup>420</sup> *ibid.*, page 109. **Figure 5A** shows a printout of the EEG waves of an average person in the ordinary state of consciousness. The left and right brain hemispheres show insignificant correlation (synchronization value = 7.6%) and no specifically harmonic patterns. The printout encompasses Theta, Alpha, Beta and Delta waves, given in terms of the known frequency regions from 0 to 30 waves per second.

**Figure 5B** shows the printout of a practiced meditator in a state of deep meditation. The left and right hemispheric patterns demonstrate a pronounced harmonic element and they are highly synchronized (synchronization value = 99.8%).

**Figure 5C** shows the EEG patterns of two subjects meditating together but without sensory contact with each other. The left and right brain hemispheres of each subject (left and right side of the image) are quasi-identical in both subjects (cross-person synchronization value = 90.0%)

**Figure 5D** shows the EEG of 12 almost completely synchronized people in simultaneous deep meditation but without sensory contact with each other, showing a sense of unity. The average synchronization is 81.2%.

<sup>421</sup> Sheldrake has ventured some guesses as to the relationship between morphic fields and our individual memory and intelligence. He suggests that our brains may not contain memories and knowledge, per se, but may be devices for tuning in to relevant sections of the morphic field for human memory, much as a radio tunes into radio waves. Our own personal memories would naturally be more accessible than those of other people or cultures (since, in morphic resonance, like resonates with like), but theoretically the memories of every human (and other entities?) would be available to anyone capable of tuning in.

Sheldrake further wonders if natural laws are the evolving habits of the physical universe. An increasing number of scientists are believing that, ever since the Big Bang, the contents and processes of the universe have been evolving, and are evolving still. Sheldrake notes that it is an act of incredible faith to believe that all the laws governing the universe are so eternal and immutable that they existed prior to any of the contents of the universe. It is much more "natural" to believe that the readily-observable evolution of life, culture and our own selves are merely manifestations of an evolutionary tendency deeply embedded in the very nature of things.

In short: We are all learning. Not just people but everything in the universe. And our learning is shared. That's the bottom line of Rupert Sheldrake's work.

<sup>422</sup> "Light Can Break Its Own Speed Limit," [July 20, 2000] at [www.CNN.com](http://www.CNN.com). See also Leake, J., *Eureka! Scientists Break Speed of Light* [5June2000] @ [www.foxnews.com](http://www.foxnews.com).

<sup>423</sup> Akimov, A.E., *A Heuristic Model*, loc. Cit.



424 "**Quantum Leap: Seize the Light**" **Wired News (01/09/02); Anderson, Mark K.**

Quantum computer research made two important steps forward recently, with the published discoveries of a new framework for enabling quantum computing and another for storing data using quantum methods. The first discovery, made by the Munich-based Max Planck Institute for Quantum Optics and the Zurich-based Institute of Quantum Electronics, involves keeping a set of atoms carefully lined up and ready to conduct quantum computations. Quantum computing means manipulating individual atoms in a tightly controlled manner, so keeping them secure and in place is important. The technique involves temperatures near absolute zero and lasers defining tight boundaries for the atoms. Texas A&M, MIT, and South Korean researchers made the second discovery, which involves storing information in photons frozen in a yttrium-silicate crystal, a solid that could eventually be incorporated into devices. Previous efforts in quantum cryptography used gas to freeze or slow photons, which would be a difficult technique to use in computers. Work still needs to be completed in how to maintain data integrity using the photon technique, the scientists say.

<http://www.wired.com/news/technology/0,1282,49448,00.html>

425 "The New Maxwell Electrodynamics Equations: New Tools For New Technologies," A collection of 60 papers from Alpha Foundation's Institute for Advanced Study. **Journal of New Energy**, [Winter 1999]. Vol. 4, No. 3.

### **Chapter Eight**

426 Sawyer, T., Farr, S.S., Chesbro, D. ***What Tom Sawyer Learned From Dying*** (1993) Hampton Roads Pub Co.

426 ***Tom Sawyer***, loc. cit.

427 Kubler-Ross, Elizabeth, ***Death & Dying***

428 Ref: - bio Raymond Moody and suggested readings

429 Ref: - bio Kenneth Ring and suggested readings

430 Ref: bio Melvin Morse and suggested readings

431 Ref - bio Robert Sullivan and suggested readings

432 Ref - bio Michael Grosso and suggested readings

433 Ref: IANDS contact coordinates

434 Ref: Ray Moody says 8,000,000 NDE's in US

435 Ref: NDE/ musical instruments

436 Ref: - NDE/ foreign languages

437 Ref. - NDE/ mathematics

438 Ref. - NDE/ science and physics information

439 Ref. - NDE/ artistic skills

440 Ref. - NDE/ metaphysical skills

441 Penfield, Wilder - Melvin Morse ibid

442 Morse, M. Closer To The Light - ref:

443 Morse, M. Ref: research report for Sylvian Fissure

444 Ref. - Chilean research and the Sylvian Fissure

445 Penfield, W. Ref: quotation source

446 Ref. - Moody/ what NDE is not caused by

### **Chapter Nine**

447 Ref: Nature - discovery of "final particle." July 26, 2000

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

- 
- 448 Sky and Telescope - December 1987, page 582.
- 449 Bearden T.E. - Ref: Delta T component of consciousness and the limited western view.
- 450 Comment - light coupling constant phenomenon with local and non-local fields
- 451 Santilli, R. Il Grande Grido and Hadronic Mechanics, loc.cit.
- 452 Phillips, S. Extra-Sensory Perception of Quarks, The Theosophical Publishing House, Madras, India/ London, England/ Wheaton, Illinois, USA (1980) ISBN: 0-8356-0227-3,
- 453 Ref. - Sutras of Pantanjali/ commentary and background
- 454 Ref. - background note/ Theosophical Society
- 455 Ref: bio CW Leadbeater
- 456 Ref - bio Annie Besant
- 457 Ref: Occult Chemistry/ Theosophical Society
- 458 Ref: 1951 3<sup>rd</sup> Edition
- 459 Ref: 1980 4<sup>th</sup> Edition
- 460 Dr. Stephen Phillips is an English Physicist educated at Cambridge University, where he received his B.A. and M.A. in theoretical physics. He received a M.Sc. degree at Cape Town University and a Ph.D. in particle physics at the University of California. In 1979 his paper entitled "Composite Quarks and Hadron-Lepton Unification" appeared in Physics Letters. He proposed that sub-quarks be labeled "Omegon" particles.
- 461 Ref. - Phillips/ at the introduction
- 462 Leadbeater, C.W., Besant, A., ***Occult Chemistry: Investigations by Clairvoyant Magnification Into The Structures of The Atoms of the Periodic Table and Some Compounds.***[3<sup>rd</sup> Ed. March 1997] Kessinger Publishing Co.
- 463 Ref: sub-quarks at FermiLabs.
- 464 Withdrawal of Fermilab sub-quark [preon] research papers - ref: FermiLabs was pressured to withdraw its report and recant its findings and eventually did so, on grounds which are still fundamentally specious. The exercise of this kind of political might by those who control access to research publications and resources is utterly unconscionable. Accordingly, I will continue to develop this model to include the extraordinary work produced by the sub-quark research teams, since it is clear that the discovery is valid, repeatable and fundamentally consistent with both the best practices of empirical science and the predictions made by the most current versions of super string theory. The fact that the sub-quark level of matter is also predicted and described in intimate detail by no less a scientific luminary than Dr. Tom Bearden, President of the Society of Distinguished Scientists in the United States.
- 465 Soviet Remote Viewing with Russian Submarine fleet - ref:
- 466 Graff, D. Tracks in the Psychic Wilderness ref:
- 467 Graff, D. River Dreams, ref:
- 468 Morehouse, D. Psychic Warrior, ref:
- 469 Schnabel, J. Remote Viewers: The Secret History of America's Psychic Spies ref:
- 470 Swann, I. book title and references
- 471 Swann, I. internet hyperlinks - ref:
- 472 Swann I. - latent human potential - Ref:
- 473 Bearden T. E. - President and CEO of CTEC, Inc., Lieutenant Colonel US Army (Retired), MS Nuclear Engineering, Georgia Institute of Technology, BS Mathematics, Northeast Louisiana University, Graduate of Command and General Staff College, US Army, Graduate of Guided Missile Staff Officer's Course, US Army (equivalent to MS Aerospace Engineering) and numerous other electronic warfare and counter-measures courses. Tom is President of the Association of Distinguished American Scientists (ADAS), a life member of the Alabama Academy of Science, Emeritus

- 
- member of the American Association of Physics Teachers. He has served on the boards of directors of several associations and corporations.
- He is the leading advocate of scalar potential electromagnetics and the Fogal charge-blocking semiconductor. He is involved in the development of revolutionary new alternative energy production devices and scalar electromagnetic system prototypes. He is credited with defining  $q$ , the elusive  $q$ -bit called the Quark by Gell-Mann, as a coupled system of two paired components (called Preons or sub-quarks). He has developed an advanced mechanism for a vacuum engine in which the particle flux of the physical vacuum is organized and used to energetically shape and manipulate both matter and energy. He has developed a mechanism which operationalizes a Bohm/Aharonov-type quantum potential, which theoretically allows an operator to engineer, direct and focus action at a distance in physical systems
- <sup>474</sup> Bearden, T.E. Mind Control and EM Wave Polarization Transductions, Explore! Magazine, Volume 9, Number 2, 1999, at page 59-108.
- <sup>475</sup> TEB ref 1
- <sup>476</sup> Identify Minkowski - Ref:
- <sup>477</sup> TEB ref 4
- <sup>478</sup> Edelman, G. Bright Light, Brilliant Fire , loc.cit.
- <sup>479</sup> Do not allow this notion to confuse you. It is very simple in concept - what is being referred to here is the notion that time-polarized energetic actions in the time domain automatically couple with and become 3-space energetic polarizations as a natural part of the way nature works. What is compelling about this notion is that our physics simply ignores the existence of any correlation between time domain functions and EM wave form propagation.
- <sup>480</sup> TEB - ref to soviet use of mind control on military pilots.
- <sup>481</sup> Whittaker, E.T. op.cit. Scalar Potentials ref/
- <sup>482</sup> TEB - diagram #1
- <sup>483</sup> TEB ref page 61 This sounds very much like our observations of the behavior of the sub-quark, with its characteristic dash-space-dash-space traces on the photographic emulsion plate.
- <sup>484</sup> TEB, ref ibid.
- <sup>485</sup> TEB ref 6
- <sup>486</sup> TEB ref 8
- <sup>487</sup> TEB ref 9
- <sup>488</sup> TEB ref. 10
- <sup>489</sup> TEB ref. 11

