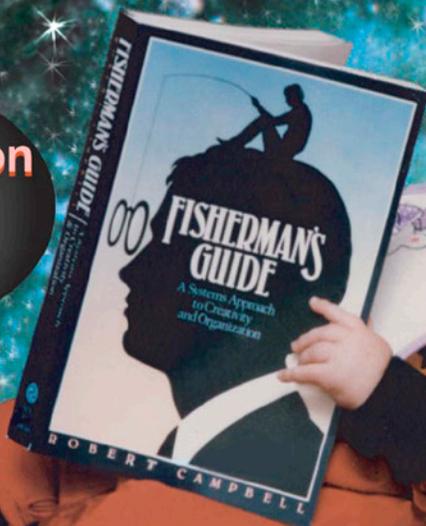


# FISHERMAN'S GUIDE

to the Cosmic Order

**New Edition**  
From  
The Void



Robert Campbell

A GUIDE  
TO THE  
COSMIC ORDER

Fishing in the Canadian wilderness provides the setting for this intuitive fishing trip into the cosmic order, embracing the natural history of the biosphere and the stars beyond. The whole of science is investigated in the course of introducing the divine scheme of the cosmos, revealed in a cosmic experience. The big screen—not the big bang—hosts the cosmic movie, where galaxies are theaters eternally recycling their stellar populations so that sentient beings may emerge on the stage with a cosmic role. Profound yet practical spiritual insights, into the organization of all experience, provide a valuable new synthesis on how we develop our ideas and endeavors. This focuses on business, physics, astrophysics, cosmology, biology, evolution of the nervous system and the human social dilemma. Fishing takes on a global flair with Western left brain technology brought to terms with Asian right brain intuition, both anchored firmly to our ancient heart in Africa—three dimensions to the integration of human experience. The eternal plan guiding our human evolution in the biosphere emerges into a new paradigm as we search for direction on the threshold of the new millennium.



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# **Fisherman's Guide** to the **Cosmic Order**

Robert Campbell

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perspectives derived may be to your  
lasting benefit.*



# FISHERMAN'S GUIDE TO THE COSMIC ORDER

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# Preface

This book is about the cosmic order. It is therefore about the *System* of organization that underlies the whole of experience. It is about the creative process and the whole of creation.

In the main, humanity's scientific and spiritual pursuits have led to divergent perspectives of creation. The *System* that is introduced here indicates that these two pursuits are essential complements of one another in our search for an understanding of our natural heritage through an evolutionary record that reaches back billions of years. The deciphering of the *System* can help us to read the record, not only in the biosphere, the planets, the stars, and distant galaxies, but also in the structure of our bodies and in the workings of our nervous systems. The *System* can help us to see our part and place in relation to the whole.

The book should be of interest to any reasonably informed reader who has ever seriously reflected on the meaning of life. It should be of special interest to any who have followed the dialogue of science, even in a modest way. The book, however, is not confined to science. It clarifies how we integrate everyday experience, and how this relates to our evolution in the biosphere. It includes a review of history, it touches on ancient systems of understanding, and it assesses the problems of organization in the business world. Most important the book is about the wilderness and fishing.



# Overture

In the three centuries since Newton, science has skyrocketed like a fireworks display that in this century has exploded into nearly every area of human experience. The fragments of the spectacular display have not yet lost their brilliance, but still hang suspended as a great blossom of light, holding sway over man's mind as we marvel at the pageant that we have created for ourselves. In the fascination with such a display one seldom pays attention to the grandstand, even though the brilliance of the show may illuminate the whole environment. The fragments cool and lose their luster, then flutter back to earth in darkness as the audience stumbles homeward with only memories of a moment left behind.

It's been over two thousand years since our last fireworks display in the golden age of Greece, and it was a long period of darkness in between. Already there are signs that the energies of the current show are waning, and one wonders if we must soon fumble through another age of darkness. But the scale and magnitude of this extravaganza threaten planetary bankruptcy. Perhaps we will not be able to afford another show. Perhaps for evermore we will have to stumble on in darkness through the ashes, half animal, half man, not knowing who we are, but worse: knowing that we had a chance and lost it. Perhaps it is not too late to look around and while the light is good, kindle some enduring flames.



# Prologue

I had phoned ahead and made reservations. It was a good job that I did. I would have been sleeping on the beach with quite a few others. Pee Pee Island has become very crowded ever since they made the movie there—*The Beach*, with Leonardo Di Caprio. There was a big fuss about it in the news, because they temporarily transplanted sixty palm trees and changed the face of an uninhabited island to make it look more pristine. You should have seen it fifteen years ago, before tourist traffic killed the coral in Maya Bay and left tons of garbage around. Spectacular. Cliffs soaring straight out of the sea a thousand feet. The cliffs are still there, but it's not the same.

It wasn't just me that was a little bewildered by it all. A five meter python had crawled out of the jungle into the village one night. I guess it wanted to see what all the fuss was about, only to be mesmerized by throngs of people. It was right beside the main footpath and it stayed there all day, sticking its tongue out at passersby. Fortunately someone happened along who knew something about pythons, and by enlisting a few deputies, carted it up a hill back into the jungle. It weighed sixty pounds.

There have been great changes in Asia, since I first came to this part of the world, twenty years ago—big developments, you might say. Western technology, industry and commerce have invaded like a storm. Thai-land has become a newly industrialized country, an NIC in the slick vernacular of the economic world. You can see it most clearly in Bangkok. Thousands of skyscrapers have sprung up like a well manured patch of nettles. There is a sting to it all. While girded glass fingers stretch for the sky, the price of land has soared beyond the reach of all but a few. Two economies have emerged, one inflated for the rich, one depressed for the poor. Amid the pollution choked arteries that feed the beast, the numbers of street children increase in proportion to the GNP. Why is it that our technology provides such a capacity for wealth, while impoverishing so many? Why is it that our material well being so often leaves us morally and spiritually indifferent? Why is it that our accumulation of knowledge so often sharpens our wits while eroding our understanding?

A new insight into the cosmic order is presented here in an effort to broaden our understanding of the knowledge that we have accumulated

over the last few centuries, especially the explosion of scientific knowledge about the world that we live in. Better ways have been found to describe the cosmic order than in the original *Fisherman's Guide*, published by Shambhala in 1985. The same background is covered, the same signs and signals are here, but they are more clearly and directly focused. The role of the cosmic order—the System as it is called—is accented as it works within each of us. In a similar way, this includes our social and economic organization, through which we relate to the natural world. We shall see that the same cosmic order keeps recurring in different disguises. Because of the way the cosmic order works, all phenomena are ordered in a self-similar way.

The sharper focus is due in some measure to my prolonged exposure to Asian cultures, and of course to just more years of experience upon which to draw. This period has also included a few more years working in remote oil fields of the Libyan Sahara, and more exposure to sub-Saharan Africa and India.

Throughout this time I have assiduously maintained my studies of various branches of science in depth. I keep abreast of significant developments at the forefront of the physical and biological sciences. These labors are directed at better translating and communicating the cosmic order, as it was so awesomely demonstrated in a revelatory experience thirty years ago. Other insights followed to assist in that direction.

Insight must find translation in socially meaningful ways. The cosmic order works this way. It relates to the explicit social order apparent around us—our knowledge—as well as it does to the spiritual order implicit in experience—our understanding. It seeks an intelligent balance between these two perspectives. We shall see that understanding is de-pendent upon direct intuitive insight, while explicit social expression is dependent upon knowledge assimilated through language.

There are really three perspectives involved in the balance, because right brain intuitive insight and left brain social expression are fueled by emotional energy generated by our autonomic nervous system. The latter is ancient. We have evolved up through the species of the natural world, according to the workings of the cosmic order itself, progressively integrating developments explored by our vertebrate ancestors into the structure of our nervous systems. We shall explore more fully how we are hard wired to our evolutionary history through our emotional apparatus. Emotion fuels our mute intuitive perceptions that socially

direct our rational intellect. We thus have three sides constrained to live in the same house together, and we often don't get along with ourselves.

Every human being functions in three mutually related arenas at the same time. We are much more than the transient individuals that we often mistake ourselves for. One arena is our historically integrated past that sustains our energy needs in our organic bodies. This arena is built on foundations going back four billion years. We not only see our evolutionary heritage around us in nature, we experience it within our bodies. We are very old.

The second arena is a timeless and transcendent spiritual reality that regulates our intuitive access to the cosmic order through which we have evolved, and continue to evolve. All of us have moments of inspiration sometimes, mute insights or intuitive energy patterns that lead us to integrate our experience in certain ways that tend not to change over time. They can often provide guiding direction throughout a lifetime. Sometimes we are born with strong intuitive direction. Sometimes we may acquire it in various degrees, or both may happen. We are not only very old, we also have a timeless quality about us.

The third arena is our need to relate in practical ways to our immediate social environment. We are often led by short term interests in this respect, but hopefully also in ways that are emotionally balanced to some extent with mute perceptions of the cosmic order through which we have arrived where we are. In any case, we recreate ourselves as we please every minute of our lives, according to how we make our commitments. Even our body replaces itself in a matter of months. We are old; we are eternal; we are also very young. It is hard to say exactly what we human beings are. We are one part animal, one part divine, one part human.

Our modern science and technology that is having such an impact on our lives and the world that we live in is a social phenomenon that was born in Western culture. Its seeds were planted in ancient Greece and took fifteen hundred years to germinate during the renaissance, maturing into full bloom during this century. The seeds were simple little concepts, a brief imperfect glimpse of one face of the cosmic order, and they proliferated in the weed ridden garden of the social arena.

We tend to take for granted the influence that science has on our lives, even though it has drastically altered our social orientation in a few generations. We have recreated ourselves as a species, minute by minute, by our social commitment to science. Leading this commitment are those few very tenuous insights into the nature of the cosmic order, and despite

modifications and alterations to suit in the process of maturing, they continue to prevail in guiding the general thrust of our social commitment to science. We have unwittingly shown great trust in a few abstract principles that would now seek to render us captive forever. In recent decades sciences has been striving to write a new bible about the way things are and work, with the hope of closing the book for all people for all time. Our transient social orientation seeks eternal status.

But science is not an isolated arena of human experience. It is not an ivory tower that is sacrosanct unto the scientific community. Science cannot claim immunity from public scrutiny, nor can it act with impunity. Our science and technology has a powerful influence on how we all think and behave. Not a human being on the planet has been left untouched by the relentless march of science.

The whole of science thus comes under the microscope when we begin to speak of the cosmic order. During the last couple of centuries, and especially in this one, there has been a strong tendency for science to monopolize the microscope for itself. Religion and philosophy have both been elbowed aside. Those ancient seeds, planted over two millennia ago, have been force fed into a new cosmological view of the universe. Science wants to outgrow its social shackles and claim ascendancy as the sole author of the cosmic order. This might not be so bad if it did not reduce the whole of the universe, including all sentient beings that may have arisen within it, to a meaningless accident arising from less than nothing, completely devoid of universal values or purpose.

Before some of us jump to condemn science for its efforts, or others to defend its eternal achievements, it must be acknowledged that this tendency to self supremacy has been prevalent throughout human history. "I'm the king of the castle and you're the dirty rascal." We've been clubbing each other for millennia over this deadly game. We all still play at this silly game, so it's not surprising to see science and religion playing at it also. We have not progressed very far from the sand pile, and making one or the other out to be rascal or king will resolve nothing.

Religion and philosophy are such woolly affairs. Science is woolly at its roots too, but it gives us clear practical results, like cars and television sets. It sends men to the moon, so it must deal in facts and truth, right? Its remarkable achievements are undeniable. For this reason it has attracted a large following of true believers. Nobody likes woolliness, not even the religious believers among us.

Our efforts to exclude woolliness from our lives have engaged us in a considerable degree of hair splitting over the centuries. In science this

has taken us inside the atom through the splitting of spectral lines, and on to what happens in the centers of stars and galaxies. On the religious front, the Christian bible has been dissected into scores of differing interpretations. The Hindu systems are probably the most prolific, having generated seemingly endless interpretations. Then the Theravada Buddhist Tipitaka is itself forty volumes, with many more volumes of commentary, and a still burgeoning volume of literature besides. Even the Muslim Koran has ranks of commentaries engaging in regimental hair splitting, trying to steer it out of woolly terrain in its long march forward.

These hairs concern the nature of identity, of self and other, one and many, universal and particular. We shall be exploring this ground in detail with good reason. Wars are fought over these hairs. They are a matter of life and death. More. They concern one's psychic integrity, or perhaps one's psychic annihilation. Nothing is more important than these hairs. All human conflict revolves around them, all values, all realization. The human social challenge is to reconcile these hairs between self and other. But woolliness is abhorrent to us. We feel eroded by its indefiniteness about who we are. We rationalize in words and want to frame the dilemma in language, enshrine it as immutable truth on a piece of paper, make a stand to say who we are. We don't like woolliness.

Neither did Pontius Pilate at the trial. He did not want to convict, but he could not get a satisfactory answer from the accused. Only silence. Then he washed his hands. These words and this hair splitting are the crucifixion. Likewise the Buddha was pressed on various occasions about the identity of the self, and the existence of God. Only silence in response. He is also reported to have made a woolly response known as the quadrilemma: '*Is, is not, both is and is not, neither is nor is not.*' He likewise explicitly denied that he denied the self, even though he taught that you cannot explicitly identify a self. You cannot isolate it, put it in a box and gift wrap it, so to speak. Everything is interdependent. *Anattā* means *not-self*, not *no-self*. Strange how religions get twisted over hair splitting, or the lack of it.

In the original version I leaned heavily on the word isomorphy, but this word has now been largely replaced by "self-similarity." It is a more accessible term and it relates more directly to the problem of identity. The woolliness can more readily be seen to revolve around it. We shall see that there are obvious hierarchies permeating the natural order. We shall also see that each level in a hierarchy has a hierarchy within it that is self-similar to the whole hierarchy. So the woolliness cannot be

resolved by saying things are this way as opposed to that. A journalistic approach can't accomplish the task. Reality can't be reduced to neutral facts, nor can logic untie the knots within knots. It can only be resolved by making the creative process transparent, so that anyone can see through the endless hair splitting for themselves. The woolliness is not rationally resolved. It simply evaporates in the process of becoming transparent.

Rendering it thus is a far from easy task. But I believe I have found ways to approach the problem in a reasonably accessible fashion that most average readers should see, or at least glimpse sufficiently to make them wonder deeply and sharpen their intuition. In this respect the revisions are a big improvement over the original version.

The focus on science is thus not intended to condemn our scientific efforts, nor to dispense arbitrarily with its achievements or conclusions, any more than it is intended to dispense arbitrarily with the spiritual essence of the world's religious traditions. On the contrary, science has provided us with a fund of knowledge and factual evidence that now makes it possible for a more profound insight into the cosmic order to emerge from hiding under layers of language.

Language itself can be one of the impediments in this effort, so an assist is provided through the non-linguistic means employed to delineate the cosmic order as the *System*. The seeds that were planted in ancient Greece are accounted for by the *System*, but they are placed in a much more fundamental context, opening up new horizons for the whole of science. Moreover these horizons are no longer inconsistent with the essence of the world's religions. Perspective within each of these separate arenas may become mutually complementary and mutually balanced. The *System* can provide a bridge between them to assist in this direction. We needn't live in a schizophrenic world, rigidly compartmentalized and forever in conflict with ourselves.

Asian perspectives are generally more tolerant of woolliness than the left brain logical regimentation of Western cultures. Eastern cultures tend to see more of the self-similarities in experience. While the Western intellect homes in on the differences, the Eastern mind tends to emphasize the similarities in experience more than the differences.

For example there is a huge tree at a place called Mae Sai at the northernmost tip of Thailand, in the infamous Golden Triangle area adjacent to Burma and Laos. The trunk of the tree is about ten meters in diameter, with the crown spreading about one hundred meters across. The local people have adorned the tree with bright ribbons around its

girth, and have built a small temple under its sprawling crown. It's not a Buddhist temple. In fact the little temple is not associated with any formally organized religion as such. Under the temple's roof is a life-sized figure of a man seated in a cross legged position. He has black hair and a mustache. The man represents the spirit proprietor of the piece of land that produced this incredible tree. People go there and they pay him respects, the same as they might respect the judge in a court that has proprietorship over a local jurisdiction. They use the same name to describe him. There is thus a self-similarity in the way they perceive the spirit of the land and the prevailing jurisdiction of a court of law. Their spiritual perceptions, despite what a westerner might dismiss as superstitious, concern the natural order. After paying their respects they may place a small bundle of bamboo against the trunk of the tree, then say a little prayer, that they might participate in the spirit that produced this extraordinary tree and be strong like the bamboo.

Every house and building in Thailand has a spirit house erected to respect the spirit proprietor of the piece of land on which it sits. Spirit altars are a common practice throughout East Asia. Even Buddhist temples have them. In accepting Buddhism the people haven't abandoned their spiritual roots. Their tribal roots are still largely intact, not only with the shamanist tribal minorities in remote mountain areas, but in spiritual practices within their Buddhist culture. They see no incongruity in this. Ever since its inception, Buddhism has thrived in this way, hand in hand with aboriginal beliefs that common people sense a woolly self-similarity with. These spiritual roots fuel their Buddhist practice, strengthen it, especially in the thousands of forest monasteries, where the discipline is strong. In the forest monasteries, monks become more directly exposed to the spiritual energies of the cosmic order as they manifest in nature in a self-similar way.

For example, a Western monk at a forest monastery recently told a story about a practice they have of going into the jungle as a group, near the Burmese border, each of them equipped with a mosquito net suspended from an umbrella, and a straw mat. They disperse in the jungle out of shouting range of one another to meditate for a couple of months at a time. It's a remote area of jungle where there are still wild leopards, tigers, elephants, bears, snakes and so on, so they must come to terms with their apprehensions about their natural environment. At night every strange sound can assume sinister proportions. One monk was walking alone at night with a small kerosene lamp when a mature tiger happened upon him. The monk stopped frightfully in his tracks, while

the tiger slowly circled him at close range a couple of times. Then the tiger also stopped about seven or eight feet away and just looked at him, probably wondering who this strange creature was, with a small trembling fire in his hand. The monk was afraid to move at first, and struggled to retain his composure. Then after a short while it occurred to him that the situation wouldn't worsen if he quietly left. He slowly turned and walked away. He wasn't on the menu, but might have been had he responded differently. Tigers integrate their experience in a self-similar way to humans and have intuitive perceptions that lead their behavior too.

So in the East, traditions still thrive that seek to balance our ancient emotional apparatus with intuitive perceptions of the cosmic order as translated into explicit behavior. Three arenas are acknowledged to some extent by the mainstream cultures, despite whatever shortcomings they may have. Social problems exist, of course, but they have a different flavor than they do in the West. There is more woolliness in their social orientation, more tolerance. There is also more room for corruption, and even disruption. The usually pleasant and gentle demeanor of Asian people is more easily exploited by those inclined to do so. They lack the same aggressive defenses of most Western people, so ready to fight for their rights, whether real or imagined.

In bringing science under the microscope for examination, we will find that this intellectual creation erected on the foundations of Western thought, allows no formal room for three arenas. But to appreciate this, and find a workable bridge between knowledge and understanding, we shall have to embark on a fishing trip.

# PART 1

## THE ROAD to the SYSTEM



# Chapter 1

## Night Fishing

The boat rocks gently to the rhythmic beat of waves against its hull. It's the kind of soft hypnotic roll that brings a certain harmony to a contemplative mood. The sharp-crested ripples that have been stirred by a mild evening breeze are beginning to mellow at last. Soon they will be no more than glimmering shadows blinking a mottled dance on a slippery surface.

At this time of year, the pattern is the same each night. It is a ritual perfected through countless centuries of repetition, yet each occurrence preserves the freshness of a premier performance. There is an insistence to the stillness that settles here each evening—the world holding its breath in anticipation of the coming night. It penetrates the being, making all thought seem redundant and strangely out of place. The stillness can be seen vibrating in the air. There is an immediacy to it that makes one feel they can reach out and touch it. There is peace, but it is a peace that is vital, filled with energy and alive. The crickets and frogs have started now to tantalize the stillness, which stands out the more. The sun has set, and the remnants of color are rapidly draining from the sky. A first few stars have penetrated the encroaching darkness.

The boat is anchored in nine or ten feet of water, about fifty feet from underwater rocks that extend about forty feet in diameter. Just at dusk the mosquitoes can get bad for a short while, but tonight there are only a few. The bass should be feeding on the surface now. The stillness is broken by a quiet reach for the fishing rod. On the surface, plunkers are as good as any, and tonight a hula popper will get its chance. Darkness is coming quickly. The wooded shoreline looms like a ghost looking at itself in the water.

Smallmouth bass have a habit of surface feeding at night. Although not many are caught at one time, they are usually a nice size. The first cast is directly over the center of the rock pile. The rocks are covered by only a foot or two of water in most places, although well out from shore and surrounded by deeper water. In the fading light, the plug can be seen

as it lands and generates a series of concentric ripples. The high arch of the line plummets to the surface, marring its perfection. The plug bobs to a standstill and sits there for a moment. The slack in the line is taken up, and the popper jiggled just a little. Another smaller series of circles grows, and another. Often bass have to be teased into biting by this gentle jiggling. Now the pole is jerked sharply to one side. There is a solid-sounding plunk, and the popper bobs back to the surface. Now a wait in anticipation, but no takers. More gentle jiggling and another more moderate plunk. There is a sharp sounding snap, but from a small rock bass hitting short on the rubber skirt. Soon the plug is near the boat and reeled in to throw again. Several more casts attract only some small fry. Maybe there will be no action tonight.

Another cast tries for a run over one side of the rock pile. The instant the plug lands a very loud splash signals a strike. It must be a nice one, although it is too dark to see. The slack line is frantically reeled up. Sometimes, before one can get a taut line, they will swim straight for the boat, break water, and shake the hooks. The slack is caught up just in time. The fish feels heavy as it clears the water, shaking furiously. No sooner is it back in the water than it is out again. It breaks water several times in succession, then starts digging for the bottom, taking line. The tension adjustment is tightened up a little. The fish comes up again quickly to provide a glimpse. A nice one! Down again it goes, digging for the bottom and heading toward the anchor rope. An attempt to horse it a bit to keep it away is too late. Around the rope once, a little slack line, and the fish is gone.

Too bad, perhaps, but there is no point in feeling remorse at losing a fish. The anchor is lifted and the hula-popper retrieved from the anchor rope. Fortunately the line isn't broken. There is nothing to do now but settle back across the seat to let the stillness once more take command.

The night is clear. The air is moist and fresh. Gazing into the cosmos brings back amazement at the spectacle of grandeur unfolded before the eyes. The feeling is remembered from early boyhood, with wonder that it has not changed in so many years. Some two hundred thousand million suns in our galaxy alone. Such numbers cannot register its true immensity. Only a few thousand can be seen with the naked eye. The rest merge as a milky expanse across the sky as we look into the edge of our own spiral galaxy we call the Milky Way. It is one of a number in our cluster. Andromeda, a misty blotch to a good pair of eyes on a clear night is hardly distinguishable tonight. Another world of suns as immense as ours—yet to intergalactic space we are like two ants on an ocean.

The instruments of modern astronomy reveal more galaxies than there are stars in our own Milky Way. They tend to congregate in clusters that appear to be moving away from one another, such that each appears to be at the center of a gigantic expansion. To each the most distant galaxies seem to be moving away fastest, such that the perceptual limits to the universe appear to be determined by the speed of light.

The mind boggles! Physical conceptualizations begin to dissolve into myth. Space and time lose meaning. These concepts have no absolute reality in themselves. They result from a more fundamental order that underlies the nature of things. There is an order to the cosmos and everything in it that we may justly call the cosmic order. The experience had vividly demonstrated this, but now is not the time to go into that.

Instead, the mind turns toward science, that huge body of formalized thought that has been laboriously constructed by thousands of brilliant minds, and which has pieced together large patches toward a landscape of understanding. It has provided humanity with many conveniences, in many ways expanding the possibilities of experience. It has provided a degree of mastery over disease, extended the average life expectancy, and alleviated untold suffering. To many people science has assumed the proportions of a religious dogma. They have an unquestioned faith that, whatever the problem, science will one day offer a solution. Other people focus on the negative consequences of science: they see a runaway technology undermining human values and exhausting resources, only to threaten the environment.

Some people, however, search beyond either of these simplistic views. They recognize that, although there has been an enormous growth of knowledge, this growth has been paralleled by a certain nagging deficiency. Although science has resolved many problems and afforded many new opportunities, it has also created new problems of severe proportions and bewildering complexity. Still the deficiency is an elusive one. Even those who recognize it cannot quite put their finger on it. They cannot accurately put it into words.

The attention drifts out again into the cosmic spectacle that embraces the origins of time and space. It does not take an expert to recognize that science is not yet a match for this. One doesn't have to scrutinize a theoretical framework in search of an error. The deficiency permeates the whole structure of science. It is necessary only to experience the immensity and precision of a clear night to sense the inadequacy of our words and signs and symbols in the face of such a scene.

We are such latecomers to the stage—just a flash, an instant in evolutionary time—yet we have the temerity or the need to seek and wonder, with curious searching thoughts, led on a leash of language. Language distinguishes us most from other earthbound creatures. Through language we evolve our cultures, our social structures, and our sciences. Language has altered the workings of our nervous system. It shapes our perceptions. We use it to see, to understand, but in the face of this vast mystery we are left with a flickering candle to illuminate a universe. Our vision captured by our proximity to a diffusing, undirected light, we catch only fleeting shadows through a veil. We sense the distance better with the flame snuffed out. Gazing skyward, waiting for the stillness, with words and thoughts extinguished, we feel there is sense in wonder. Lost in time, absorbing subtle energies, the mind drifts deep in formless wonder, filled with a feeling of long ago.

A bat swoops near the boat to bring back the present moment. The boat has drifted. It is time to stretch out some kinks and paddle quietly back toward the rock pile. The moon has begun to rise in the east—maybe its light on the surface of the water will help the fishing some. Casting is resumed as before, but there is no action whatsoever. Even the rock bass have quit their occasional snapping. After a few casts it seems clear that the fish have lost all interest. It is about midnight and time to head back to camp.

The steady drone of the outboard motor is an unseemly intrusion in the night. Behind the boat the wake rises in a pile, spreading itself evenly into two trailing rows of waves clearly visible in the moonlight. The moon itself looks like an omniscient Cyclops rising for a better view. It moves in unison with the boat, keeping an even pace over the horizon as the boat skims across the surface. There is no escape from its surveillance. Its motion is effortless and silent, with that aura of magic often regarded as just a romantic illusion of dreamers and foolish lovers.

Science deals with facts. Does this mean that reality can be reduced to facts, to something permanent, rigid and cold like a mummified corpse? Surely few scientists would agree. Some see beyond the facts to a transforming world of magical relationships, and they explore the mystery there. Facts are what we make of them. They must have relevance, of course, but it is in that relevance that magic is revealed.

The moon has a profound influence over life on earth that the language of science can do little to elucidate. It soars through space like a great pendulum regulating the rhythm of life on the planet. This influence is most obvious in relation to the tides, but there are parallel influ-

ences on the atmosphere and the force fields of gravity and magnetism, as well as other more subtle fields. All of these influences interact in a rhythmic, repetitious pattern, as they have done throughout the epochs of evolutionary history.

Although the energy for life comes from the sun, the pattern of its manifestation on the earth is modulated and blended by the rhythms of the moon. The moon presents a dominant daily rhythm to life in such a perennially steadfast manner that all other influences must be reconciled with its pattern. The massive rhythmic movements of the tides against the contours of the earth modulate the currents of the ocean and the distribution of energy from the sun. The winds and weather of the world are regulated in accord, the conditions and energies of life being constantly brought to harmonic balance. The moon thus provides a rhythmic variance to the distribution of energy that provides a basis for a harmony to life on earth. Is harmonic balance not a measure of romance?