### **Chapter Ten**

- <sup>490</sup> ref. Maxwell's EM Field Equations
- <sup>491</sup> ref Whittaker, . E.T.scalar potentials and EM forces
- <sup>492</sup> ref. Crowell's L. reformulation of Maxwell's EM Field Equations
- <sup>493</sup> ref. Greene, B. The Elegant Universe, loc.cit.
- <sup>494</sup> ref. JNE, Reformulation of Maxwell's Field Equations
- <sup>495</sup> ref. Prigogine, I., Stengers, I. Dissipative Structures, loc.cit.
- <sup>496</sup> ref. Bak, P. How Nature Works, loc.cit.
- <sup>497</sup> Hagelin, J.,Is Consciousness the Unified Field? A Field Theorist's Perspective, Maharishi International University, Fairfield, Iowa.
- <sup>498</sup> Bohm, D., ***Wholeness and the Implicate Order***, loc.cit.
- <sup>499</sup> Mandelbrot, B., Fractals, loc.cit.

### **Chapter Eleven**

<sup>500</sup> Weiss, Brian Many Lives, Many Masters ref.

<sup>501</sup> Weiss, Brian, Through Time Into Healing, ref/ See also Messages From The Masters, ref/

<sup>502</sup> Catherine knew very little about my personal life. On my desk I had a baby picture of my daughter, grinning happily with her two bottom baby teeth in an otherwise empty mouth. My son's picture was next to it. Otherwise Catherine knew virtually nothing about my personal history. I had been well schooled in traditional psychotherapeutic techniques. The therapist was supposed to be a tabula rasa, a blank tablet upon which the patient could project her own feelings, thoughts and attitudes. These then could be analyzed by the therapist, enlarging the arena of the patient's mind. I had kept the therapeutic distance with Catherine. She knew me only as a psychiatrist, knew nothing of my past or of my private life. I had never even displayed my diplomas in the office.

The greatest tragedy in my life had been the unexpected death of our firstborn son, Adam, who was only twenty-three days old when he died in early 1971. About ten days after we had brought him home from the hospital, he had developed respiratory problems and projectile vomiting. The diagnosis was extremely difficult to make. "Total anomalous pulmonary venous drainage with an atrial septal defect," we were told. The pulmonary veins, which were supposed to bring oxygenated blood back to the heart, were incorrectly routed, entering the heart on the wrong side. It was as if his heart were turned around, backward. Extremely, extremely rare.

Heroic open heart surgery could not save Adam, who died several days later. We mourned for months, our hopes and dreams dashed. Our son Jordan was born a year later, a grateful balm for our wounds.

At the time of Adam's death, I had been wavering about my earlier choice of psychiatry as a career. I was enjoying my internship in internal medicine, and I had been offered a residency position in medicine. After Adam's death, I firmly decided that I would make psychiatry my profession. I was angry that modern medicine, with all of its advanced skills and technology, could not save my son, this simple, tiny baby.

My father had been in excellent health until he experienced a massive heart attack early in 1979, at the age of sixty-one. He survived the initial attack, but his heart wall had been irretrievably damaged, and he died three days later. This was about nine months before Catherine's first appointment.

My father had been a religious man, more ritualistic than spiritual. His Hebrew name, Avrom, suited him better than the English, Alvin. Four months after his death, our daughter Amy was born, and she was named after him.

<sup>503</sup> I knew that Catherine did not and could not know these facts. My father died in New Jersey and he was buried in upstate New York. He did not even have an obituary. Adam died a decade earlier in New York City, twelve hundred miles away. Very few of my close friends in Florida knew about Adam. Even fewer knew the circumstances of his death. Certainly no one at the hospital did. Catherine had no way of knowing any of this family history. Yet she had said "Avrom," and not the English translation, Alvin.

<sup>504</sup> Ian Stevenson, MD, Professor and Chairman Emeritus of the Department of Psychiatry at the University of Virginia, has collected and documented more than two thousand cases of children who have had reincarnation-type experiences. Many of these children exhibited xenoglossy, the ability to speak a foreign language, often ancient language to which they had never been previously exposed. Usually very young, these children also knew specific and detailed facts about towns and families hundreds or thousands of miles distant and about events that occurred a decade or more ago. Half of these children came from the Western world, not India or Tibet or other areas in Asia

where belief in reincarnation is common. Many of the specific details in these cases were carefully corroborated by Dr. Stevenson's research team.

<sup>505</sup> B. Weiss, *Through Time Into Healing*, Fireside Publishing (1992) ISBN: 0-671-74529-X and -671-86786-5 Pbk.

<sup>506</sup> B. Weiss loc. cit. page 25.

<sup>507</sup> Tibetan Book of Living and Dying ref.

<sup>508</sup> Egyptian Book of the Dead ref

<sup>509</sup> Rk Veda ref

<sup>510</sup> Lisitsyn – coupling constants ref.

<sup>511</sup> Kaznacheev – coupling constants ref. Also, TE Bearden ref. To Kaznacheev's work.

<sup>512</sup> Akimov – consciousness models, ref.

<sup>513</sup> Garnder, H.W. *Frames of Mind* ref.

<sup>514</sup> Wilber, K., *A Unified Theory of Everything* ref..

<sup>515</sup> Kronin, Y., coupling constants and accelerated data input. Also, T.E. Bearden, *Excalibur Briefing*, ref's.

<sup>516</sup> Graff, *Dale River Dreams* ref:

<sup>517</sup> Nadeau, D., Kafatos, M. "The Non-local Universe," ref. See also ***Looking In Seeing Out***, ref.

<sup>518</sup> Talbot, M. *The Holographic Universe* ref:

<sup>519</sup> Yurth, D. *Torsion Field Mechanics: Verification of Non-local Field Effects in Human Biology* ref's.

### **Appendix One**

<sup>520</sup> Leadbeter and Besant, Ref.

<sup>521</sup> Phillips, S., *Extrasensory Perception of Quarks* ref.

<sup>522</sup> Capra, F. ref/

<sup>523</sup> Zukav, G. ref/

<sup>524</sup> Leary, T. ref/

<sup>525</sup> Dass, R. ref/

<sup>526</sup> Joy, B. ref/

<sup>527</sup> Wilber, K. ref/

<sup>528</sup> Radin, D., *Conscious Universe*, ref.

<sup>529</sup> Moyers, W., Campbell, J., *The Masks of the Gods*, ref.

<sup>530</sup> Stanford-Binet, ref/

<sup>531</sup> Gardner, H., *Frames of Mind*, ref.

<sup>532</sup> Garnder, H. - 12 different talents, ref/

<sup>533</sup> Radin op.cit.

<sup>534</sup> Swami, ref.

<sup>535</sup> Monroe Institute, ref.

<sup>536</sup> Joy, B. ref/

<sup>537</sup> Joseph McMoneagle, ref.

<sup>538</sup> Dale Graff, ref.

<sup>539</sup> Deepak Chopra, ref.

<sup>540</sup> Stan Grof, circular breathing, Michael Talbot, *Conscious Universe*, ref.

<sup>541</sup> Ingo Swann, remote viewing ref/

<sup>542</sup> Monroe Institute, ref.

<sup>543</sup> MacMoneagle, Joe ***Remote Viewing***, ref/

<sup>544</sup> Suzuki Method, ref.

<sup>545</sup> Crussard, C. Pechiney Ugine Kuhlmann, Paris; J. Bouvaist, Pechiney Aluminum Research Center, Voreppe, ***Study of Certain Seemingly Abnormal Deformations***

---

**and Transformations of Metals**, A Translation of "étude de quelques de formations et transformations de Metaux", C. Crussard & J. Bouvaist, *Memoires Scientifiques Revue Metallurgie*, February 1978. Translation Reviewed and Edited by Herve de Maigret and Pamela Maigret, in cooperation with Charles Crussard of Pechiney Ugine Huhlmann of Paris, France, with Eugene Kovalenko and David Faust of the Eyring Research Institute, Provo, Utah, November 1978, revised after final review by Charles Crussard, March 1979.

<sup>546</sup> Castaneda, Carlos Tales of Power, ref/

<sup>547</sup> Brugh Joy, MD, Joy's Way, ref/ see also, Paramahansa Yogananda, Autobiography of a Yogi, ref/

<sup>548</sup> Don Graves, early 1900 meditation and hypnosis references. Applied Mysticism – Huston Smith ref/.

<sup>549</sup> Graves, D., "All hypnosis is self-hypnosis. Although facilitated by the hypnotist, the trance state is an internal event. The hypnotist may guide the client towards some desired outcome (quitting smoking, weightloss, or the uncovering of some hidden subjective pattern) but only the client can allow this to occur. The operative "can" here is a function of the client's willingness to move towards some desired outcome, otherwise he will not go. The hypnotist cannot take the client someplace he does not will to go. Therefore, and ultimately, all hypnosis is self-hypnosis."

<sup>550</sup> Neurolinguistic Programming, ref/

<sup>551</sup> Hooper, J., Teresi, D. "Would the Buddha Wear a Walkman?" ref.

<sup>552</sup> Boyd, D., Swami ref/ see also ref's Maharishi Mahesh Yogi, Rashnishi, Bagwan, etc.

<sup>553</sup> Smith, Huston, **World Religions** ref/

<sup>554</sup> Peck, Scott, MD., "Further Along the Road Less Traveled" notes on cults in Graves' universal religions materials ref/.

<sup>555</sup> Monroe, R. The Monroe Institute, ref/

<sup>556</sup> Tart, C. "Altered States of Consciousness", ref/

<sup>557</sup> Grof, S. Circular Breath, ref/

<sup>558</sup> Kundalini breathing techniques, ref/

<sup>559</sup> Joy, B. **Joy's Way**, ref., see also M. Crichton, "**Travels**," ref/ In his description of the process B. Joy refers to as "foundational work," Crichton attended a two week workshop at Joy's Sky High ranch, located in the high desert outside Lucerne, California. During the workshop, participants were gathered together in a specially designed room and seated in a circle on the deeply cushioned, carpeted floor. The room had been deliberately designed as a sound plenum, with the walls, ceiling and floor all engineered to function as tympanic membranes. Music of differing types was played at a volume gauged to be just below the pain threshold. Crichton reports that the effect of being exposed to music in this special environment was quite spectacular, inducing almost instantly altered states of consciousness which produced a wide range of experiences which can only be described as "ecstatic." Dr. Joy is no longer conducting these workshops and, as of this writing, it appears that no one has taken up the continuation of his ground breaking work.

<sup>560</sup> Hatha Yoga meditative postures, ref/

<sup>561</sup> MacMoneagle, J. **Remote Viewing** ref/

<sup>562</sup> Hooper, J., Teresi, D. **Would the Buddha Wear a Walkman?** ref.

<sup>563</sup> Burroughs, W. **Naked Lunch** ref/

<sup>564</sup> W. Burroughs, "**Dream Machine**" ref/

<sup>565</sup> Hooper, J. loc.cit.

<sup>566</sup> metaphysics-based college courses, ref/

### **Appendix Two**

<sup>567</sup> T. Bearden, *Fer de Lance*. "Specifically, we have identified some flaws in vector mathematics itself, particularly with the concept of the zero force vector. The zero force vector is a system of forces that sum to a zero resultant. Hence the components of the summation represent a patterned stress in the medium to which they are applied, or in which they are imbedded. This includes the vacuum (spacetime) medium. In classical electromagnetics, this vacuum stress due to a zero-vector summation of EM force fields has been totally omitted and ignored.

As such, the EM "zero" force-vector summation produces a "trapped internal EM flux and flux pattern, without resultant (external) force field" condition -- precisely as does the Aharonov-Bohm effect. The components of the artificially zeroed system, however, can be transmitted and still maintain their special relationship and coherence. While the AB effect has been shown to hold for the mesoscale (a few thousands of angstroms), the zero-vector scalar EM effect can hold for hundreds of thousands of kilometers.

To provide a unified electrogravitation, we adapt Kaluza-Klein 5-dimensional gravitational concepts to the idea of the zero-vector stress system in vacuum-spacetime. We also point out how simultaneously varying the magnitudes of the force components of a stress, all in phase, produces a stress wave or scalar EM wave. Scalar waves are almost always absorbed and emitted by the nucleus of the atom, not by the electrons in orbit.

The relationship of mass and vacuum, and the constitution of the vacuum, are pointed out from the viewpoint of modern quantum mechanics.

How a scalar wave resonance differs from conventional EM resonance is developed briefly. Mass and inertia are the direct result of -- and are -- trapped scalar resonance. The trapping mechanism is the spin of the particle.

Severely limiting assumptions in ordinary general relativity (OGR) are pointed out. In OGR, it is assumed that the local frame is always a Lorentz frame, and never curved. In other words, local spacetime is always assumed to be flat. This saves the conservation laws, simplifies relativity, and reduces "general" relativity to special relativity with distant perturbations and curvatures.

By removing this ad hoc assumption, a much richer local general relativity results. This local general relativity is readily engineered. Note that in OGR, the physicist has actually assumed that he can never "engineer" local general relativity! Indeed, with the scalar EM approach, he can easily do so, in contradiction to what is taught in all Western universities.

By engineering a local general relativity (LGR), the individual conservation laws can be violated locally. This includes the conservation of energy/momentum, and the conservation of charge, for example.

The major implication of this startling new engineering physics is that one can engineer physical reality itself. For example, elements can be transmuted with minuscule energy input, free energy devices are possible, action at a distance is possible, communication faster than light speed is possible, etc.

By using the zero-vector approach, the virtual state can be organized and made largely deterministic, rather than statistical. This means that the probabilities of the states propagated forward by the Schroedinger equation can be engineered and changed. Whether or not a certain quantum change shall emerge or not can be determined or substantially influenced in advance. Bohm's hidden variable theory now becomes

directly engineerable. This is a drastic change to quantum mechanics and physics in general.

Another implication is that this is the final engineering, for it allows the direct engineering of physical reality itself. Humans must now find a way to resolve their differences peacefully, or shortly Man will destroy himself and his biosphere by his own hand."

<sup>568</sup> S-X Jin, LENT ref

<sup>569</sup> S-X Jin, HDCC papers. ref.

<sup>570</sup> This is a significant element of the HDCC concept. Conventional nuclear particle accelerators operate at 3.5-5.0 million electron volts to propel protons and neutrons towards a target. Electrons, however, can be propagated at the same velocity using 2.5 KeV, which is 1,000 times less voltage. Because of the nature of SIA's, the same voltage is used to propel  $10^{11-12}$  electrons as for just one. When the toroids comprised of electrons in a SIA capture free positively charged protons from a proton-rich environment [such as Deuteride gas], the protons are accelerated to the same speed as the cloud of electrons without loss of momentum. In this way, heavy hadronic particles can be accelerated to significant velocities with significant energy efficiencies.

<sup>571</sup> H. Puthoff HDCC patent, ref.

<sup>572</sup> P. Ilyanuck HDCC device descriptions, JNE ref.

<sup>573</sup> Prof. Mesyats HDCC device descriptions, JNE ref.

<sup>574</sup> JNE Proceedings, August 1998, ref/

<sup>575</sup> ref. Avogadro's number – John Gribbin ref/

<sup>576</sup> Bak, P., *How Nature Works*, ref/

<sup>577</sup> Santilli, R., *Hadronic Mechanics*, loc. cit.

<sup>578</sup> Jin, S-X, lithium residues in hdcc-treated solutions. In common terms, what appears to be happening during this process is that the SIA's capture positively charged protons and impact the nuclei of radioactive materials [such as spent nuclear fuel pellets in Zirconium casings or Thorium-enriched Uranium waste concentrated in liquid form] at 10% light speed. As a result of the impact, the nuclei of the waste material are temporarily banged apart, liberating copious quantities of heat and light. Immediately thereafter, free floating protons, neutrons and electrons recombine to form more stable elements. For example, radioactively inert Lithium is a material commonly found in predominant quantities following extended HDCC bombardment of radioactive Thorium in solution.

<sup>579</sup> What also appears to be happening in this process is that the atomic structure of the Thorium in solution is modified to that of another isotope of Thorium with a half-life of less than two hours. Within less than two hours after being treated, the solution becomes essentially non-emitting.

<sup>580</sup> see JNE CD-ROM demonstration and accompanying research data, ref/

<sup>581</sup> Buckey Balls, ref/

<sup>582</sup> Energy Generation ref/s, esp. T.E. Bearden, 2001 Conference Report, Using Scalar Waves to Extract Energy From the Physical Vacuum, ASDS, etc.

<sup>583</sup> CNES - Comprehensive National Energy Strategy, U.S. Dept. of Energy, April, 1998, DOE/S-0124, (National Energy Policy Plan) available at <http://www.hr.doe.gov/nesp/cnes.html>.

<sup>584</sup> Integrity Research Institue, ref/

<sup>585</sup> Worldwatch Institute - Brown, Flavin, French, *State of the World 1999*, W.W. Norton & Co., New York.

<sup>586</sup> Hathaway, P. Graneau and N. Graneau, "Solar Energy Liberation from Water by Electric Arcs," *Jouranl of Plasma Physics*, vol. 60, part 4, page 775-786.