Life on earth has been indebted to the influence of the moon throughout the ages, yet the moon itself supports no life. Profound unchanging clarity and stillness proclaim its nature. To really see the moon is to feel the reverberations of its rhythm recalling from the depths of our unconscious being the harmony of our ancestral past. The romantic significance of the moon is as real as the starkness of its cratered face or the power in the tides. And what a magical thing that for each revolution it should rotate precisely once on its own axis such that its face toward us never changes.

The outline of the dock is hardly visible in the moonlight as the boat is turned for shore. The motor is slowed to a troll, then shut off to let the boat glide smoothly in beside the dock. The path to the cottage is only sixty or seventy feet up a small rise. The fishing gear is set on the porch. The cottage is entered in darkness and a chair is selected in front of the window facing the lake. The familiar array of tree trunks stands silhouetted against the silver-gray surface of the lake.

The crickets and frogs are still busy squeaking and croaking their monosyllables. Each tiny, intermittent contribution is absorbed into the eerie chorus of a choir of millions that undulates and fades into the distance. The haunting refrain proliferates in waves, in a vibrant, living web laced intricately throughout the countryside. The persistence of the rhythm saturates the stillness to pace the procession of the night. This strange enchanting language has a message that's implicit.

There is an underlying system to the cosmic order that is both implicit and in communication with itself. It is intelligent. What we observe in

natural processes are the explicit manifestations of this underlying system of order. This is the world of fact—the starting point for piecing together a scientific framework of understanding.

Science seeks to develop a framework that can be universally applied, but it falters through the deficiencies of its language. It observes that an object can be moved by applying a force against it, then explains the fact with a principle of objective causality. Events are said to occur in external action sequences of cause and effect within a space-time framework. Every effect has an explicit cause.

The western idea of causality goes back to ancient Greece, but only three centuries ago Isaac Newton first formally applied the notion of a continuum to space and to time with practical results. These fundamental ideas fitted nicely together with basic laws of motion, permitting largely arbitrary but convenient definitions of physical concepts. With the development of more advanced mathematical language, the approach enjoyed a growing measure of success, stimulating an exploration of electricity, magnetism, chemistry, and thermodynamics. The approach has been very productive, but the best of efforts have been unable to produce a unified framework of understanding.

This principle of causal determinism which underlies science is seriously challenged only in the world of particle physics. Sub-atomic particles—electrons, protons, and many others—are found to display the characteristics of both waves and particles. This is something like saying that the water in a river may consist of both solid ice and a series of fluid ripples, in the *same* interval of time. In order to devise a framework to account in some measure for this unusual behavior, science has accepted a principle of indeterminacy in the realm of quantum mechanics. Energy is observed to be quantized or packaged in discrete amounts that portray a wave behavior that is also associated with a particle behavior. Wave-particle behavior is said to be governed by rules of chance, requiring a language of probability to predict events. If the water in the river is energy, then whether it behaves more like solid ice or more like fluid ripples depends on a roll of the dice.. There is a range of possibilities, but some are more probable than others.

On the other hand, when we observe natural processes from an implicit perspective, a quite different underlying system to the cosmic order emerges. It is neither a linear causal determinism nor an indeterminacy governed by chance. The cosmic order is implicitly deterministic and cyclic.

Everywhere we look, things can be observed moving in cycles. The motion of the planets, the seasons, the patterns of growth and decay, the migration of birds, the spawning patterns of fish, the recurring patterns of industrial production, even the routines of daily living—all have a cyclic character. Nothing is exempt. Each of these cyclic patterns has a degree of independence, yet all are related in a vast complexity of cycles with cycles within cycles. There are sometimes contingent disruptions where the cogs of interacting cycles don't mesh, but there is a preponderant determinism that pervades it all.

The determinism is of such precision that it can maintain order in the galaxies for billions of years, preserve the integrity of species through millions of generations, and coordinate the myriad factors in a complex thinking human being. The cosmic order is not restricted to events in space and time; rather it determines them. There is a staged, evolving progression to it that is also cyclic and that can make allowances for intelligent adjustment at many levels. This cyclic, deterministic order is intelligent.

It is possible to gain an insight into this underlying system of order because there is an isomorphy to the structure of experience. In other words, there is a common underlying structure to all phenomena that recurs again and again. This structural quality of self-similarity pervades experience regardless of the scale of magnitude or the diversity of circumstance. Despite the complexity of structure, isomorphy renders it communicable.

There are many clues that point in this direction. For instance, as different as people are as individuals, we all share the same biological structure. With minor variations, we also share the same skeletal and visceral arrangement with the mammals and reptiles. At a more basic level, we share the same genetic language—neatly locked up in the DNA molecule—with all forms of cellular life on the planet. Further underlying the chemistry of our cells, our bodies share the same chemical elements with the universe. There is thus a unity of organization underlying the diversity of experience—the cosmic order. This system of organization can be called simply “the system,” because there is no other system possible. It embraces all of the possibilities to experience. What are normally called systems are surface fragments of “the system.”

The essentials of the system were revealed in an unusual personal experience. Over a period of years a way has been devised to make it communicable, but it should be emphasized that the system is not just a concoction of the human mind. The experience was profound beyond

description, unbearably intense, and vividly explicit. Sanity and life were left hanging by the slimmest of threads, unable to disbelieve the depth and scope of its revelation, or to directly assimilate it. It has taken many years to make rational sense of the experience, to understand the system that was demonstrated, and to find ways to express it.

There is a journey involved in learning to understand the system. It is a journey through a very changeable landscape, like an extended fishing trip with many good fishing spots along the way. There is an intuitive kind of fishing that must be done to grasp the essence of the system.

We will be going on the fishing trip together; I will be along as an ordinary fishing guide hired for the price of this book. My job will be to make the trip interesting, to point out the fishing spots, and to draw on personal experience to illustrate different facets of the system. The real guide, however, is the system itself as it works silently through the intuition of each of us. Each of us is really on the fishing trip alone. Each of us must fish for ourselves, yet there are self-similar areas where we can benefit to an extent from the experience of others.

We will make stops in many fishing holes, including history, business, evolution, biology, earth science, physics, astrophysics and cosmology, philosophy, religion, psychology and others, all of which will be mirrored in the constant traveling companion of nature. This kaleidoscope of experience is presented to illustrate the universality of the system through which all experience is integrated. It is more fundamental than language, which introduces a special challenge in communicating it. Insight into the system must be personal and direct, since it stems from a creative dilemma that prescribes an implicit as well as an explicit aspect to experience.

The dilemma of the moment, however, is the time of night and the need for rest. A cloud has masked the moon to dull the shimmer on the lake. It is time for bed.

## Chapter 2

# Whitemen and Indians

There is a small bench under a cedar tree by the lake that is a good place to sit and let breakfast digest. The day has already become quite warm, though still fresh and comfortable. The morning dew has dissipated, and a quiet breeze is softly wafting through the cedar grove. A young robin is taking a solitary bath next to some reeds by the shore.

This part of the country is very beautiful. It consists mostly of thick forest cover over granite rock and muskeg swamps, interspersed with literally hundreds of thousands of lakes—part of a vast wilderness stretching for some three thousand miles, from the Labrador coast through Quebec, Ontario and Manitoba, into the North West Territories. Known as the Precambrian shield, it is one of the oldest geological areas on earth.

To the early settler the area was virtually impenetrable. Except for Indian resistance, there was ready access to the parklands of southern Ontario, and to the river basins of the Ottawa and St. Lawrence, but settlement halted at the fringe of the shield. There was simply no possibility of major movements through it. Transport was limited to the fur trader and canoe, as a new way of life evolved throughout the intricate system of waterways draining toward the St. Lawrence. The *voyageur* tirelessly paddled and portaged goods for many hundreds of miles to the cities of Montreal and Quebec, the seaports to the world. With the formation of the Hudson's Bay Company the same process took place on the water systems flowing to the north and from the west, throughout the shield and beyond, through the Rocky Mountains to the Pacific coast. It was the fur trader and early missionary who first established Canada's continental identity. Permanent settlement and agricultural development to the west came much later, lagging that of the United States by a couple of generations.

The discovery and colonization of the Americas coincided with discoveries in many other areas. An exploratory quest was simultaneous-

ly ignited in the fields of art, literature, music and science, with repercussions in religious, political, and economic reform. For the whiteman the renaissance was an awakening from a creative slumber that had lasted for fifteen centuries, since the golden age of Greece. Suddenly the whiteman was asking questions, wondering about all manner of things and following an intuition of discovery that brought with it a great variety of creative expression. It began in Italy, the homeland of the former Roman Empire that had transplanted the essentials of Greek thought alongside the Christian teaching. Soon the germ of inquiry had infected the whole of Europe, while colonial empires spawned and spread, first exploring, then exploiting, sea routes throughout the world.

Donatello and his contemporaries used perspective, a concept introduced by Brunelleschi, in pioneering a naturalist interpretation to sculpture and painting, that was refined by Botticelli and da Vinci. Da Vinci combined his artistic talents with daring excursions into anatomy and science. Michelangelo perfected the depiction of the human form through a study of anatomy, then in later years turned his skills toward architecture. He never lived to see his enormous plans for St. Peter's Basilica completed, but Bernini followed through with some classic finishing touches. Subsequent masters inherited a wealth of artistic insight on which to draw.

Meanwhile paper was replacing parchment to give an impetus to literature, while Gutenberg's innovation of typeset printing made literary works much easier to reproduce. The writings of Rabelais, Montaigne, Cervantes, and Shakespeare were well received, their humanist views making a significant impact on prevailing opinions of the day. The value of the written word became widely recognized, stimulating intense interest in every field of human thought.

Musical innovations began within the church, where fundamental contributions to musical theory established a basis for the long series of majestic new forms of music to follow. The church, however, began to have its problems. While it was reconstructing the basilica in Rome, John Calvin and Martin Luther were taking issue with the dogma of the church, intent on reconstruction of another kind. Meanwhile King Henry VIII of England severed papal ties with Rome for passionate reasons of his own. The new enthusiasm for inquiry was to bring with it many confrontations along the way.

While colonial empires were rapidly being extended, Copernicus, Galileo, Kepler, and Descartes were pursuing new insights into science and mathematics. These found a synthesis with Isaac Newton, who firm-

ly built the foundations of modern science. Scientific discovery brought with it applications to machines. New and concentrated forms of industry emerged, followed by more and more complex machines. These developments were matched by increased complexities in finance, trade, and economic organization generally. The whiteman's mind was seized by the relentless spirit of discovery that was in the air. It was a new and creative framework of understanding that was being explored, but not without some negative consequences.

The colonial history of North America was also the history of the decline and fall of a great civilization. Native American culture was transplanted from Asia following the last ice age, and it retained the spiritual orientation prevalent throughout East Asia, and that still persists to this day. During its long history in the Americas it evolved in a variety of related forms, all in a common spirit of harmony with nature. The Indian's framework of understanding looked toward the implicit side of experience, toward the underlying spirit. It focused on universals implicit in experience as a means of integrating and making sense of experience. The appearance of the whiteman on the continent brought a confrontation with a framework of understanding that looked toward the explicit side of experience, toward the application of technique. The whiteman focused on the particulars of experience, on the fragmented parts, then sought universal laws to explicitly put all the pieces together again, within the presumed vessel of space and time.

The Indian integrated experience spiritually, the whiteman materially, and the conflict that ensued between them was inevitable. In Canada, an initial period of friendliness gave way to hostility, particularly with the Iroquois, who effectively controlled early colonization of their territory. As with the Indian nations further to the south, they had been obliged to fight as a matter of survival.

Conflict with the Indian was averted in central Canada, but not through any effort on the part of the whiteman. It was the austerity of the Precambrian shield that subdued the whiteman, forcing him to come to terms on common ground. Through fur trading the Indian and whiteman reached a limited degree of mutual understanding.

But life remained quite a different experience for the Indian. To the Indian everything had a spirit. Everything was alive. There were spirits in the wind, in the water, in the earth, and in the mountain. Each of the flowers, plants, and trees had a distinctive spirit of its own, some of which were recognized as healing spirits capable of counteracting the evil spirits of disease. The animals represented another level in the spirit

world. As the Indian boy matured to manhood, he went alone into the forest to wait there for a sign, a dream, or a vision. The animal whose spirit was attuned to his nature was in this way revealed to him. It was to this guardian spirit that he usually prayed, and in which he found support through burdensome times in his life. Animals—accorded the respect due spiritual brothers—were basic for food and shelter but not killed for sport. The spiritual life of the Indian was an integral part of his technology and the basis of his entire framework of understanding. Their folklore, ritual dances, and ceremonies were filled with spiritual significance. Their world was teeming full with spirits, great and small, strong and weak, good and evil. Presiding over all was the Great Spirit, to whom they made special petition on the most serious matters.

The Indian looked at a mountain and felt its presence. The whiteman looked and saw a pretty pile of rocks. The essence of the Indian's framework of understanding was integration with his environment. The essence of the whiteman's framework was separation from it. The whiteman strove to conquer nature; the Indian sought nature for an ally. It is easy enough to appreciate the Indian's approach. Despite our inability to reconcile it to the whiteman's culture, it strikes a responsive chord in the hearts of most people. It was not necessary for the Indian to segregate his religion and his science which, crude though it may have been, was derived from his spiritual insight. Explanations of natural phenomena, predictions of weather, famine and plenty, the determination of the curative power of plants—all had a spiritual basis.

In contrast, it is difficult to understand the reasons for the whiteman's divergent approach to science and religion. Many of the most important contributors to science have been profoundly religious people, yet the two fields of endeavor have been treated as mutually exclusive.