- 
- <sup>587</sup> P. Brown, "Betavoltaic Batteries" and "Effective Radioactive Waste Remediation," Proceedings of the First International Conference on Future Energy, Proceedings of COFE, pp 19 & 123, Integrity Research Institute, 1999, ISBN: 0-9641070-3-1.
- <sup>588</sup> Shang-Xian Jin, "Characteristics of High Density SIA's: A Theoretical Model," *Journal of New Energy*, vol. 1, no. 4, Winter 1996, pp 5-20.
- <sup>589</sup> D. Wallman, "Carbon Arc Gasification of Biomass Solutions," Proceedings of COFE, p. 30.
- <sup>590</sup> R. Santilli, **PlasmaArcFlow™ Technologies, Santilli's Liquid MagneCules™, Santilli's Magnegas™**, see <http://www.santillimagnegas.com/technology/patent.htm>.
- <sup>591</sup> G. Miley, "Emerging Physics for a Breakthrough Thin Film Electrolytic Cell Power Unit," AIP Conference Proceedings, #458. STAIF 1999, p. 1227-31.
- <sup>592</sup> Hockaday, R. thin film technologies, ref/
- <sup>593</sup> D. Chung, SUNY Buffalo, 608 Furnas Hall, Buffalo, NY 14260
- <sup>594</sup> P. Correa, "Excess Energy Conversion System Utilizing Autogenous Pulsed Abnormal Glow Discharge," Proceedings COFE, p. 150 (Labofex Laboratory, Concord, Ontario)
- <sup>595</sup> H. Puthoff, D. Cole, "Extracting Energy and Heat from the Vacuum," *Physical Review Ek*, vol. 48, no. 2. August 1993

### **Appendix Three**

- <sup>596</sup> Antoine Priore, T.E. Bearden reports ref.
- <sup>597</sup> CDCC notes on Hepatitis C/ Robert Pennington ref's.
- <sup>598</sup> Bearden, T.E., telemerase repair techniques, ref's.
- <sup>599</sup> suppressed inventions, cures and technologies, ref's.
- <sup>600</sup> One strongly points out the relevance of Dr. Robert Becker's epochal experiments proving that cells can be dedifferentiated and redifferentiated electrically. Those experiments are strong indicators that the cancer cell should be capable of being reverted to its more primitive state—that of the normal cell—by electromagnetic means.
- <sup>601</sup> Excerpted from **AIDS - BIOLOGICAL WARFARE** by Lt. Col. T.E. Bearden (retd.), 1988 Copyright. *The Priore Machine and Phase Conjugation: A Non-Technical Description of the Priore Process.*

### **Y-Bias & Angularity**

- <sup>602</sup> Bak, Per, ***How Nature Works***, Springer-Verlag (New York @ Copernicus) 1996.
- <sup>603</sup> Ayres, D., Y-Bias and Angularity, ref.
- <sup>604</sup> Ayres, ibid
- <sup>605</sup> Bak loc.cit.
- <sup>606</sup> Physical Vacuum – definition [QED, SED]
- <sup>607</sup> Zero Point – definition [ $10^{-33}$  cm, Planck distance ***h*** + Planck unit of time ***t***]
- <sup>608</sup> Prigogine, I., Stengers, I., ***Order Out of Chaos: Man's New Dialogue With Nature***, Bantam, New York (April 1984) ISBN 0-553-34082-4.
- <sup>609</sup> Bak, ibid
- <sup>610</sup> Ayres Y-Bias/Angularity files, ref.
- <sup>611</sup> Prigogine, I., Stengers, I., ***Order Out of Chaos: Man's New Dialogue With Nature***, Bantam, New York (April 1984) ISBN 0-553-34082-4.
- <sup>612</sup> **AUTOPOIESIS** = the process whereby an organization produces itself. An autopoietic organization is an autonomous and self-maintaining unity which contains component-

---

producing processes. The components, through their interaction, generate recursively the same network of processes which produced them. An autopoietic system is operationally closed and structurally state determined with no apparent inputs and outputs. A cell, an organism, and perhaps a corporation are examples of autopoietic systems. See [allopoiesis](#). (F. Varela) Literally, self-production. The property of [systems](#) whose components (1) participate recursively in the same [network](#) of productions that produced them, and (2) realize the [network](#) of productions as a [unity](#) in the space in which the components exist (after Varela) (see [recursion](#)). Autopoiesis is a process whereby a system produces its own [organization](#) and maintains and constitutes itself in a space. E.g., a biological cell, a living organism and to some extent a corporation and a society as a [whole](#). ([krippendorff](#))

<sup>613</sup> Entropy – definition sources, ref.

<sup>614</sup> Kafatos, M., Nadeau, R., ***The Conscious universe***, by, (1990) Springer-Verlag New York, Inc . See also Alfred Korzybsky, ***Science and Sanity: an Introduction to Non-Aristotelian Systems and General Semantics*** (1995) 5<sup>th</sup> Edition, Institute of General Semantics. See also J. Campbell, ***Grammatical Man: Information, Entropy, Language and Life***, Simon & Schuster, New York (1982).

<sup>615</sup> Dr. Tom Bearden, President of the Society of Distinguished Scientists in the United States.

<sup>616</sup> Ref Gisin et al

<sup>617</sup> Ref. Poponin et al

<sup>618</sup> Ref. Plotknov et al

<sup>619</sup> Ref. Aspect et al ; see also Drexler University @Faust et al ; see also Eyring Research Institute [Spoon Bending Studies] ref.

<sup>620</sup> Ref. Wheeler et al

<sup>621</sup> Nimtz et al, Yang et al, Hodowanec et al

<sup>622</sup> King et al

<sup>623</sup> Ref. Shpilman et al. See also Langmuir's Hydrogen recombinant energy differentials.

<sup>624</sup> Langmuir, I., ***Hydrogen Atom EMF Behaviors***, ref: see also, ***Armagnac***, A.P., ***Magic With Magnetism***, Popular Science, June 1944.

<sup>625</sup> Santilli, Il Grande Grido, ref. See also Prof. Ruggero Maria Santilli

CV at <http://www.i-b-r.org/santilli.htm>

President and Editor in Chief

INSTITUTE FOR BASIC RESEARCH

Algebras, Groups and Geometries

Hadronic Journal

Hadronic J. Supplement

35246 US 19 North, # 215

Palm Harbor, FL 34684, U.S.A.

Tel. +1-727-934 9593

Mob. +1-727-421 7976

Fax +1-727-934 9275

E-address <ibr@gte.net>

Web sites

<http://www.i-b-r.org>

<http://www.neutronstructure.org> <http://www.nuclearwasterecycling.com>

<http://www.magnegas.com>

<http://www.hadronicpress.com>

<http://www.i-b-r.org/ir00006.htm>

<sup>626</sup> Why Constants of Nature May Be Changing, 25Nov03, Northeastern Univ.

<sup>627</sup> Evans, M. et al, Reformulation of Maxwell's Electrodynamics, ref

<sup>628</sup> Melehey, M., reformulation of the Laws of Thermodynamics, ref

<sup>629</sup> Santilli, R., reformulation of Hadronic Mechanics, JNE ref

<sup>630</sup> Poponin, ibid. Also Aspect, ibid. Also, Wheeler, ibid. Also, Gisin, ibid. See also D. Faust/ Drexler University Karen Gersten Effects.

<sup>631</sup> Crussard, C., Pechiney Ugine Kuhlmann, Paris; J. Bouvaist, Pechiney Aluminum Research Center, Voreppe, ***Study of Certain Seemingly Abnormal Deformations and Transformations of Metals***, A Translation of "etude de quelques de` formations et transformations de Metaux", C. Crussard & J. Bouvaist, "Memoires Scientifiques Revue Metallurgie", February 1978. Translation Reviewed and Edited by Herve de Maigret and Pamela Maigret, in cooperation with Charles Crussard of Pechiney Ugine Huhlmann of Paris, France, with Eugene Kovalenko and David Faust of the Eyring Research Institute, Provo, Utah, November 1978, revised after final review by Charles Crussard, March 1979. From the introduction,

*"...Thus, the selection which we are presenting is the result of a lengthy and rigorous screening process. In only 20 of 150 test samples which [were] deformed or transformed in front of us or our collaborators, could we positively confirm the "abnormal" nature of the effects observed. In this report, we will describe eight of the most important cases. It must be pointed out that a majority of the tests which were eliminated were most certainly valid. We used a very strict screening process in eliminating the demonstrations which did not follow a pre-defined protocol. Other tests with extensometric gauges will be published later.*

*Thus, our concern for rigor led us to eliminate some rather remarkable observations concerning deformations at a distance, deformations of objects or test samples in the hands of observers who were above any suspicion, or those held on one side by J.P. Girard and on the other by an observer. The tests which will be described were conducted under our responsibility with the authorization of Pechiney-Ugine-Kuhlmann."*

This is the forward to the definitive report, published and prepared by the Eyring Research Institute, accompanied by extensive film footage taken under rigorously controlled conditions, which describes the use of human consciousness alone to deform, transform and exert other measurable effects on both metallic and non-metallic substances, at a distance. While portions of the study remain classified, the report referred to here has never been classified by the United States Government. Our thanks to David Faust for providing this publicly available information.

<sup>632</sup> Radin, D., ***The Conscious universe***, ref.

<sup>633</sup> Ref. Bearden etal

<sup>634</sup> Ref. Bohm etal implicate order, Goedel's inequality principle

<sup>635</sup> ibid Gisin/ CERN

<sup>636</sup> V. Poponin, "Phantom DNA Effects," ref.

<sup>637</sup> Ref. Plotnikov – the physics of gravity

<sup>638</sup> Anastasovski etal, quantum gravitational effects, geometrized field forces

<sup>639</sup> Gisin, ibid. Nimtz, ibid. Wang, ibid. Hodowanec, ibid.

<sup>640</sup> The newest study was led by Roberto Ragazzoni of the Astrophysical Observatory of Arcetri, Italy and the Max Planck Institute for Astronomy in Heidelberg, Germany. Ragazzoni told SPACE.com the expected quantum effect is like a subtle version of the blurring caused by Earth's atmosphere, which makes stars twinkle.

<sup>641</sup> Ref. Ragazzoni article

<sup>642</sup> Ref. Lieu etal

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

- 
- <sup>643</sup> Ref. Plotnikov – the physics of gravity
- <sup>644</sup> Observed variations in C, refs. Also, reduction of C to 40 mph at Cal Tech, ref.
- <sup>645</sup> mitigation of B field effects, refs.
- <sup>646</sup> Soviet M-2 experiments, ref. Nimtz experiments, ref. Wang et al, Princeton, refs. Hodowanec gravimetric sensors, ref.
- <sup>647</sup> Aspect, Wheeler, Drexler Univ., refs
- <sup>648</sup> Anastasovski et al, quantum gravitational effects, geometricized field forces
- <sup>649</sup> P.Bak, *ibid*.
- <sup>650</sup> *ibid* Bak et al
- <sup>651</sup> Bak, P., *ibid*. pp 160-164. "Only fools, charlatans and liars predict earthquakes." Richter (father of the Gutenberg-Richter Law and the Richter Scale for measuring earthquake magnitudes).v
- <sup>652</sup> Bak, P., *ibid*.
- <sup>653</sup> Wheeler, J.A., ***Einstein's Vision***, Springer-Verlag, 1968, page 112. See also A. Dolgov, Yu. Zel'dovich, M. Sazhin, Cosmology of the Early universe, **MGU Publ.**, Moscow 1988, page 200 (in Russian). See also M. Lavrent'ev et al, On Remote Action of Stars on Resistor, **Doklady AN SSSR**, 1990, vol 314, no 2, page 352 (in Russian). See also A. Pugach, A. Akimov, "Astronomical Observations by N. Kozyrev's Methodology: Preliminary Results," in the press (in Russian).
- <sup>654</sup> Flyvbjerg, H. Sneppen, K. and Bak, P. ***Mean Field Theory for a Simple Model of Evolution***. *Physical Review Letters*, 71 (1993) 4087. See also, Sheldrake, R., ***Seven Experiments That Could Change The World: A Do-it Yourself Guide to Revolutionary Science***, Riverhead Books, Inc. NY (1995) ISBN: 1-57322-14-0.
- <sup>655</sup> Capra, F., ***The Turning Point: Science, Society and the Rising Culture***. Bantam/Simon & Schuster, New York (1982).
- <sup>656</sup> F. Capra, ***Turning Point***, ref
- <sup>657</sup> Wilcock, D. Personal Notes: "Consider the Nineveh Constant, discovered by NASA scientist Dr. Maurice Chatelain – where all the planets' orbits are some form of harmonic division of a master time cycle of roughly 6.5 million years, or 70 multiplied seven times by 60 in seconds. (Vol. 3, Convergence, Divine Cosmos.) The second, as a time quantum, is a basic "beat" frequency of the universe, whose macroscopic structures are the byproduct of harmonic oscillation of the PV, creating stable fields that appear as nested, rotating spheres (i.e. the planetary orbits) with Platonic geometries that are formed by the vibrational nodes on the surface of each sphere – thus explaining many different geometric phenomena I have explored at all levels of scale. Consider Roschin and Godin's replication of the Searl Effect and the nested magnetic spheres that were detected when it was in operation as one of many examples showing these fields at work. I also have yet-unpublished data showing these nested spheres emerging as zones of redshift variance (correlated with PV density levels by Aspdén) in galaxies. It appears that the in-progress interplanetary climate change I am documenting is a byproduct of our entrance into a higher density of PV in the galaxy, causing a moment of "punctuated equilibrium."
- <sup>658</sup> Mandelbrot, B., ***Fractal Geometry of Nature***, WH Freeman & Co., (August 1988) ISBN: 07 16711869.
- <sup>659</sup> Bearden, "The Source Charge Problem: Its Solution and Implications"
- <sup>660</sup> Timothy H. Boyer, "The Classical Vacuum", **Scientific American**, pp.70-78, August 1985.
- <sup>661</sup> Robert Matthews, "Nothing like a Vacuum", **New Scientist**, p. 30-33, 25 February 1995.
- <sup>662</sup> P. W. Milonni, ***The Quantum Vacuum: An Introduction to Quantum Electrodynamics***, Academic Press, New York, 1994.

<sup>663</sup> Timothy H. Boyer, "Random Electrodynamics: The theory of classical electrodynamics with classical electromagnetic zero-point radiation", **Physical Review D**, Vol. 11:4, pp.790-808, 15 February, 1975.

<sup>664</sup> Mikel Bowuer, "Vacuum Energy, Problems and Perspectives," **About-Nature.net**

<sup>665</sup> Casimir Effect, ref.

<sup>666</sup> B. Haisch, A. Rueda, and H. E. Puthoff, "Physics of the Zero-Point Field: Implications for Inertia, Gravitation and Mass", **Speculations in Science and Technology**, Vol. 20, pp. 99-114, 1997.

<sup>667</sup> Bearden, T., **Fer de Lance: Vector Mathematics Has a Fundamental Problem**. 2<sup>nd</sup> ed. 2002

In the physical case, several changes to the axioms of abstract vector mathematics are required. (1) the "potential" of a vector zero must be taken into account, such as is represented by the sum of the squares of the magnitudes of its vector components. (2) the specific deterministic pattern of the vector components comprising the zero must be taken into account. (3) The dynamic variation in both the deterministic directions and deterministic magnitudes of the components and of the overall pattern must be taken into account. (4) Frequencies of the changes in the direction, magnitude, and actual makeup of the vector zero must now be accounted for. That is, time and wavelengths are rigorously aspects of the vector zero, and these may be deterministic variables. Since time itself is now a variable aspect of the vector, the vector zero system can affect its "rate of time flow" in the observer's system. (5) Since a "reference vector zero" can be established at any point of a vector magnitude, then individual vectors themselves may have dynamic substructures inside a special "zero reference" in and on the vector. The patterned potential of a vector is a reality.

This leads to a system of "vectors nested inside vectors" ad infinitum. In other words, it leads to an infinite-dimensional system, and the "opening" of every finite closed vector system through its vector zeroes.

<sup>668</sup> <http://www.enterprisemission.com/moon6.htm>

<sup>669</sup> In 1959, Aharonov and Bohm published a fundamental paper in Physical Review which pointed out the QM implications of potentials as the real entities, while force fields were derived effects. They showed that, even in the presence of zero EM force fields, the potentials may still exist and produce real effects in physical systems. They also suggested experiments to prove these predictions.[from Bearden's "**Fer de Lance**]

<sup>670</sup> E. T. Whittaker, "On the Partial Differential Equations of Mathematical Physics," Mathematische Annalen, Vol. 57, 1903, p. 333-355; --- "On an Expression of the Electromagnetic Field Due to Electrons by Means of Two Scalar Potential Functions," Proc. Lond. Math. Soc., Series 2, Vol. 1, 1904, p. 367-372

<sup>671</sup> Van Flandern, Analogy ref.

<sup>672</sup> On the Expression of the Electromagnetic Field due to Electrons by Means of Two Scalar Potential Functions, by E.T.Whittaker, 1903, Published in Proceedings of the London Mathematical Society, Vol.1, 1904, p.367-372. Also it is included in Annex C, Gravitobiology, T.E.Bearden, p. c-1.

<sup>673</sup> Gravitobiology, by T.E.Bearden, 1991, Tesla Book Company, P.O.Box 121873 Chula Vista, CA 91912, USA. Library of Congress Catalog Card Number 86-50553.

<sup>674</sup> Bearden, **Gravitobiology**, ref.

<sup>675</sup> Frolov, A.V., **Report on the International Conference "New Ideas in Natural Sciences"**, St. Petersburg, June, 1996.

<sup>676</sup> Frolov, A.V., *ibid*.

<sup>677</sup>[http://www.cheniere.org/techpapers/Fact\\_Sheets/Fact%20Sheet%20-%20Source%20Charge%20Problem10.doc](http://www.cheniere.org/techpapers/Fact_Sheets/Fact%20Sheet%20-%20Source%20Charge%20Problem10.doc)

- 
- <sup>678</sup> Wheeler, J.A. **Einstein's Vision**, Springer-Verlag, 1968, page 112. See also A. Dolgov, Yu. Zel'dovich, M. Sazhin, Cosmology of the Early universe, **MGU Publ.**, Moscow 1988, page 200 (in Russian). See also M. Lavrent'ev et al, On Remote Action of Stars on Resistor, **Doklady AN SSSR**, 1990, vol 314, no 2, page 352 (in Russian). See also A. Pugach, A. Akimov, "Astronomical Observations by N. Kozyrev's Methodology: Preliminary Results," in the press (in Russian)
- <sup>679</sup> Santilli, R. *Il Grande Grido: A Cry in the Wilderness* loc.cit.
- <sup>680</sup> **"Inclusive Jet Cross Section in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.8\text{TeV}$ ,"** F. Abe et al., The CDF Collaboration, FERMILAB-PUB-96/020-E. Submitted to *Phys. Rev. Lett.* January 24, 1996 -- Abstract, Paper
- <sup>681</sup> R. Santilli, loc. cit.
- <sup>682</sup> **The New Maxwell Electrodynamics Equations: New Tools for New Technologies.** A Collection of 60 papers from the Alpha Foundation's Institute for Advanced Study. *Journal of New Energy*, Winter (1999) ISSN: 1086-8259
- <sup>683</sup> L.B. Crowell, "Quantum Electrodynamics of NonAbelian Electrodynamics in a Cavity," *Journal of New Energy*, Volume 4 No.2, page 70-81, (Summer 1999).
- <sup>684</sup> Akimov, A.E., Finogenov, V."P Experimentainiya Proyavleniya Torsionnykh Polei i Torsionnye Tekhnologii" ("Experimental Manifestations of Torsion Fields and Torsion-Based Techniques"), Moscow: **NTTs** "Informatekhnika," 1996, 68 pages, published by Sci-Tech Center "Informatekhnika." (in Russian).
- <sup>685</sup> Swartz, M.R. "Generality of Optimal Operating Point Behavior in Low Energy Nuclear Systems," **Journal of New Energy**, Vol. 4, No. 2, pp. 218-229.
- <sup>686</sup> Anastasovski, P.K., Benson, T.M. **Quantum Mass Theory Compatible With Quantum Field Theory**, Nova Science Publishers, Inc. (1995) ISBN: 1.56072-157-X.
- <sup>687</sup> Trefilov, A. et al I.N. Frantsevich Institute For Problems of Materials Science, Anthopos Files ref/
- <sup>688</sup> Reed, D. "Torsion Field Research and Implications for New Physics and Energy Technologies," **Journal of New Energy**, Vol. 4, No. 2, pp 151-164 (Summer 1999).
- <sup>689</sup> Santilli, R., *Il Grande Grido*, loc.cit.
- <sup>690</sup> Iooss, G., Traveling Waves in the Fermi-Pasta-Ulam Lattice, in *Nonlinearity*, Vol. 13, No. 3, 2000, pp. 849-866 (18), Institute of Physics Publishing. **Abstract:**