Whatever the reason, whiteman's science has been founded on two very strange but complementary concepts. The first is the concept of causality, commonly understood as the belief that every effect has a cause and in turn can act as a cause for a subsequent effect: Everything is a series of chain reactions like a succession of tail-end collisions on a freeway. This belief has become so firmly entrenched that many people cannot imagine the possibility of an alternative. The second concept is embodied in the whiteman's scientific method, which requires that all scientific observation be objective. All traces of subjective interpretation must be avoided in the firm belief that the only substantial reality exists between the outside surfaces of things. In other words, there are no drivers inside the cars that collide on the freeway. Together the two concepts

cannot lead to an impartial interpretation of experience, for they exclude the subjective pole of experience.

A nice tidy short circuit was thus introduced into the pattern of the whiteman's mentation. By the objective concept of the scientific method, certain structures and processes could be observed in nature, then the concept of causality tried out to see if it explained events. This introduced other concepts such as force, mass, acceleration, and so on, and a scientific language based on objective causality proliferated.

The whiteman was particularly gratified by his degree of success, since he was so thorough in excluding his own psychological and emotional experience from the process. Since these subjective qualities had no substantial reality, there was no reason to believe that they should be conditioned according to his understanding or behavior. Having therefore mastered nature he was free to do as he pleased.

To keep whims in check, the whiteman acknowledged a social morality based on religious doctrine that was totally divorced from science. In essence it was very simple—reward or punishment was to come in heaven or hell. Although no one knew where heaven and hell were, this was irrelevant from a scientific viewpoint, as it was not a substantial reality that went there anyway. You body rotted in the ground.

The more sophisticated the whiteman's science became, the more it determined his social organization, and the less the religious component was required. Any real basis to religion was in fact discredited by the concepts of objective causality from the day of their inception. Whiteman's science now shapes the worlds of industry, trade, and commerce—economic and social survival being inextricably dependent on it. At the same time, the deficiency of science is creating such a formidable complex of problems that it threatens economic and social survival. There doesn't appear to be anywhere to turn. How have we gotten into such a fix?

Nonetheless, objective causality has led to a journey of discovery that has lasted for over three centuries. The world of fact has been rooted out, to accumulate an enormous fund of knowledge. We owe a great deal to science, but it has not brought with it a parallel development of understanding. This requires insight into the implicit side of experience.

The objective approach has required science to search for answers in two independent directions: toward the center of things, and toward the periphery of things. Although these correspond to the two poles of the ever present creative dilemma, the objective language of science has

been obliged to treat them independently. They stand apart, like the whiteman and Indian, to present the many contradictions in our situation.

In penetrating toward the center of things, science has learned that pure substances are molecular combinations of ninety-two naturally occurring elements. Underlying atomic structure, an elaborate array of short-lived particles and antiparticles has been found to display remarkable symmetries, transformations, and also wave properties that present an enigma to the objective language of science. How can matter be both hard little lumps, and at the same time, smeared out wave propogations? Unable to determine the precise nature of events at the center of things, science has been forced to adopt a principle of indeterminacy.

In the other direction, science looks out toward the periphery of things, toward the external limitations to events. On the assumption that time and space are like an infinite vessel in which physical events occur, science devised laws of motion, ascribing them to nature. Then it was discovered that light does not obey these laws, that it travels at the same velocity in relation to all objects, irrespective of how fast they may be moving in relation to one another. Relativity theory was devised to compensate for the constancy of the speed of light: objects moving at great speed relative to an observer appear shorter in the direction of travel; their mass tends to approach infinity; and their time slows down to a relative standstill.

For instance, if we could see an astronaut inside a rocket ship approaching the speed of light as it passed earth, he would appear his normal height but would look thinner, even though his mass had increased, and his wrist watch would run slower. Since science sees us to be part of an expanding universe in which the farthest galaxies recede from us at speeds approaching that of light, the perceptual limits to the universe lose meaningful significance to our space-time frame of reference. Questions about a periphery to experience become as indeterminate as those about a center.

The deficiency of science is most apparent at its extremities; its language is unable to reconcile the center-periphery polarity within a common framework of understanding. Thus the two poles of the creative dilemma are linguistically opposed, just as they were culturally opposed between the white man and Indian. The same deficiency generates a different set of problems in a different situation.

Many sides to the center-periphery dilemma present themselves in every area of experience, but there are a few features that are always apparent in any circumstance. Of prime importance is that neither the

center nor the periphery of experience can be known to the exclusion of the other. The one owes its existence to its relationship with the other. This requires an active interface between a center inside and a periphery outside. The center inside relates actively to the periphery outside and there is generally a degree of feedback in the reverse direction.

For example, we have emotional feelings and thoughts that are active within us. We call them subjective and they motivate us to act with respect to our peripheral environment outside. At the same time there is objective feedback from the outside coming in through our senses of sight, hearing, touch, taste, and smell. We even sense thoughts and feelings of others. These are very common aspects to experience.

Everything we know we owe to the active properties of interfaces. Interface processes define the complexities of experience. The perception and integration of our senses is likewise dependent upon active interfaces within our nervous system. We use them to observe and make sense of ourselves in relation to the environment and they constitute the subject matter of all scientific study.

Cultural interfaces associated with language and social traditions concern the conscious patterning of experience through the way we make commitments to an ordered way of life. A reasonable degree of subjective to objective balance is implicit between individuals within any given social tradition. Unfortunately, the deficiencies of language usually constrain this polar balance within narrow limits established by cultural bias. Communication across cultural interfaces frequently runs into stormy weather, especially when cultures are so widely divergent as those of the whiteman and Indian.

For now it is enough to know that interface processes are very fundamental to the system. As our journey progresses their properties will gradually become more apparent, especially when we get to the delineation of the system itself.

The position of the sun indicates that the morning has slipped by. The wind has picked up a little. Sitting by the lake and soaking in the scene that is so old, yet always fresh and new, one feels as if the hand of time is halted and held prisoner in the present. The greenery still exudes the same persistent vitality with which it bursts forth in early spring. Now as the plant world coasts with the season into summer, the vital tempo assumes an air of confidence that projects the certainty of completing a magic mission for another year.

The lazy ripple of the water laps listlessly at the shore. In the sand beside the dock, and at the edge of the water, there is a small frog, hardly finished changing from a tadpole. It is sitting half in, half out of the water as if unable to decide between two worlds. It too is soaking in the scene and reflecting on it, but without need to reconstruct the process. During the day it sits and suns itself, or feeds on bugs, or seeks shelter in the shade. At night it too marvels at the mystery of life from its station by the shore, in its own direct, uniquely wondrous way. It looks out across the surface of the water or upward to the secret messages of a starry semaphore, adding its raucous croak to the chorus of the night.

The oldness of the scene is a tribute to its newness, its newness likewise a tribute to its oldness. What is time except a notion to explain away uncertainty? Yet it is a notion that turns on us, condemning us to the certainty of a death march down a blind corridor of our own construction. Here in this scene, there is no such thing as time. There is only life going on, a complex living process complete with all the polar attributes of birth and death, joy and suffering. Time and its partner, space, are only dialogue in the play, not the players.

There is just enough wind to do some drift fishing for pickerel. After a short swim and some lunch, the fishing gear is collected and taken to the boat. The minnows in a styrofoam bucket in the shade are gathered as well. With enough gasoline in the tank everything is set. The wind is from the southwest—just about right for drifting along the edge of the big shoal. Sometimes in the afternoon the pickerel come in there to feed. With one pull of the rope the motor starts and the boat heads up the lake.

## Chapter 3

### Circles and Squares

The threat of a late afternoon thunderstorm has forced an exodus from the lake, none too soon. The rain is coming down hard now. A glance out the window catches a ragged flash of lightning followed quickly by a shivering crash of thunder. The phone burps a few unsteady rings. Close! Before heading in, good fortune provided a couple of pickerel for supper, just big enough for a good feed. Bass, trout, and northerns are fun to catch, but when it comes to eating fish, pickerel are the best.

The thunder has become an almost continuous rumble with occasional sharp cracks nearby. There is a good sized hill behind the cottage which offers protection from a direct hit by lightning, but sometimes a minor charge will follow the telephone or hydro wires in. These systems are not nearly so well grounded as they are in the city.

The two pickerel are filleted on a board kept for the purpose. They are not very large, about fifteen inches, but enough for a good meal. Pickerel is a fish from which every bone can be removed without destroying the fillet. All fish have fine bones protruding from the rib cage into the flesh—these have to be severed when removing the fillet. In pickerel, however, they form a single row that can be removed in a neat sliver of flesh with little additional waste.

Usually fishing serves as an effective technique of clearing the mind of debris. One has to adopt a special kind of concentration in order to fish. The fish world is very different from the world of our experience, but one has to establish contact with it to catch a fish. There is, of course, the obvious physical contact through the fishing line, but it seems that another contact is called for, a psychic or communicative contact. Fish live in a world of water, we live in a world of air. The two are separated by a surface through which perception is very limited in either direction. There are as many worlds of fish as there are lakes, each requiring a framework of understanding distinctive to the fish within it. Although different species of fish have distinctive habits, it is also necessary to learn how those habits are displayed in each specific lake.

Generally speaking, fish tend to be very selective in their choice of feeding ground. In some lakes this might be restricted to only a few spots; in the case of pickerel or bass some of these spots might be only a few yards across. There are also lakes where it is difficult to distinguish any special spot. The size of lake is also a factor, although not necessarily a predominant one. For example, there are small lakes that are teeming full of northern pike, but you rarely catch a large one. There are also small lakes that seem to contain very few northerns, but you rarely catch a small one. The characteristics of the lake can therefore be as distinctive as the characteristics of the species. One has to have an understanding of them both, but this understanding is still far from complete.

The fish of a given species within a given lake tend to behave as an individual. To a lesser degree this is also true within a district of lakes. When one feeds, they all feed, and when they aren't biting, it is often hard to catch any. Feast or famine seems the order of the fish world, especially where man has not yet seriously disrupted its natural order. Where the incessant roar of speedboats has chewed up the weed beds and turned an underwater wonderland into a hi-fidelity resonator, it is a wonder that fish can survive at all, let alone demonstrate distinctive habits. Weather seems to have an effect on the collective response of fish to feed, but it is by no means a consistent effect. While fair weather from the prevailing direction seems best for fishing, minor storm centers don't seem to hurt any. On many occasions, there is excellent fishing both in the midst of thunderstorms and in steady drizzle. Sometimes there are long periods of poor fishing in good weather. There are always exceptions, and that helps make fishing what it is. It has to be experienced to be appreciated.

Whatever the conditions of fishing, the essential experience is always the same. It is a formless search beneath the surface of the water in a world where perception is very limited. It is a quiet, almost meditative endeavor to establish contact with a living member from that world through the material aid of a fishing line and bait. This of course doesn't include the hook dunkers. There are fishermen and there are hook dunkers—very often you cannot tell them apart by their technique. Sometimes hook dunkers have the very best of equipment and know everything there is to know about fishing. Some have traveled to inaccessible places and can boast of unexcelled catches, but every fish they catch amounts to no more than a fortuitous accident. Hook dunkers are consciously engaged only in mechanically dunking a hook in the water using a variety of methods. A fisherman is engaged in a communicative experience. The

fisherman isn't concerned with trophies or record catches, nor does he get perturbed if he catches nothing. To catch nothing is as much a part of the experience as to catch a boatful. Fishing in this sense is more than a contact with the fish world. In its purest form, it is a contact with our own beginnings, a groping for an ancestor from our evolutionary past. It is a search beneath the surface of our thought into the formless depths of being, as clear and refreshing as a drink of spring water.

One must be an intuitive fisherman to understand the system. It is beneath the surface that one recognizes the universality of the system—an intelligent master template to experience. Because the system underlies all experience it can offer unlimited potential. It can provide a new and better perspective on problems of every kind, but one doesn't pursue an understanding of the system just to solve the problems of the world.

The problems of the world may be collective, but they are collective because they are individual. Nobody has the solutions because everybody has them. The problems of the world are signposts to an individual search for understanding. Each of us is presented with a set of problems according to our circumstance; each of us is obliged to cope according to our understanding.

Understanding implies perceptual insight within a framework in which things are seen to fit into place. Complete understanding implies a universal framework—a requirement for common understanding. It is therefore a requirement for genuine communication. This implies not an explicit foreknowledge of all things, but an implicit relationship between all things. Our responses to circumstances in this way fit into a universal framework. Whatever the caliber of our understanding, each of us contributes through the responses we perceive to be suited to our situation.

The thunderstorm is not letting up any. It is a hard, driving rain. Water is running in makeshift rivulets down the slope in front of the cottage. It should make the farmers happy, but the timing also seems right for other reasons. There is something about a thunderstorm that clears the air.

The pickerel is delicious—more than enough to eat. Things are cleaned up before once more sitting down to listen to the erratic rumble of thunder and the staccato pattern of rain on the roof. The food has improved the mood—maybe the rain has too. Atmosphere and mood are related somehow. Moods tend to affect our perspective and the content of our thought, but they are often initiated by external influences. They are coupled to sensory input, thus maintaining a relevance to one's activity, covering a wide and varied spectrum, from very passive to very dynamic.

They set the tone of the body, tuning the mentation process in a way that is suited to circumstance and the activity concerned. Moods are an implicit component to spirits, although we do not always recognize spirits as such, calling them by various names. The explicit component is the pattern of animated activity in response to ongoing circumstance. Spirits emote a pattern of activity through our emotional apparatus, the autonomic nervous system. We adapt a spirit to activities of every kind, from sports and work to music and war.

Spirits are patterned energies that become organized on many levels through experience. These energies are refluxed via the autonomic nervous system into the mentation process in a reciprocating, ongoing way that modifies and refines them in a manner deemed appropriate to the needs of circumstance. They are tailored through conscious mentation by overriding frameworks of understanding, as we shall see.

Attachment to the patterns or routines of activities tends to produce closed belief systems that become self-perpetuating ends unto themselves. In a changing world they eventually lose relevance; the energies concerned must be modified or dissipated. Otherwise they may become stultifying or harmful to those who persist with them. In contrast, a universal framework of understanding has the capacity to maintain an evolving relevance to changing circumstance. A universal framework doesn't change: it prescribes the pattern for change in any circumstance.