We consider travelling wave solutions on a one-dimensional lattice, corresponding to mass particles interacting nonlinearly with their nearest neighbour (the Fermi-Pasta-Ulam model). A constructive method is given, for obtaining all small bounded travelling waves for generic potentials, near the first critical value of the velocity. They all are given by solutions of a *finite-dimensional reversible ordinary differential equation*. In particular, near (above) the first critical velocity of the waves, we construct the *solitary waves* (localized waves with the basic state at infinity) whose global existence was proved by Friesecke and Wattis, using a variational approach. In addition, we find other travelling waves such as (a) a superposition of a periodic oscillation with a non-zero uniform stretching or compression between particles, (b) *mainly localized waves* which tend towards a uniformly stretched or compressed lattice at infinity, (c) *heteroclinic solutions* connecting a stretched pattern with a compressed one.

- <sup>691</sup> Young-Mills Equations, ref.
- <sup>692</sup> Akimov, A.E., "An Heuristic Discussion of an Issue of a Discovery of New Long Distance Interactions," **EGS-Concepts. MNTC VENT**, pre-print N7A, page 63 (in Russian); Akimov, Shipov, "Torsion Fields And Their Experimental Manifestations," *Journal of New Energy*, Vol. 2, No. 2, page 68, Summer 1997.
- <sup>693</sup> Dubrovsky, V. "Elastic Model of a Physical Vacuum," **DAN USSR**, vol 282, no 1, 1985 (in Russian).
- <sup>694</sup> Nimtz, G. **Superluminal Signal Velocity**, *Annalen der Physik* **7**, 618 (1998); see also G. Nimtz, W. Heitmann, **Superluminal Photonic Tunneling and Quantum Electronics**, *Progress in Quantum Electronics*, vol. 21, 81 (1997); see also, A. Enders,

G. Nimtz, "Photonic Tunneling Experiments," **Physics Review**, B 47, 9605 (1993) regular paper; see also, A. Enders, G. Nimtz, **On Superluminal barrier Transversal, Journal of Physics (France)**, vol. 2, at pp. 1693 (1992); see also, G. Nimtz, A. Enders, H. Spieker, **Photonic Tunneling Experiments: Superluminal Tunneling**, Trani Workshop, 24-30 September 1992, Waves and Particles in Light and Matter. A.v.d. Merwe and A. Garuccio (eds.), Plenum Press, NY (1994).

<sup>695</sup> G. M. Wang, E. M. Sevick, Emil Mittag, Debra J. Searles, and Denis J. Evans, "Experimental Demonstration of Violations of the Second Law of Thermodynamics for Small Systems and Short Time Scales," *Phys. Rev. Lett.*, 89(5), 29 July 2002, 050601. The authors experimentally demonstrate some new results for the integrated transient fluctuation theorem, which predicts appreciable and measurable violations of the second law of thermodynamics for small systems over short time scales. Entropy consumption is experimentally demonstrated over colloidal length (micron size) and time scales for up to two seconds. (We point out that a cubic micron of water, e.g., contains some 30 billion molecules. So this is an appreciable effect indeed, having very powerful implications for chemistry, and it has been surprising to most physicists).

<sup>696</sup> Associated Press, Light Can Break Its Own Speed Limit..., July 20, 2000.

<sup>697</sup> Bunin, V.A. "Newest Issues of Gravitation in the Light of Classical Physics," **Proceedings 4<sup>th</sup> Astro-Geological Meeting Geographical Society of AS USSR**, L. 1962, page 88 (in Russian). See also V.A. Bunin, "Unitary Electra-Gravitation Equations of Mathematical Physics," Auto-repherates of speeches in the section entitled MOIP, 1965, no 1, p 4 (in Russian).

<sup>698</sup> Quantum Fields, LLC – Press Releases. Current NASA news is found at <http://www.grc.nasa.gov/Doc/news.htm>. On August 19, Quantum Fields, LLC, received word from NASA that their proposal submitted to the breakthrough propulsion physics program was selected for funding. A copy of the press release follows, along with a link to a summary of the proposal. See the URL at <http://www.quantumfields.com/EPRproject.htm>.

(2) Jordan Maclay (Quantum Fields, LLC) Richland Center, WI) and MEMS Optical, Inc. (Huntsville, AL) proposed an experimental and theoretical study of quantum vacuum energy. The experiments will use micro-electromechanical devices to test force and energy effects by quantum electrodynamics.

#### FEASIBILITY OF COMMUNICATION USING QUANTUM CORRELATIONS

For all space missions, it is imperative to have reliable communication links to transmit data, computer codes, or other information. The current electromagnetic communications technologies (including laser, RF, X band, S. band) do not scale well as the mission distance increases. With current methods, the power, weight, cost and complexity increase rapidly with distance, while the transmission reliability decreases. We propose to explore the possibility of a revolutionary approach to communications based on recent theoretical and experimental developments in quantum physics, in particular based on quantum correlations between entangled atoms or ions (EPR pairs). Recent experiments have verified the existence of quantum correlations between entangled atoms photons, in which the polarization measurement of one photon is always correlated with the measured polarization of another, distant photon (*this is a specific reference to the work of Nicolas Gisin and his team at CERN, Geneva*). Theory indicates it is not possible to use standard quantum mechanical measurements on entangled systems, such as polarization correlations of photons, for communications. Current theory restricts but may not deny the possibility of using quantum mechanical correlations in small movements or adiabatic perturbations of entangled atoms as a communication means. Further, if non-linear modifications to quantum mechanics suggested by Nobel Laureate S. Weinberg are present, then EPR



communications is clearly allowed. If experiment verified that the use of EPR pairs was viable, it should be possible to develop an almost ideal communications system, a compact, low weight, communication architecture in which no broadcast power or antenna is required, no environmental noise is present, the signal does not fall off as the inverse square of the distance, and high data rates with complete security are possible. The purpose of this effort is to investigate the possibility of using quantum correlations in the adiabatic movements of atoms as a means of communication, to perform an initial theoretical feasibility analysis, identifying the key issues with such an approach, and to propose an experiment to resolve some of the fundamental questions.

- <sup>699</sup> Ramsay, B. "Generic Gravity Wave/ Scalar Detector," ***Journal of New Energy, Proceedings of the 5<sup>th</sup> INE Symposium***, Vol.4, No. 2, Summer 1999, pp 148-150.
- <sup>700</sup> Hodowanec, G. ***Hodowanec's Rhysmonic Cosmology***, a collection of notes, papers and articles authored by G. Hodowanec, reflecting some of the theoretical and experimental findings, as well as the 1985 monograph ***Rhysmonic Cosmology***. Available c/o B. Ramsay Publisher, 563 29 ¼ Road #3, Grand Junction, Colo, 81504, (970)241-5863. See also Bill Ramsay, "Fixed Rate Scanning, Enigma or Research Tool?", unpublished paper August 1997. See also, Bill Ramsay, "Exploring the Aethers: Adventures Inspired by Hodowanec's Discoveries," ***Proceedings of the International Symposium on New Energy***, Denver, Colorado, May 12-15, 1994
- <sup>701</sup> Pert, C. "***Molecules of Emotion***", ref.
- <sup>702</sup> Fiorenza, Nick Anthony "Gravitational Wave and Planetary Correspondence," Argo Navis, Inc., 288 Bluff St. Suite 474, Boulder, Colorado, 80301, 1994. See also Alastair, "Measuring Gravity," 181 Star Route, Hana, Hawaii, 96713. See also [aquarius@t-link.net](mailto:aquarius@t-link.net).
- <sup>703</sup> Matveyenko, L.I. "Visible Superlight Speeds of Components Scattering Extra-Galactic Objects," ***UPhN***, 1989, vol. 140, no. 3, p 469 (in Russian).
- <sup>704</sup> Hameroff, S. et al, "Tubulin Dimers" ref/
- <sup>705</sup> Akimov, Shipov et al, "Torsion Fields And Their Experimental Manifestations," ***J. New Energy***, vol 2, no 2, page 72, 1997.
- <sup>706</sup> Yurth, D. ***The Anthropos Files*** loc.cit.
- <sup>707</sup> Akimov, Shipov et al, "Torsion Fields And Their Experimental Manifestations," ***J. New Energy***, vol 2, no 2, page 74, 1997.
- <sup>708</sup> Akimov, A.E. "Torsion Communications of the Third Millennium," Papers of the International Conference "Modern Telecommunication Technologies", Moscow, May 1995 (Russian). See also A. E. Akimov, G.I. Shipov, "Torsion Fields and Their Experimental Manifestations," ***Journal of New Energy***, Vol.2No2. 1997 @ page 78.
- <sup>709</sup> Akimov, Shipov et al, "Torsion Fields And Their Experimental Manifestations," ***J. New Energy***, vol 2, no 2, page 72, 1997.G.
- <sup>710</sup> Convegno Internazionale: "Quale Fisica per 2000?" Bologna, 1991. See also D. Yurth, ***Anthropos Files***, ibid.
- <sup>711</sup> Yurth, D., ***The Anthropos Files***, ref.
- <sup>712</sup> Super capacitors, ref. found at <http://www.esma-cap.com/?lang=English>
- <sup>713</sup> Akimov, A.E., Binghi, V. "Homeopathy, Quantum Physics and Torsion Fields," ***Proceedings of the Congress of the International Homeopathic Association***, Kiev, Sept. 25-29, 1991, page 143 (in Russian). See also V. Binghi, "Induction of Metastable States of Water within the Framework of Torsion Field Concepts," ***CISE VENT***, 1991, preprint no 3, page 35. (in Russian).
- <sup>714</sup> Harvalik, Z.V. ***The American Dowser***, 1973, vol 13, no 3, page 85, 87. See also D. Chadwic, L. Jensen, ***Utah Water Research Lab., College of Engineering, Utah State Univ.***, Logan, 1971, page 120. See also S.W. Tromp, "Experiments on the Possible Relationship Between Soil Resisting and Dowsing Zones," ***Oegatgeest***, 1956.



- 
- <sup>715</sup> The frequency signature of the Hepatitis-C virus was mapped using infra-red spectrometry, a specially designed scalar interferometer and MRI technologies. The complex waveform which is mutually exclusive to the Hep-C virus was then fed into a desktop computer and converted to a waveform which was its phase conjugated opposite. The resulting waveform information was then fed to a NL2 fieldt generator which was used to irradiate a .5% molal solution of NaCl (Ringer's) for a period of 30 minutes. The ionic salt solution emitted a phase conjugated signal when fed into the patient's system. The solution was infiltrated into the vascular system of 15 patients diagnosed with advanced cases of Hep-C. After 30 days of three-times-per-week treatment, 14 of the 15 patients were diagnosed as being completely free of any sign of infection. The 15<sup>th</sup> patient died during treatment from complications arising from an extremely advanced, chronic case of the disease. The technology is now being tested under double blind protocols by Dr. Robert Pennington and virologists at the Baylor University Medical Center.
- <sup>716</sup> Sciama, D.W. "The Physical Structure of General Relativity," *Rev. Mod. Phys.*, 1964, no 36, page 463. See also D. Ivanenko, P. Pronin, G. Sardanashvilli, *Calibrating Gravitation Theory*, *BGU Publ.*, Moscow, 1985, page 143 (in Russian). See also Ya Zeldovich, "Interpretation of Electrodynamics as Consequences of Quantum Theory," *Pisma v. ZhETF*, 1967, vol6 no 10, page 922 (in Russian). See also A. Sakharov, *Vacuum Quantum Fluctuation in Curved Space and the Gravitation Theory*, *DAN*, 1967, no 1, page 70 (in Russian). See also V. Bellin et al, "On Quantum Gravitation Effects in Isotrope universe," *ZhETF*, vol 6, 1980, page 2082 (in Russian).
- <sup>717</sup> Akimov, A.E., Finogenov, V.P. "Experimentainiya Proyavleniya Torsionnykh Polei i Torsionnye Tekhnologii" (Experimental Manifestations of Torsion Fields and Torsion-Based Techniques), Moscow: *NTTs* "Informatekhnika," 1996, 68 pages, published by Sci-Tech Center "Informatekhnika." (in Russian).
- <sup>718</sup> *ibid.*
- <sup>719</sup> *ibid.*
- <sup>720</sup> Ivanenko, D., Pronin, P., Sardanashvilli, G. "Calibrating Gravitation Theory," *BGU Publ.*, Moscow, 1985, page 143 (in Russian).
- <sup>721</sup> *ibid.*
- <sup>722</sup> Fox, H., Ramsay, B. "The Super-Luminal Velocity of Gravity Waves," Trenergy, Inc., Salt Lake City, Utah, 1998, 4 pages with references.
- <sup>723</sup> Obukov, Yu., Pronin, P., Yakushin, I. "On the Experimental Estimations of the Axial Torsion Mass and Coupling Constants," in the press (in Russian). See also Ch. Imbert, "Calculation and Experimental Proof of the Transverse Shift Induced by a Total Internal Reflection of a Circularly Polarized Light Beam," *Phys. Rev. D*, 1972, vol 5, no 4, page 787 (in Russian). See also "Phantom DNA Effect" as defined by V. Poponin, *loc.cit.*
- <sup>724</sup> Zhvirblis, V.E. "Playing Bublik," *Chemistry and Life*, no 5, 1995, pages 10-15. See also V.A. Sokolova, "Investigation of the Plant's Response to the Action of Torsion Radiation," preprint no 48, Moscow: *VENT*, 1994, 32 pages. See also V.F. Panov, B.V. Testov, A.V. Klyuev, T.D. Afonina, "'Effect of Torsion Radiation on Mammals Organism,'" in: Reports Theses, PERM State Medical Academy, Scientific Session of 1997, PERM, (Russia), thesis no 159. See also [28]
- <sup>725</sup> Kichigin, V.I., Klyuev, A.V., Kurapov, S.A., Panov, V.F., Khaldeev, G.V., Borisova, T.F. "Torsion Fields and Eelctrochemical Processes at Metal-Electrolyte Interface," *Journal of New Energy*, vol 1, no 2, 1996, pages 27-31. See also V.P. Mayboroda, A.E. Akimov, G.A. Maximova, V.Y. Tarasenko, V.K. Shkholniy, "Influence of the Torsion Fields in Tin Melt," *MNTP, VENT*, pre-print no 49, Moscow: 1994, 13 pages (in Russian). See also V.P. Mayboroda, A.E. Akimov, G.A. Maximova, V.Y. Tarasenko,

V.K. Shkholniy, N.G. Palaguta, G.M. Moltchanovskaya, "Structure and Properties of Copper Inherited From a Melt After Applying to it a Torsion Emission," *MNTP, VENT*, pre-print no 50, Moscow: 1994, 11 pages (in Russian).

<sup>726</sup> Akimov, A., Kurik, M., Tatasenko, V. "Effect of Spinor (Torsion) Field on Crystallization of Micellar Structures," *Biotehnologiya*, 1991, no 3, page 69 (in Russian). See also V. Zhitnikov, A. Kamenshchikov, V. Ponomarev, "Precision Gravity Measurements and New Types of Physical Interactions," *Gravitational and Hypothetical Interactions*, ed. By Ya. Teriletsky *UDN Publ.*, Moscow, 1989, page 3 (in Russian). See also C.I. Cheng, P. Li, K.I. Szeto, "Microscopic Detection of Spin-Dependent Long-Range Interaction," *Phys. Lett. A.*, 1991, n0 4-5, page 235 (in Russian).

<sup>727</sup> Reed et al., "Super-Luminal Velocity of Gravity Waves," loc.cit.

<sup>728</sup> Obukhov, Yu., Pronin, P. "Physical Effects in Theory of Gravitation With Torsion," Moscow: *VINITI*, 1991, page 5 (in Russian).

<sup>729</sup> Gisin, N. "Simultaneity – Non-Local Effects at a Distance," loc.cit

<sup>730</sup> Wilcock, D. Comment: I highly recommend that you check out RST – Reciprocal System Theory – first put forth by Dr. Dewey Larson. They posit a balanced universe with three dimensions of space and three of time, and with a very small set of assumptions they can build a solid cosmology that covers just about everything missing in the classical models. Dr. Bruce Peret has further modified classic Larsonian thinking in what I believe to be a valid direction, by invoking the idea of "counterspace" and "projective geometry" as being the characteristics of the time domain. You need more than one dimension to account for the helical nature of torsion waves and the geometric substructures that can form within the PV itself. I have always known that the ultimate unification theory would integrate Russian torsion-field studies, geometric phenomena and Larsonian thought. Unfortunately none of these categories of thinkers are familiar enough with each other's work to perform this unification.

<sup>731</sup> "**Inclusive Jet Cross Section in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.8\text{TeV}$** ," F. Abe et al., The CDF Collaboration, FERMILAB-PUB-96/020-E. Submitted to Phys. Rev. Lett. January 24, 1996 -- Abstract, Paper

<sup>732</sup> **FERMILAB MEDIA ADVISORY 2/7/96, CDF Results Raise Questions on Quark Structure.** An article to appear in the February 9 issue of Science describes results contained in a paper submitted to *Physical Review Letters* by the 450-member Collider Detector collaboration at Fermilab. The CDF paper reports results that appear to be at odds with predictions based on the current theory of the fundamental structure of matter. The paper, submitted January 21, reports the collaboration's measurement of the probability that the fundamental constituents of matter will be deflected, or will "scatter," when very high energy Protons collide with antiProtons, according to CDF spokesmen William Carithers and Giorgio Bellettini.

<sup>733</sup> Particles and their decay patterns, sub-quarks as illustrated by the CDF Collaboration, found at

[http://www-cdf.fnal.gov/events/pic/decay\\_chart.gif](http://www-cdf.fnal.gov/events/pic/decay_chart.gif)

<sup>734</sup> Phillips, S., "The Extrasensory Perception of Quarks," loc. cit.

<sup>735</sup> Hait, J. **Information Exchange Attributes of Standing Wave Lasers at the Interference Fringe**, ref.

<sup>736</sup> Wilcock, D., Comment: This brings to mind Dr. Paul LaViolette's discussions of the Belousov-Zhabotinsky effect – which is a macro-level event of a similar type in his definition. Also the "ball lightning" in Hessdalen, Norway, which I wrote about in Divine Cosmos, blinks "on" and "off" at times but is still detectable in the infrared spectrum when it is "off", thus suggesting that it is going into another domain whose fingerprints are still visible in infrared.