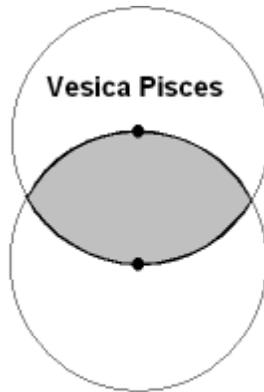
The system integrates experience in a way that is neither static nor rigid, although it never changes. All possible varieties of experience are expressions of the system, whether they evolve toward the coherent integration of experience or devolve in a degenerate spiral toward fragmentation and decay. There are both evolutionary and involutory variants to the system.

Although the system is very flexible and adaptable, it does not resolve problems for us. Personal problems present us with choices that can either make things worse or better. Life requires us to discriminate alternatives and make value judgments according to circumstance. If this were not so, we would be denied the opportunity of learning to cope in a pertinent, responsible manner. Problems teach us—they make us take notice, observe, wonder, and search for a better basis of understanding. The system reveals itself through search and wonder; thus problems bring us to the system.

There have been other expressions of the system in the distant past, products of other ages and other civilizations. Today only a few scraps of such systems remain, often regarded by science as products of primitive

and superstitious civilizations, sometimes with sound reasons. There is, nevertheless, a large body of evidence in some cases that points to a highly developed understanding of the cosmic order in ancient times.

Strangely enough, the last of these ancient systems of understanding began to lose influence at the beginning of the Christian era, which coincided with the dawn of the Piscean age. The early symbol of Christianity had in fact been the sign of the fish, derived from a figure called the *vesica pisces*. (See Figure 1.) The *vesica pisces* is that figure bounded between two overlapping circles of equal radius such that the center of each is on the periphery of the other. It is therefore a representation of the center-periphery dilemma.



*Figure 1*

One circle is taken to represent internal animating spiritual energies, while the other circle represents external physical expressions of them. The spiritual circle has universal characteristics such that there may be any number of physical circles centered around its periphery.

For example there is a common spiritual pattern to the way that all human beings are emotionally animated, albeit with a great many variations. Despite the physical fact that there are nearly six billion different particular individuals on the planet Earth, we all share a universal aspect—a common spiritual quality that identifies us as human. The same is true of horses or elephants or seals. In a self-similar way it is true of beetles or trees, or flowers. There is a distinctive horseness to every horse, a roseness to every rose.

This is a cosmic phenomenon that concerns the very nature of identity. Every particular creature or thing that we can explicitly identify distinct from others, we must do so by relating it to universally patterned characteristics implicit within that creature or thing, whether its a spider or a space ship. All spiders, big and small, whatever their color, have eight legs and multiple simple eyes, with generally similar anatomy and characteristics. Within any one species of spider, the characteristics of all members of the species are virtually identical.

We likewise invest our human creations, from space ships to tea cups, with our own creative energies universally implicit in their design for a particular use. Everything we know, we know through the dynamic interplay of universally patterned energies implicitly at work within explicit particular examples of them. Otherwise we could identify nothing. We could not give anything a name. Explicit language about particulars of experience always relates to an intuitive recognition of implicit universals. Even the operation of our brains are organized accordingly, into a language hemisphere and an intuitive hemisphere, both of them being harnessed to a common emotional apparatus. More on this later.

John Michell in his book *City of Revelation*<sup>\*</sup> has explored some of the significance of the vesica pisces. He shows that St. John's description of the holy city in the Book of Revelation conforms to the principles of a system of sacred geometry that is extremely old and is demonstrated in the structure of the pyramids, in the temple at Stonehenge, in the groundplan of Glastonbury Abbey, and in the English system of measurements.

The problem most fundamental to the sacred geometry was that of squaring the circle, which involves drawing the square whose circumference is identical with that of a circle. This is logically impossible, since pi ( $\pi$ ) is an irrational number. The curved circumference of a circle can never be measured or computed exactly, in the same units of measurement used to measure the straight radius or diameter. Yet a circle can readily be drawn on a piece of paper using a compass of fixed radius. The logically impossible thus clearly exists. Moreover it's abundantly apparent in the endless circles of the heavens.

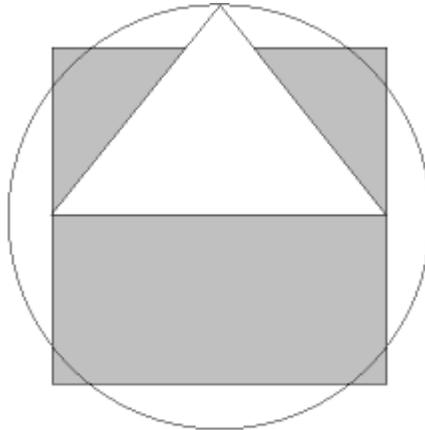
To the ancients, the square and the circle represented two contrasting geometric principles that must find reconciliation within a common framework. The ruler and compass were the only tools permitted.

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<sup>\*</sup>John Michell, *City of Revelation* (New York: Ballantine books, 1977).



Michell also points out the structure of the Great Pyramid as another monument to the squaring of the circle. The height of the pyramid corresponds to the radius of a circle, the circumference of which is exactly equal in length to the perimeter of the base of the pyramid. The correspondence is precise according to official surveys, much too close for coincidence. (See Figure 3)

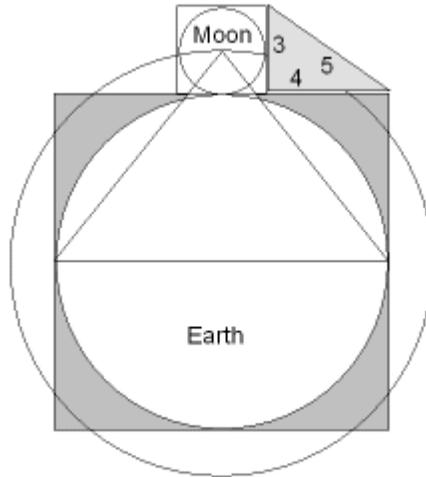


*Figure 3*

The Great pyramid is accurately aligned toward the four points of the compass, and has various other remarkable astronomical features. It has none of the usual attributes of a tomb, no sculpture or artistry to the interior, no hieroglyphics—just the stark accuracy of its geometric design. To add to the mystery, there has never been a mummy discovered inside a pyramid. The stone coffin or sarcophagus inside has always been found empty.

The most impressive example of squaring the circle is given in the relative dimensions of the earth and moon. When they are drawn to scale tangent to one another and each is enclosed in a square, then the circle scribed concentric with the earth through the moon's center will have a circumference equal in length to the perimeter of the square containing the earth. This arrangement is similar to the circles at Stonehenge, and the relevance of the pyramid can be seen also. In addition, if the corner of the square containing the moon is joined to the corner of the square containing the earth, then the enclosed right-angled triangle has sides closely in the proportion 3, 4, and 5. This is a triangle of special geome-

tric significance. It is remarkable that the relative dimensions of the earth and moon should provide a geometric representation of the moon's significance to the harmony of life on earth. (See Figure 4.)



*Figure 4*

Why have there been no successful attempts to piece together an understanding of the ancient systems of knowledge? At least part of the answer should be apparent. It isn't possible to do it within the context of an objective determinism, since this approach cannot embrace both poles of the creative dilemma.

The language of Western science is dichotomous. It engenders an either/or type of logical approach that tries to prove things objectively, often at the expense of subjective realities. Either this or that is the cause—out there, in the external world. While this approach may meet with limited success in some instances, pursued indiscriminately it tends to fragment experience rather than to integrate it. Choice is seen as an expression of dominance that is often pursued to extremes. Aggressive competition, organized anarchy, open warfare are the extremes of choice when confined to an objective determinism.

The ancient systems were polar, insisting on a unified perspective that exhibited great integrative power. With a single stroke they grasped the essence of the universe in all its diversity of form. Ancient systems were expressions of the system couched in a language that was appropriate to their age.

There is a special technique for delineating the system that is not dependent on language, yet it can be used to develop language that is pertinent to science or to other forms of social, economic, or even spiritual organization. It requires that old frameworks be reassessed and reassimilated. One should be cautious of overzealous efforts to understand the system. It can sometimes be difficult psychologically, emotionally and even physically. It takes time to understand, time to fish, time to wonder at the stars, or just to listen to the rain and let things settle into place.

There are many sides to it all, just as there are to fishing. One can understand the habits of the species, but this in itself is not enough. It is necessary also to know the lake. There are many worlds within the world and there is not time to fish in them all, but neither is this necessary to become a master fisherman. First it is necessary to become more than just a hook dunker seeking a quick catch. One must learn to search beneath the surface.

The thunder has let up some but the rain continues in a steady downpour. It is already dark. There will be no bass fishing tonight. Another day has passed with little progress toward the system. However, this preliminary ground must be covered well. The mind has absorbed enough for one day. Although it is still early, it feels time for bed. The patter of the rain brings an easy sleep.

# Chapter 4

## Clouds

The sun is rising over the horizon, peering with a large red eye through a flimsy curtain of cloud and struggling to clear its vision. The rain has passed to leave the promise of a nice day, but everything is sodden, a little hung over from the storm. Although it is early, sleep has run its course. A little exercise is good to get the vital juices flowing; a thirty minute run is followed by a swim.

After breakfast the hill behind the cottage is climbed, and a comfortable looking rock is chosen for a seat. The morning air is beginning to warm up, and the grass exposed to the sun is already dry.

The attention gravitates to the spectacle of life, abounding with variety, singing a common song. A few birds are trying out the freedom of the air. Trees and plants are politely bowing in the breeze, whispering silent messages too intimate to hear. Everything is thrilling to the casual excitement of a part perfected through the ages, performed with ease and grace. A monarch butterfly comes fluttering by in typical erratic fashion. It comes to within a few feet to check things out. It flutters a few figure eights while conducting its examination, then flutters off, only to return in a couple of moments to double-check. It seems that everything is in its place except for man. A newcomer to the choir, we have yet to learn to read the music.

An insight into the system first came quite a number of years ago as a result of a prolonged intensive effort to understand the nature of a business organization. The story begins in the late 1960's. I was working as a professional engineer for a natural gas utility company in Southern Ontario and the spiritual aspects of life were the farthest thing from my mind, or so it seemed at the time. I was not a very religious or spiritual person in any traditional sense.

As Plant Engineer I was responsible for a major portion of the company's operations, the design, construction and maintenance of its buried plant, from the gate stations where we purchased natural gas through the maze of buried pipelines that distributed it to the customers' meters. Fol-

lowing the introduction of natural gas to an old manufactured gas system, we had come through a very difficult period of leakage control that involved replacing many hundreds of miles of buried gas mains and services through city streets in an urban area that was also rapidly growing. There were more leaks than could possibly be repaired and public safety was a primary concern. But the employees were young and energetic and we responded to the challenge. It took a number of years, with everyone working long hours to get it under control. A cohesive responsible organization emerged in the process.

Then the company was taken over by a much larger company that had its own ideas on how the whole enterprise should be organized and integrated. The new head office bureaucracy wanted to centralize all operations without adequate regard for fundamental differences in the two companies. They were a large, predominantly rural, sprawling company. We were a concentrated urban company. The communicative requirements between our operating parts were different. Many of the things that they wanted to do were simply not practical and we would lose control of a situation that we had struggled long and hard to cope with. Some one had to be responsible.

I thus found myself a central figure in a political battle that ensued for several years. By this time there were three hundred staff experts in a new but remote head office, and they began sending study teams with endless questions. Why, why, why? Why anything? After awhile one begins to question everything. They wanted me to voluntarily agree to methods that I knew were unworkable. Staff people are not supposed to have authority over line people, in a company organized such as theirs, so the conflict was structured in. I was the one responsible, not them, and replies and reasons kept falling on deaf ears. They didn't have to live with the consequences of their own decisions. But I had human resources at my disposal and during the last year of this period, as the struggle became very intense, I undertook a detailed study of all formal communications in the entire company, in an effort to show decisively that the system they wanted to impose wouldn't work.

During this period of intensive analysis, including self analysis, an intuitive insight gradually formulated itself that had implications far beyond the organization of a company. I called it a *primary activity*, since the pattern related to the organization of experience generally. As I conceived of it then, the primary activity consisted of three independent but related aspects. There was always a *Means* to undertaking any crea-

tive activity, there was always a *Goal*, and there was always a *Consequence*.

This wasn't a linear process of cause and effect. It was a cyclic process. The goal transformed to a consequence that enriched the means in recurrent cycles, even while each of the three aspects of the primary activity remained an independent focus of any creative endeavor. So it wasn't linear through time and space. It integrated the history of its own development. It integrated what we think of as time and space and there were any number of ways that this could occur. I was very taken by the dynamics and implications of this intuitive pattern to experience generally. It focused my attention in a new way and I began to see implications in the natural order of things. It excited me with possibilities that I had never considered before.

At this time, I made the briefest contact with the work of J. G. Bennett, through a colleague that I had barely met at the new head office. An article he had written was given to me by a mutual friend who had previously worked in my department and had transferred to the new head office Personnel Department in another city, a couple of hundred miles distant. The article by Albert Low made extensive reference to Bennett's work. Bennett had apparently developed a geometry of six dimensions, including space, time, eternity and hyperaxis. Although I knew nothing of Bennett or his work, something about it ignited my mind. He was dealing with strange bed fellows. Had physics really been related to religion? Did they both have relevance to a business organization? I didn't know, but something clicked with the quest I had been on with the primary activity. Was there a whole new way to make sense of experience?

I had just finished compiling the lengthy report on the formal communications in the organization. I had been at it long hours for many months, along with the team that I had assigned to work on it. After it was finally submitted I was exhausted and my mind was in a tumult, churning with new possibilities. I felt on the brink of something immense.

One evening I came home from work feeling drained. I had done everything that I felt I could do and could only wait to see if there would eventually be some response to the report. I entered my apartment where I lived alone and lay down on the sofa, my head on a cushion, my hands folded across my chest. My eyes fell closed.

Almost immediately the tension and turmoil of the preceding months fell away. I became aware of the inside of my head, what I thought was my own mind. I thought this kind of awareness unusual. Can

one be aware of one's own mind? Then who is aware? My focus wandered like a kind of independent perception through my whole body. My attention fell to the rhythmic rise and fall of my breathing of its own accord. Then a strange phenomenon occurred. Inside a rear corner of my head as I observed it, in or near where the right occipital lobe of the brain is located, there was suddenly a tiny spark of light, little bigger than a pinprick. From it a little shower of lights trickled across my mind as I conceived of it inside my head. It was like a miniature fireworks that I simply observed. It was odd but it didn't disturb me. My attention fell again to the rhythmic rise and fall of my breathing.

Then a wondrous thing began to happen. It started ever so gently. I became aware of the form of my body as I became more absorbed in the rhythmic rise and fall of my breathing. I made no effort to interfere. I had no thoughts. My mind was empty. There was only a clarity of awareness of events that were taking their own course. Then I became aware of a form to the form of my body. My breathing began to assume a vibrant harmony between the two. I became an impartial witness to a vibrant harmony of breathing.

The harmony of breathing gradually enveloped my whole body with a wondrous feeling that filled every fiber of my being, every nerve, every muscle, every cell. As it did the area of my chest seemed to open wide and become alive. A vibrant golden light began to glow within my chest and it blossomed forth to fill my mind and engulf my whole body in a field of golden light. I became a vibrant ecstasy of living golden energy. The energy encapsulated me in an effulgent globe of inexpressible rapture. It filled my vision.

Then, in what seemed a most ordinary fashion, a mirror image of my face appeared before me in rich, full color. It was just my head and face, looking impartially and intently at myself. The eyes of my mirror image were looking directly into my own eyes as if they were open, as I lay there with my eyes closed. There was nothing dream-like or trance-like about it. I was more fully aware than I had ever been. It was like looking into a mirror of living gold. My face just quietly appeared, then faded in a moment leaving me immersed in a formless ecstasy of living gold.

It was some time before I slowly sat up. As I opened my eyes, it was like having been asleep from birth, living out some distorted dream, and then waking up for the very first time. The root of all anxiety was gone. Everything was bathed in living light that worked in and through it, making it what it is. There was a spontaneous awareness of every cell in my

body that was far more than just awareness. Every cell in my body was in organic union with the form to the form of my body. Every cell was in a state of ecstatic ongoing orgasm that showed no sign of letting up. The walls of the room were cast in living light that seemed to fill the air. I could see the vital energies teeming within the potted plant in the room. A sparrow landed on the railing of my balcony, chirping and hopping along in a dance with the energies that bathed it. I could visually see the tiny wheels of energy turning within its little head and breast and I implicitly felt a unity of appreciation for its avian concerns.

It went on like this for several days, everywhere I went. It never left me for a moment. The energy transformations of all living processes were illuminated and could be seen visually in meticulous transforming details that were infinitely too complex to attempt analysis. The whole of physical existence was a transparent projection cast upon a world of living light.

I called the next morning to say that I wouldn't be into work, then the weekend came. My concerns at work seemed futile and wasteful in this wondrous new world in which I now found myself. It was the same old world but seen and experienced in a profoundly more meaningful and intelligent way. I was a living part of a living whole that was pulsing and teeming with cascades of energy that were the very essence of life itself. The whole world that I saw swarming in brilliant life giving patterns around me was also living in and through me. I was in intimate personal contact with every living thing, every blade of grass, every tree, every leaf on every tree, every dog, every cat, every bird, every human being, every creature under the light drenched heavens above. Each night I drifted effortlessly off to sleep in blissful thankfulness. Each morning I awoke to another adventure in ecstasy. I bathed in a world that was a living being of intelligent energy of immense complexity and proportions.

Ecstatic though the experience was, it was at the same time mundane. It wasn't like a euphoric fantasy induced by some kind of wish fulfillment. There was a depth of reality and discovery in every perception. An effortless balance and equanimity pervaded the rapture. I functioned completely normally, although something of my condition must have been apparent and strange to others, if for no other reason than nobody has the right to be so incredibly happy and at peace.

The emotional problems and attachments of total strangers could be seen visually as they passed on the street. I could see their emotional energies generated within their body, then rising up through their cere-

bral consciousness and projected out in a way that returned to them and generated endless cycles of the same problem. Endless streams of living energy were churning painfully through them. They were locked in a wheel of suffering that was self-perpetuating, yet they were powerless to see it themselves. They were powerless to do a thing about it. The sorrow of this was fully apparent but not in a way that disrupted the equanimity of the experience. If I could have done anything to help I would have, but the streets were full of people like this, some of them carrying terrible burdens. I had been through some difficult periods myself and now those burdens were lifted from me completely. I did see people with clear minds and they seemed constructive, but their numbers were very few.

I didn't rationally understand what had happened to me. I had no preparation for it, no discipline of spiritual practice of any formal kind, apart from growing up with an empathy for nature in a backwoods village. I had a normal Christian upbringing as a young child, like everyone else in those days, but there was no hint in this of the quality of experience that I now enjoyed. And I didn't enjoy reading. I enjoyed fishing, swimming, hockey and the outdoors. My only other passion was art, and other interests and demands submerged that in my teens. I truly shunned reading. I had read little or nothing about such matters.

But I had heard or read briefly about the Hindu and Buddhist religions—hardly more than a few rumors. I had heard vaguely about enlightenment, although I had no idea that it could be like this. Had I somehow lucked into an experience of enlightenment? Was this possibility open to anyone? I thought at the time that that must be it. Whatever had happened it didn't seem to require a lot of analysis. It was impossible to explain. It was impossible to articulate the living insight that flooded through me in a continual deluge.

As the days passed I began to wonder what I would do. I decided to resign from my job. My boss came to see me early the following week and I told him of my intention. I could see that there was little hope that the strife at work would subside of its own accord. So long as I stayed I would only help to perpetuate it. There was no way to convey this sublime perspective to anyone. I couldn't change the whole world. I was not a messiah and I was far from perfect. To stay would be to perpetuate an exercise in frustration, like the tragic legions I saw walking on the streets. I had some savings to tide me over for awhile and I had no dependents. Still I wondered what I would do in this state that was both sublime and mundane, and at the same time so foreign to everyone else in the world around me. For all the splendor and rapture of the expe-

rience it was mute. It set me apart. I could see no way to translate it in a socially meaningful way that would be acceptable to those around me. I was beyond the pale.

It was as I was sitting alone in my apartment one night, wondering what I would do, that the rapturous experience of organic union came to an end. It just gradually faded away and as it did I had the feeling that something was turning around backwards. The end was in fact the beginning of something new, another side. I received a direct and unmistakable telepathic message. Twelve words.

*“You have seen my face and now you will do my bidding.”*

The words were deliberately articulated within my being in a way they could not be denied as a message from someone other than my person. They were not like thoughts. They were explicit words that penetrated my whole being. There was a severe intensity to them. They were startling.

At the beginning of the experience I had seen a mirror image of my own face, but this was not myself talking to myself. What other face had I seen? What was this sudden invasion of what I regarded as my privacy? Was my own mind not private? I did not reply aloud. I replied to the message in deliberately formulated words in my mind. I instinctively had the ability to project them in similar telepathic fashion.

*“I haven’t seen any face.”*

Suddenly the walls of the room again became transparent but they were not filled with living light. There was a transparent spatial depth extending indeterminately beyond the wall but it was not space as we know it normally. It was a vast field of balanced energies. A face appeared directly in front of my eyes. My eyes were wide open, every nerve alert. I was aware that something was backwards, the inverse of what it should be. The face appeared after the message. I will never forget the exact words of the message as stated above. It was in the past tense. Time was backwards. I was aware that something had turned around. Something had become *perceptually transposed*.

The face was looking directly at me. It was three or four feet in front of me. It was ghost-like in appearance with fuzzy edges, but it was more than a ghost. It was a real living being. It had an incredible presence that extended indefinitely in a two dimensional plane, like an infinitely extended interface of ordered energy with the face in the center. It was the face, the head, the neck, and the shoulders, of a smallish aging man. It had no color. I was aware of an intuitive connection between us. I was a part of it and it was a part of me. The face implicitly embraced the whole

of humanity, from the genesis of human history up to the present. It was the genotype of the human species, a universal archetype associated with every human being who has ever lived.

The depth of the face was incorporated into its presence through human suffering—incredible human suffering. It was terribly scarred—almost mutilated—by tragic events that reached back countless thousands of years. I could sense the events in general terms inherent in the energies of the field behind it, like memories unable to rest. I could catch glimpses of them in the indeterminate distance, like looking backwards from the present through the whole of human history. I could feel the depth of its immense suffering. There was a particularly painful wound in its neck, a gash several inches long, that was still not healed over. It was an event in recent times, a mass carnage of some sort, a major war. There were many similar events that were written in the depth of its suffering and recorded in its face, reaching back to the origins of history. It carried the burden of the whole of human history integrated into its being.

In spite of this social burden of mankind from its inception, the face embodied a will of absolute impartiality. It *must* sustain the burden despite overwhelming odds against it. Suddenly I became intuitively and graphically aware of the future that it knew it faced. Impending events in the near future are cataclysmic. I could sense them viscerally and see inferences of them reflected in the face. They are staggering in their proportions and consequences for the whole human race. This archetype of the whole of humanity may not survive. In fact it appeared certain that it *could not survive* the way things are headed. The fate of all humanity hangs in the balance. It was a fearsome realization—bowel wrenchingly fearsome. This impossible dilemma imposed an extreme severity to the presence of the being, yet it was sustained with gargantuan strength and depth. Its will was monumental.

As the face faded from view, I again replied to the being through deliberately formulated words in my mind. I might have asked what bidding it had in mind, but I didn't. I rejected the message completely.

*"I don't care who you are, it's not right for anyone to impose their will on another."*

The response was automatic. I'd been fighting this very thing for several years. I made a hasty retreat into another room, hoping it was over, but my feet were stopped in their tracks. Suddenly all organic feedback from my emotional apparatus to my cerebral mentation processes was suspended. My slate was wiped clean in marked contrast to the liv-

ing light that had filled me during the previous days. It was like I had stepped outside of humanity, though I was still the same human being.

There was a clarity of perception into an indeterminate formless distance that could be seen right through the walls of the room. The room lost its substantiality, becoming but a flimsy transparent veneer over a vast and shining sea of mist.

A series of intuitive realizations came to me in an orderly sequence. They were intentionally fed to me from a source other than my personal being. I was aware that they came from another source that was different also from the tragic face of humanity. Organic feedback that normally fills one's mentation was suspended. These intuitions weren't organic in nature at all. They were cosmic.

First there was a perception into the formless distance of unlimited possibilities. It was a recognition that possibilities need not be confined in any way, that the range of possibility is unlimited. I seemed able to see forever into the depths of the shining void. This was followed by a few examples, most of which I cannot find words to describe. One of them, a little frightening in its implications, was the possibility of unlimited lifespan. This brought with it a trace of anxiety about how to relate to an indefinite lifespan when our thoughts are so conditioned to a brief lifetime of striving ending in death. But even this latter concern was an intuitive one that was part of the series that was fed to me. My thoughts and emotions were being controlled.

I took another step or two when the most disconcerting thing happened, though I didn't feel it so at the time. Everything vanished completely! The room, the city, the planet, the universe, even my own body, all just vanished completely! There was no loss of a sense of identity, despite not being identified with a body. I was still there but I was an empty I. I had no thoughts, no physical body, no perceptible body of any kind. I was an integral part of the vast and shining sea of mist that contained no forms whatsoever. It was an identity in emptiness with the whole of being. It was experienced with wonder, a pure sense of being and wonder. There was no organic rapture, no heavenly bliss, no pain, no loss, no gain, no sorrow. Everything was balanced in a field of pure being and wonder. It was like gazing into a silvery moonlit night without the moon or stars, even while being an integral part of the emptiness. It was a vast void with a limitless quality of indeterminate depth.

In a moment everything returned again as a thin transparent veneer, but only for a moment. Then everything was gone again. This happened

several times in succession as if someone was switching the entire universe on and off to deliberately show me something.

Next that someone appeared in the room directly in front of me, about eight feet away. But it was not part of the world of material form, so that distance or magnitude had no real relevance. It was just suddenly there all at once. It was an awesomely indescribable and supremely intelligent being. It was a being of pure living energy, but not a being of light. It was round but not spherical. It had depth within its being but not as a physical spatial dimension. It was about two meters or so in diameter, both with form and without, both with color and without, constantly transforming within itself, yet staying the same.

There were multitudinous tiers of intelligent transformations going on within it, energies and colors transforming and changing in an infinite complexity of shifting patterns that were all meticulously integrated into the unspeakable dynamism of its being. I could see into them even as they transformed and changed. It had a million eyes and ears, so to speak, a million living brains transmuting into one another, all of them inter-dependent with one another and with the whole of its being. A million or a billion or a gillion, it's utterly impossible to describe. It was filled with a splendor and a magnificence beyond all reproach. It was suddenly just hovering there in the room, immaculately ordered and harmonized unto itself, seeing and knowing *all*, yet perfectly balanced and impartial.

It could change its texture at will and communicate through emanations of energy that came like a shower of rain from every part of its being. After its initial balanced appearance, it began to emanate friendliness toward me, just like meeting a new and genuine friend only much more so. There was no doubting the flawless quality of friendship it projected. It changed its texture again, this time to mercy. Unrestrained mercy came streaming from it in an unqualified torrent of magnanimity. It changed again to compassion, unlimited compassion with the purest of heart. Then came an absolute deluge of infinite love with a warmth and depth exceeding anything that we know in human experience. Unblemished love came gushing freely from the bottomless wellspring of its entire being without the least expectation in return. There was not the slightest stain in the immaculate quality of its entire being.