<sup>737</sup> Anastasovski, ref:

<sup>738</sup> <http://news.bbc.co.uk/1/hi/sci/tech/3034754.stm>

<sup>739</sup> Shoulders, K. Appendix 1 ref.

<sup>740</sup> This visualization of the interior of a rotating Bose-Einstein condensate shows an array of 12 spontaneously appearing vortices. Bright regions correspond to low condensate density, and color denotes the phase of the condensate wave function. Experimental and theoretical developments in Bose-Einstein condensation are discussed in articles by Wolfgang Ketterle (page 30) and by Keith Burnett, Mark Edwards, and Charles Clark (page 37). (Image courtesy of David L. Feder and Peter Ketcham, NIST, Gaithersburg, Maryland.)

<sup>741</sup> FermiLab CDF Collaboration, "Mass of Quarks" diagram found at [http://www-cdf.fnal.gov/events/pic/6q\\_mass.gif](http://www-cdf.fnal.gov/events/pic/6q_mass.gif)

<sup>742</sup> FermiLab/Brookhave Muon results, ref. found at

[http://d0server1.fnal.gov/projects/Muon\\_Electronics/web\\_page/Muon\\_par.pdf](http://d0server1.fnal.gov/projects/Muon_Electronics/web_page/Muon_par.pdf)

<sup>743</sup> The **Pauli exclusion principle** is a [quantum mechanical](#) principle which states that no two [identical Fermions](#) may occupy the same quantum state. Formulated by [Wolfgang Pauli](#) in [1925](#), it is also referred to as the "exclusion principle" or "Pauli principle."

The Pauli principle only applies to Fermions, particles which form antisymmetric quantum states and have half-integer [spin](#). Fermions include [Protons](#), [Neutrons](#), and [Electrons](#), the three types of elementary particles which constitute ordinary [matter](#). The Pauli exclusion principle governs many of the distinctive characteristics of matter. Particles like the [photon](#) and [graviton](#) do not obey the Pauli exclusion principle, because they are [bosons](#) (i.e. they form symmetric quantum states and have integer spin) rather than Fermions.

<sup>744</sup> Santilli, R., *Il Grande Grido – A Cry in the Wilderness*, Ref.

<sup>745</sup> Anastasovski, Ref

<sup>746</sup> <http://www.astro.uni-bonn.de/~dfischer/mirror/286.html>

<sup>747</sup> <http://www.enterprisemission.com/moon6.htm>

<sup>748</sup> <http://rugth30.phys.rug.nl/quantummechanics/ab.htm>

<sup>749</sup> Jagnow, A., ref [gary vesperman]

<sup>750</sup> [http://www.noao.edu/image\\_gallery/html/im0063.html](http://www.noao.edu/image_gallery/html/im0063.html)

<sup>751</sup> Laithwaite, E., <http://www.alternativescience.com/eric-laithwaite.htm>

<sup>752</sup> Laithwaite, *ibid.*

<sup>753</sup> Ref. found at <http://www.hyperphysics.phy-astr.gsu.edu>

<sup>754</sup> Trefil, *The Moment of Creation*, ref.

<sup>755</sup> <http://hyperphysics.phy-astr.gsu.edu/hbase/astro/c1>

<sup>756</sup> <http://hyperphysics.phy-astr.gsu.edu/hbase/astro/c3#c3>

<sup>757</sup> Trefil, *ibid.*

<sup>758</sup> <http://www.thunderbolts.info/tpod/2005/arch05/050427sun.htm>. Also consider James Maxlow and others' theories of "Earth Expansion Tectonics," showing that the Earth has been steadily growing larger with time.

<sup>759</sup> Tatterson K.G. "Boom! From Light Comes Matter. *Photonics Spectra*, November 1997, page 31.

<sup>760</sup> In 1996, Anastasovski experimentally verified that under certain carefully controlled conditions, photons of real light can be shown conclusively to demonstrate properties of measurable mass. This heretical idea is explained in Anastasovski's extraordinary book. See P. Anastasovski, *Quantum Mass Theory Compatible With Quantum Field Theory*, Nova Science Publishers, Inc. (1995) ISBN: 1-56072-157-X.

<sup>761</sup> Talbott, Ref.

<sup>762</sup> <http://www.webster-dictionary.net/definition/Inertia>

*Endnotes, Comments, References, Hyperlinks & Suggested Reading*

<sup>763</sup> Trefil, Ref.

<sup>764</sup> Bak, P., bibliography, Ref.

<sup>765</sup> Russian astrophysical research, superluminal velocities in heavenly bodies, ref.

<sup>766</sup> Ref Russian Academy of Astrophysics – super luminal bodies

<sup>767</sup> Guth, A. ***The Inflationary Hypothesis***, ref.

<sup>768</sup> Lemonick, Nash, "Time Magazine" article, ref.

<sup>769</sup> Hagelin, J., "The Maharishi Model of the Universe," ref. See also **Variations on the Maharishi Model: An Integration of Consciousness and the Unified Field**, presented to the 5<sup>th</sup> Annual International Symposium of the New Energy Society, Salt Lake City, Utah [28August1999]. Journal of New Energy Proceedings et al.

<sup>770</sup> Muon experiments at FermiLabs and Brookhaven National Labs, ref.

<sup>771</sup> K. Shoulders, J. Sarfatti et al, "High Density Charge Clusters – Theoretical and Mathematical Proofs," ref.

<sup>772</sup> Kenneth Shoulders, Patent No. 5,018,180, "Energy Conversion Using High Charge Density" 3 May 1989;

<sup>773</sup> EVO's in China and CIS, ref. Journal of New Energy

<sup>774</sup> Jin, S-X, "High Density Charge Cluster Accelerator: Transmutation of Nuclear Waste" ref. INE publications 4 April 2001.

<sup>775</sup>

<http://www.svn.net/krscfs/Electromagnetic%20Pulse%20Source%20Using%20Fluidized%20Electrons-Appendix%20I.PDF>

<sup>776</sup> Shoulders, K., mathematical formulations of EVO's, ref.; see also Jin, S-X, HDCC formulations at scale of one micron, ref. This apparent violation of the 2<sup>nd</sup> Law of Conservation of Matter and Energy occurs because the field effect generated at the center of the EVO appears to mitigate gravitational effects in that locale, thereby eliminating the more general effect of inertial mass.

<sup>777</sup> Jin, S-X, EVO plasma discharge toroidal structure image, ref.

<sup>778</sup> Shoulders, K., Electromagnetic Pulse Source Using Fluidized Electrons, Appendix I, found at

<http://www.svn.net/krscfs/>

<sup>779</sup> <http://www.sciencedaily.com/releases/2000/08/000817080822.htm>

<sup>780</sup> <http://www.phys.psu.edu/~dimeo/resint.html>; see also Dimeo *et. al.*, Phys. Rev. Lett. **79** (26), 5274 (1997)

<sup>781</sup> <http://www.geom.uiuc.edu/docs/research/ieec94/node25.html>

<sup>782</sup> <http://www22.pair.com/csd/car/carfre10.htm>

<sup>783</sup> <http://goldennumber.net/classic/solarsys.htm>

<sup>784</sup> Image Credit: NASA and the Hubble Heritage Team (STScI/AURA)  
Acknowledgment: R. Lucas(STScI/AURA)

<sup>785</sup> The entire galaxy is about 120,000 light-years wide, which is slightly larger than our Milky Way Galaxy. The blue ring, which is dominated by clusters of young, massive stars, contrasts sharply with the yellow nucleus of mostly older stars. What appears to be a "gap" separating the two stellar populations may actually contain some star clusters that are almost too faint to see. Curiously, an object that bears an uncanny resemblance to Hoag's Object can be seen in the gap at the one o'clock position. The object is probably a background ring galaxy.

<sup>786</sup> In the 19<sup>th</sup> century, some astronomers speculated that M104 was simply an edge-on disk of luminous gas surrounding a young star, which is prototypical of the genesis of our solar system. But in 1912, astronomer V. M. Slipher discovered that the hat-like object appeared to be rushing away from us at 700 miles per second. This enormous velocity offered some of the earliest clues that the Sombrero was really another galaxy, and that the universe was expanding in all directions.

<sup>787</sup> **Credit:** H. Ford and L. Ferrarese, ([Johns Hopkins](#)), W. Jaffe, ([Leiden](#)), [NASA](#)

<sup>788</sup> Illustration of a black hole destroying a star in the galaxy RXJ1242-11 (Illustration: NASA/CXC/M. Weiss; X-ray: NASA/CXC/MPE/S. Komossa et al.; Optical: ESO/MPE/S. Komossa)

<sup>789</sup> Muller, Hartmut, Global Scaling Theory, found at [http://217.160.88.14/ir\\_en\\_research\\_global\\_scaling/detail.php?nr=1110&kategorie=ir\\_en\\_research\\_global\\_scaling](http://217.160.88.14/ir_en_research_global_scaling/detail.php?nr=1110&kategorie=ir_en_research_global_scaling). Muller came up with Global Scaling Theory and built a torsion-wave cell phone. According to my contacts in SF, his latest stunt was to download a 10GB hard drive into the PV from Germany and instantaneously upload it in Australia without a single bit of error.

<sup>790</sup> Note: Consider, for example, the recently published work of distinguished scientist D. Edmundson, University of Washington, whose application of a carefully engineered microwave beam has been definitively shown to reduce inertial mass I finely particulated Aluminum. Also see, ***Detail For: Disclosure: Military and Government Witnesses Reveal the Greatest Secrets in Modern History***, {May 9, 2001) ISBN: 0967323819