None of this came from me. Nothing of this was generated from within me or from within my physical body. It was not a product of my mind. It was infinitely beyond the powers of the wildest imagination. The void was pure mind and it embraced the whole of existence. This

incredible being was the universal center of the void. It was the Master of the void and the whole of experience. It was the embodiment of universal values. It transcended the whole of space and time, the whole of the history of the entire universe. It had no origin in the universe. It was the living source of the universe. It was a manifestation of God, supreme above all.

I stood there dumbfounded, gazing into the face of this incredible Being that encompassed all being. I had no thoughts, no feelings apart from awe and wonder. It was impossible to rationalize anything in the face of this Being, impossible even to think that one could not rationalize. Rejection of the Being was impossible, unthinkable. I was an empty I, a mute and passive observer to what was happening out there, objectively in front of me. I saw with my eyes, just as I would look at a tree, or a mountain, or another person, and yet what I saw transcended the whole of physical existence. I felt no friendliness, no mercy, no compassion, no love generated within me. These feelings rained from the Being out there in front of me in response to its own free will. They entered my presence from without as I stood there in dumbstruck wonder. And there was nothing in them that either sanctioned any flaws in my character or passed any absolute judgment upon me. This infinite Being was simply prepared to make me the gift of a revelatory insight into the whole creative process. In retrospect I can only suppose that this was in response to the intensive quest I had been on for years. In any case a revelation is what followed.

As I gazed in utter amazement at this Being, it became balanced again, just hovering as if it was considering something. Then it began to spin its wheels in meaningless activity that induced a similar minor activity in my chest. This was like a kind of assessment, perhaps an assessment of whether I could handle what was to follow. It paused again for a moment, then increased the intensity of its living texture, became slightly smaller, and moved up and away a little bit. It became pure creative energy, a dynamo of every manner of creativity. It was unimaginably powerful, absolutely without equal. Then it changed to a complete independence of everything, an unthinkable freedom beyond all conceptions. It transcended the whole of creation, the whole universe, the whole of history, the whole of space and time.

It paused once more as if considering something. Then in its very center there was a tiny blip of light. From it came a transmission, like a bullet of energy that came speeding straight to me across the space between us. This brought a momentary self awareness, as if a light came on

within me and dissipated as quickly. It was followed immediately by a sweep out into the void. The world faded from view, just vanished completely as before. I remained aware of a body of some kind, although I wasn't looking to check on my physical parts.

The Being was still with me. It had the ability to dispense with the whole of creation, then either create another reality, or transpose me to another place to provide a view of the same reality from an amazingly different perspective, all this in the blink of an eye.

A thin wand of energy suddenly extended an endless distance out from the center of the Being, like a projection of its will. It swept quickly in a vast arc through the void. As it did, a universe of stars appeared in a great spiral galaxy. I had been transported to intergalactic space. The void had changed its texture and lost much of its silvery appearance. It looked like a night sky, but now I was suspended many thousands of light years out in space gasping in awe and amazement at the profusion of stars cast in a great spiral swirl, with the Being beside me. It all happened quickly as if we were transported at great speed. The galaxy was seen from an angular perspective complete with the feeling of being actually suspended many thousands of light years out in space viewing the galaxy from beyond its extremities. My utter astonishment at the spectacle filled my whole being as if I was at one pole of the phenomenon and the whole galaxy at the other.

Just as magically as it had disappeared, the transparent veil of the room returned. I was standing as before, although I had somehow made a partial turn to the left. The Being was still in my field of vision to my right, hovering there like a living dynamo that could work any miracle it wished.

Then the room vanished again as two titanic power masses became suspended in the void. They were a bifurcation of the energies of the void. They were facing one another, one on top, with an interface that curved upward, like part of a huge sphere, and one on the bottom with an identical interface that curved downward. Both interfaces were extended indefinitely—infinity—being open in opposite directions, as if an unimaginably enormous sphere of energy had been ripped in two, and the top half placed underneath the bottom half.

Together these two hemispheres had to do with the nature of wholeness. On the inside of both of them were dark dangerous looking energies. They were striving for release against the inside surface of each hemisphere as if they were trying to rejoin the energies of the other hemisphere. They looked like writhing serpents of energy seething with

raw power, concentrated against each interface and placing them under great strain to contain themselves. These energies were enormous. They were also complex in the trails that they made within each hemisphere. Since each hemisphere was infinite in the opposite direction, the only way the energies could try to rejoin their other half was to struggle against the interfaces that separated them. It was a rift in the energies of the universe, a juxtaposition of self and other than self across their interfaces, and yet the whole consisted of both parts. One part was transposed with respect to the other. One part was inside with respect to the other part outside, and vice versa. Yet they were one whole. They represented the energies of the entire universe.

Separation and balance was maintained between these monstrous power masses by an exceedingly fine thread of light, just a glistening hair stretched between their closest points. This lone gossamer of light was the only avenue of communication across the gap that separated the hemispheres. It soon became apparent that creative order in and to the entire universe depended on the maintenance of this extremely intricate balance of energies. It was a dilemma of cosmic proportions. The energies of the physical universe were suspended in balance with those of the heavens by a hair. A filmy strand of light was all that stood between the inside and the outside of everything. These enormous energies that are both open and closed must be independently contained, yet mutually balanced to the most minute degree. All of creation derived from it and depended upon it.

No sooner was this recognized than these huge masses of sheer power began to tremble and quake on the verge of horrendous instability. The entire universe was suddenly in jeopardy, facing arrant destruction if the balance of energies could not be maintained. Filled with terror at the unthinkable consequences that this instability implied, the desperate thought came to me that there was some personal responsibility for maintaining the balance. But the energies were infinitely beyond the capacity of one human mind to control.

Gripped helplessly by the horrific consequences that were about to occur, there was an eruption in my body that began in the lower part of my abdomen. Irregular uncontrollable energies came cascading up through my body into my head, where they were transformed into an extreme transverse tension that was not confined to my head or my brain. My presence extended into the void. My conscious mind was being ripped open, stretched far beyond its limits in an impossible effort to hold both poles of the tension. It was as if an aspect of the tension be-

tween the two hemispheres was transposed to an extreme bilateral polarization of the hemispheres of my brain and my mind. My mind was wrenched open far beyond the confines of my physical body, struggling helplessly to restrain the tension that seemed about to tear me limb from limb. The horrendous hemispheres continued to quake on the verge of flying to pieces, while the Being hovered beside me looking passively on, seeing and knowing all. Then when it seemed that all was lost it intervened.

As I turned toward it, the Being increased its intensity and moved up a little more. It became unlimited universal power—conscious power that could be constrained by no obstacle whatsoever, exceeding all of the forces of the universe combined. Then it began to increase its power continuously, becoming smaller and much brighter as it moved up and away on a steep incline, a little to the right. There was nothing remotely conceivable to challenge its supremacy, not in the entire universe. Size distance and magnitude lost relevance to the world of form. The hemispheres were suddenly gone.

As its intensity and power reached extreme proportions, the Being began to consume the void. It transcended all creation including the void, and it began collecting the energies of the void unto itself. The void in the vicinity all around the Being began flying into it to be devoured in the intensity of its dynamism, revealing a pitch black emptiness beyond. The Being became an absolute center of very bright, intensely active energy in an absolute periphery of pitch black emptiness, as more and more of the void was being consumed. The energies of the void were returning to their source. Invisible rays of its omnipotent will radiated from it, polarizing the void in all directions, as the Being enacted the awesome spectacle. I could sense the rays penetrating everywhere. Its will permeated the entire void. There was no power to exceed its power, no will to exceed its will. All was created from the interplay of its active center of living energy and its passive periphery of darkness. It embraced the whole void and more. It was One and Supreme beyond all conceptions.

It was thus apparent that the void embraced the whole of experience, not only the universe and everything in it, but everything that has ever been. It embraced the whole of history. The energies of the void are quantized and ordered through episodes of experience. The whole of experience is integrated via the void, good or bad, right or wrong, true or false. The void itself is amoral. It is a repository of all experience. All experience consists of energies balanced through commitment to expe-

rience. The void is a master sensorium from which everything draws upon to sustain itself. The void is an eternal empty side to the world of form and to the totality of experience.

Now this Absolute Being, Almighty God, was bringing everything to its ultimate consummation, to a final end, before a witness that faced the same annihilation. It was a realization that transcended the whole of space and time, the whole of creation. The whole void became polarized by the Being's will, being drawn inexorably toward it.

Yet I was staying where I was, my eyes glued to the terrifying spectacle of great tongues of the void flying into the Almighty Being. The transverse tension in my mind that began with the hemispheres became unbearably immense. The awe of the spectacle polarized my being, bringing with it a tunnel-like opening in the energies of the void within me, from my eyes that witnessed the incredible scene down through my body and beyond. I had an internal visual perception of the event with my eyes still frozen on the Being. A bottomless well opened within me that had access into and through the energies of the void. The tunnel-like well was black, empty and bottomless, created by the extreme polarity between myself and the Being. More and more of the void around the Being was still being consumed, and yet it did not complete the awesome spectacle.

Somehow I gathered the will to turn away from the Being in an act of utter desperation to stave off the destruction of the universe. I held my arms out in a gesture to stop it, as if I could defy the omnipotent will of God and succeed. Any concern for self was overwhelmed by my concern for the universe, for other than self.

Although the Being was behind me now, I still had a perception of it, as if I had eyes in the back of my head. I could still see it in the same relative position behind an interface that was aligned across my body and identified with my person. Another perceptual transposition had occurred, when I had turned around. Now there was another transmission from the center of the Being, another bullet of energy that came speeding across the inner space behind me to impinge on the back of my head. This time a tunnel-like hole opened in front of me down into the void, like looking into another bottomless well that had access into and through the energies of the void. There was again a powerful polarization throughout my body as I saw a very rapid zigzag streak of light projected down inside the tunnel to inscribe what appeared to be an irregular six-pointed figure that vanished as quickly as it was formed.

Almost simultaneously, there was a wheel of energy a few feet to my right, stationary, but churning over with the momentum of a speeding train. These energies were derived from the void, born from the void and returning again to the void, to depict cycles of birth and death turning over like a flywheel aligned vertically beside me. It was about three meters or so in diameter so that I could see what was happening within the wheel in living color. Faces and fragments of human bodies were being mangled by the emotional energies they embodied, churning themselves over and over in repeated cycles of birth and death. They were being horribly mangled by their own emotional identifications and doing it again and again with gleaming grinning faces. Horrors devouring horrors with indulgent delight!

I managed to take a couple more steps when my feet stopped again. From a point in one side of my back a dark abstraction of quantized energy began to rise like a vapor through my body and into my head. I had an internal visual perception of the event, as if an invisible finger from the Being behind me had touched a tiny spot in my back to release associated energy from the void. My body was transparent. As the energy flowed up through my neck into the center of my head it became very bright and intense, then it went streaming out through my eyes as they watched on in sheer disbelief. This quantity of energy was ordered within itself, like a living bundle of experience. As it streamed out twelve or fifteen feet into my visual field it became a structured pattern of transforming energies a few feet in diameter. It was a visible idea, a memory derived from experience and replicated in brilliant color.

But the idea was not depicted as a normal sequence of events through space and time. There were several active, two dimensional interfaces juxtaposed to one another in various configurations of inside to outside. Dynamic energy transformations were working through them and linking them up as the configuration of the active interfaces went through a sequence of perceptual transpositions of inside to outside with respect to one another. There were virtual images projected in vivid color between some of the interfaces as they rapidly transformed through a sequence to demonstrate the idea. Then the energies just vanished in the void. No sooner was one gone than another abstraction of quantized energy began to rise from another point in my body up into my head in the same manner, then intensely out through my eyes to project a different idea in a similar way. This happened a number of times in succession.

The ideas were each recognized from memory, but they had no particular significance other than to demonstrate a principle and a pattern associated with the process of memory and recall. For instance, when I was taking geometry back in high school, I had been very puzzled about why it is impossible to trisect an angle using only a ruler and compass. I had spent many hours trying various ways to do it without success. One of the ideas was about this problem. The way the energies and interfaces and images unfolded it was obvious why it was impossible to do it. I could visually see the whole problem laid out before me, and I understood it before it vanished like the others into the void.

But the message was not about geometry or any other specific subject. It was about how experience itself is organized, how memories are structured energies that are quantized as discrete bundles through episodes of experience that become an integral part of the void. The void is a master memory bank for the whole of experience, and yet personal memories are keyed to the individual's body, the body itself being an ordered integration of energies of the void. Not all memories are personal however, and the recall process can vastly outreach personal experience, as I was soon to discover. Throughout all of this the room was like a transparent veil that faded out depending on the intensity of events, sometimes there around the peripheral vision, but often vanishing completely.

Suddenly there appeared in the void a city of light in brilliant color. It was suspended in the void in such a way that the underside of the city along its nearest edge was at first visible, and there were dark tendrils of energy reaching down into the void, like roots from which it drew its sustenance. The city was recreated from the energies of the void, its variety selected and assimilated at will by the Being behind me.

Then my perspective rose to provide a clear view across the city and down into the streets on the nearest side below me. It was a beautiful city, immaculately clean, with cobblestone streets and mostly masonry-type buildings in a variety of pastel shades, none of which were over a few stories high. There were both peaked and flat roofs, an old English style house on a corner, domed structures, and varied shaped buildings extending over quite an area, but it was not modern or as large as many cities are today. It tended to have a Mediterranean character, sort of like a new Jerusalem, although it had no specific resemblance to Jerusalem, and no churches, temples or mosques were noticed. It was brilliantly illuminated in a rich mosaic of colors, with no people or vehicles apparent. The city appeared to be empty.

While I looked on, amazed at the splendor of the view from my vantage point above the city, dark abstractions of energy began to rise through my body as before. This time they originated from the void beneath and slightly behind the transparency of my body, the energies being stronger than before. They were not from memories that I recognized and they were not keyed to my body. They came from beyond me, although they were subjective to the interface through me. As they rose up into my head to be projected out through my eyes, the intensity was severe, accompanied each time by an inversion of emotional energy as they left me, like a minor death that exhausted the commitment that I invested in them as they went on their way. The ideas went streaming out through my eyes as if propelled by the powerful tension in my mind, only this time they went flying down into the city. This happened a number of times in succession, each idea impelled by powerful intention. This time the ideas couldn't be specifically recognized. They were being used in the completion of the city.

Then other ideas began flying down into the city from different points in the void, as if they were being fired from invisible canons, although they must have been coming from unknown people. The city was an eternal creative undertaking that was still incomplete and unpopulated, another reality selected from suitable contributions to the familiar one that we know. It was a gathering of creative energies from diverse places and people, all being integrated from experience into the completion of the city. There was still a sense of terror associated with what was happening beyond my control, but also amazement, tension, awe, and wonder all at once. There was no opportunity to reflect or think. I marveled at it. The timing of everything was regular and ordered, with no energy wasted in between.

The city gave way to a magnificent landscape and my perspective rose as to the top of a mountain. Like the city, it too was brilliantly illuminated in vivid color, extending out to a distant horizon as far as I could see. Its contrasts were splendid, with very high wooded hills in the distance, a river flowing along the base of a high precipice, with ravines and areas of semi-desert to one side in the foreground. The ideas stopped streaming from my eyes as my body went unnoticed, but they started flying from various points in the void above it, down into the landscape, completing it and filling it out. A world of light was being gathered and integrated through real commitments actually made, their energies preserved for recall in the timeless void.

The room returned, with time for another couple of desperate steps, but there was no escape. I became aware of acquiring a degree of active discretion in the phenomena that were occurring and otherwise beyond my control. The transverse tension in my mind was still severe together with a good deal of terror at the prospects of what was going on.

A series of thoughts on various subjects began to come to me as if I had discretionary access to them. My will seemed able to reach beyond the confines of my body into the surrounding void of quantized energies. The energies were not seen as dark abstractions as they moved from the void as before, but were much more refined, hardly visible until they were drawn toward me as an act of will that gave me discretionary access to them. Now I was drawing the energies of the void unto myself, although on a much smaller and more refined scale than the Being had done in consuming the void. Nevertheless I had a visible perception of these energies that were drawn toward me from diffuse areas of the void around the body.

As these energies infused my body they transformed my consciousness. There was a coalescence of my emotional and cerebral processes as my perceptions exploded into a burst of intense white light in which absolutely everything relative to each thought was spontaneously known. There was an historic integration of everything associated with every thought or question that I focused upon. It was all there at once in a burst of white light that was extended as a field of vision in front of me while also being subjectively filled with white light. Although there were no explicit forms or activity visible in the field of light, it was teeming with fully integrated content all relating to the thought or question involved. All associated meaning was seen and felt and known unequivocally.

As I read later, this was similar to how some Zen writers have described a satori or kensho experience. The only problem was that I couldn't stop them from coming. Every question that came to me accessed energies from the void that infused me, bringing another burst of white light in which everything relevant to the question or thought was spontaneously known. Again and again and again it happened, many times in succession. My thoughts turned to science. A new insight into space, time and relativity was there in a burst of white light. And so on, to the evolution and the integration of experience generally. The process by which these insights came was itself transparent. I could see my discretionary access to the quantized energies from the void, followed by the coalescence of emotional and cerebral processes resulting in the burst

of a field of light that both filled me within and the visual field out there, an indeterminate distance in front of me.

But then my thoughts turned to the System by which it all worked, to the Cosmic Order that both determined and integrated the whole of experience, followed by burst after burst after burst of white light. There seemed no limit to what I could know and these insights themselves transcended the whole of creation, the whole of space and time, infinitely beyond the puny confines of my organic birth or my death. But there it all was, integrated in burst after burst in my mind.

That bottomless well that had been opened down into the energies of the void within me gave me incredible access. The transverse tension in my mind again became extreme as the questions turned to the Cosmic Order. The more I had access the greater the bilateral tension in my mind, and the greater the tension the more I had access. There was no limit to what I could know. It was total omniscience, but this became a horror to match the consummation of the universe. How could anyone live like this, with unlimited access to the whole of experience?

All of this too was orchestrated by the Being behind me, who suddenly brought it to an end. He suddenly just seemed to drop me so far as controlling my experience was concerned. As He did, a jungle of energies came crashing in from the void to inundate my usual thought processes. They were the energies of the normal social milieu in which I was obliged to function. I could see them come swarming in, coarse and confused and oppressive. Uncontrollable energies began coursing through my body in ragged patterns. I was gripped with the thought that complete madness must have seized my mind. But if that was true how could everything make such complete sense? Even a belief in madness was madness.

And I still had access to the energies of the void. The well within me deepened, with the transverse tension in my mind unbearably immense. Again and again the tension would build to extremes too impossible to hold, then break, with the whole of phenomenal existence slipping away in a vortex. Then I would capture the tension again, holding on until it broke again, everything spinning away in waves of nausea, then I would capture it again.

I needed words to hold the tension. I needed language to make some sense of it. I had to bridge the two hemispheres, establish some contact between them, however flimsy. The experience was mute and I needed words to give it rational meaning. I had to find words, and words did come.

*“Everything is, and it is not, it both is and is not, and it neither is nor is not.”*

Although it may seem like nonsense to the uninitiated, this was the only thread of common sense that I could find. I kept repeating it over and over. For the next few hours it was very important. I found out several years later that this was an ancient quadrilemma in Hindu philosophy, with Jain and Buddhist versions as well.

It was three months before reluctantly deciding to return to work. There are no words to really describe the experience or the effect that it had. Only a distorted glimpse can be given, and the wisdom of giving it is questionable.

The workings of the mind and of the universe had been revealed, but in a way that brought everything that is normally accepted into question. It resolved nothing yet offered unlimited promise. It begged to be given expression, yet language was hopelessly inadequate. I began to search the literature for others who may have had similar experiences but found precious little. There had to be a way of communicating the system and in the end I was obliged to turn back to the experience that revealed it. Other experiences came of their own accord, all of them awesome, involving the void, all of them relevant to the task, never capricious, yet none of them so complex or intense as the first. Nor were they traumatic.

It is time to get up from the perch on the hill to stretch the legs. The stomach says it must be lunch time. The wind has become quite strong. It feels good. The sky is filled with fleecy white clouds, as if they were trapped in an irregular blue net. What makes them hang together in bunches like that in such a wind? The eye fixes on a particular gossamer fragment and watches it for awhile. In a few minutes it dissolves into the blue. If the clouds are dissolving at their edges near the top, they must be forming in their center from the bottom, for they show no sign of disappearing altogether. They are like billowy thoughts in a gigantic mind, in a constant state of formation and dissolution, changing form and substance to suit the winds of time. It is just a dreamy version of the system, for the process by which they change is left untouched by change.

This afternoon would be a good time to go to North Bay. There is some shopping to do, and it is time to go to the laundromat.



# Chapter 5

## Laundering Experience

The road to North Bay goes through hilly, wooded countryside, except where occasional rolling valleys and flatlands make farming possible. Most farms in the area are only marginally successful, many still being worked by the descendants of the original settlers. Occasionally there are vestiges of abandoned farms, their dilapidated buildings overgrown with brush. There is not the same commitment to the land there used to be.

Driving is conducive to thought, especially to the kind of mental journey involved in approaching the system. Maybe it is the constantly changing stream of landscape that helps to induce the developing flux of ideation. Whatever it is, the two seem to go together with little difficulty, and the train of thought is taken up again.

While the power struggle with the head office was going on, Albert Low had been developing ideas on what he calls the structure/process of a business organization, drawing on ideas of J. G. Bennett, G. I. Gurdjieff, and others. To put it in the simplest terms he maintained that there are only six regions of activity in any company, three of the regions being structural in nature and three of them being process regions. The three structural regions are environmental, relating to the shareholder (treasury), the customer (marketing) and the employee (personnel). Each of these three has interests outside the company tending to pull it apart. The three process dimensions relate to product development, selling, and production. They are central to a company's activities tending to resist the centrifugal pressures of the environmental regions and hold the company together. There are only these six regions of activity and they are common to all businesses, although in small companies all of them are not delegated.\* In a one man company they are integrated in one man's mind.

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\* A. W. Low, *Zen and Creative Management* (Garden City, N.Y.: Doubleday Anchor Books, 1976).

Over a period of time it became apparent to me that these six regions or areas of activity in a company were associated with the primary activity that had fired my mind prior to the experience. They are associated with how we ourselves are organized to integrate experience, and a business organization is an extension of this self-similar creative process. As I began to read more, it also became apparent that the primary activity was associated with a figure introduced to the west by G. I. Gurdjieff, known as the enneagram. Somehow the enneagram, with nine points around in a circle, sometimes depicted as a snake swallowing its tail, was an elaboration of the primary activity. The experience had vividly demonstrated a six pointed figure inscribed by zig zag streaks of light down into a bottomless well through the quantized energies of the void. A similar six pointed figure was part of the enneagram.

The experience had also demonstrated memories projected out through my eyes, so that I could visually see how the experience involved in each memory was generated and organized. There were active interfaces involved with energy processes working through them, linking them up. Then the interfaces would perceptually transpose with respect to the inside and outside of each other, with energy processes again linking them up in a new orientation, then another orientation, and another, and another, in a rapid sequence of transformations that demonstrated each memory.

I began to doodle with circles on a piece of paper. With one circle there is only one orientation possible and one can think of it as an active interface with an energy process taking place from a center inside to a periphery outside, with feedback in the opposite direction. With two circles there are two possibilities. One circle can be inside the other, or the outside circle can be turned around or transposed, such that they are separate and facing one another. Seeing my own face, then the face of humanity, and the perceptual transpositions involved between the two experiences rang bells. I was on to something.

With three circles there are four possibilities and I was able to relate them to the primary activity. With four circles there are nine possibilities, only nine, and I was able to relate them to the enneagram. There was a system to it that delineated all of the structural possibilities to experience. I began to see that the system is a series of nested systems, each system determined by the number of active interfaces required to generate it. I called them System 1, System 2, System 3, System 4, etc.. What's more there is meaning implicit in each orientations of the active interfaces within each system. For example, each of the nine ways to arrange

four circles in System 4, each delineates a specific meaning. The system delineates the very nature of meaning, as we shall see later. And each of the higher systems elaborates on the lower systems, such that the lower systems transcend and subsume the higher systems. The whole natural progression of systems is an elaboration of System 1. It is all one system, one whole, concerned with the integration of the whole of experience. There is nothing exempt. There is nothing outside it. The system is all embracing.

By this time it was apparent that the six focal points of activity in a company derive from System 4. It was clear to me that these six regions of a company function in three polar pairs that provide three essential insights into the company's operation. The Idea Development ↔ Treasury polarity provides insight into the *potential* dimension of any company. The Production ↔ Organization polarity provides insight into the *commitment* dimension of any company. The Sales ↔ Marketing polarity provides insight into the *performance* dimension of any company. Without all three of these polar insights, a company operates blind. Let's examine these three dimensions more closely, and also briefly introduce how they relate to the integration of human experience.

1. *The Potential Dimension:* Idea Development in a company is concerned with the development of its products. It may be an Engineering Department, or a Research Department, but regardless of the kind of company there will always be some such activity. The development of an idea, if it is to have real potential, always takes place within the context of the resource capacity available to make it a reality, and this is the concern of the Treasury Department. For example a small machine shop obviously does not have the resource capacity to develop a new automobile, although it may readily develop certain automobile parts. This polar relationship between the idea and the resources available to bring it to fruition is the *only* way to see into the *potential* of a company.

It is also the only way for a human being to see into one's own creative potential, but one's resource capacity isn't restricted to one's bank account, nor are ideas confined to the commercial market place. The development of truly creative ideas is a highly intuitive process that is generally impossible to reduce to words or logic. It is an implicit right brain function, and it is funded by a treasury of wonder that accesses a wealth of human experience.

2. *The Commitment Dimension:* In a company of any size, the production of a product or service requires many employees and they must be orga-

nized to commit their efforts together in concert to produce an acceptable result. While the Production or Operations Department is usually the largest department, the whole organization is involved in production and must be structured correctly if it is to operate effectively. The actual production of a company's product always takes place within the context of the whole organization structure. If something goes wrong with the responsible commitment to Production, one must look to the polar relationship with the Organization structure, a concern of the Personnel Department. Either the company is not structured correctly, or it is not staffed correctly. If facilities are inadequate this reflects on those employees responsible. The Production ↔ Organization polarity thus provides the only insight into a company's commitment dimension.

As for we humans, we are social creatures, and whether we like it or not, we relate to our social organization through language. We begin learning language in the crib, and it is instrumental in every skill that we learn to perform. Language is employed in the explicit Production of our behavior and this relates to our social Organization. This human commitment dimension is a left brain function that translates the potential idea developed via right brain intuition into an explicit technique of behavior.

*3. The Performance Dimension:* One cannot assess the performance of a company by looking at a sales chart. The chart may indicate nothing more than market trends. Typewriter sales have fallen off drastically with the advent of computers and all of the commitment in the world to making and selling more typewriters won't reverse the trend. The Sales Department functions within the context of the Marketing Department and it is the Sales ↔ Marketing polarity that provides an insight into the performance dimension. Marketing is not properly concerned with selling. It is concerned with assessing market needs in light of the company's potential ability to meet those needs. It is concerned with appropriately identifying product trends and customers' needs in the market place. Marketing gives direction to the whole company and without an independent focus in this area a company performs blind. Sales must relate to market need.

In a human being the performance dimension is emotional. Our emotional apparatus is the autonomic nervous system, and it is some four hundred million years in the making, beginning with the appearance of the vertebrates. It evolved in concert with the cerebral hemispheres that reflect on emotive experience. The primitive brains of the reptile and the

lower mammal remain structured into the human brain, and they are intimately associated with emotion, thus anchoring us firmly to our natural heritage. In contrast the much larger newer part of our brains, to which we owe our intuitive ideation and language based technical abilities, has no direct control over emotion. This means that emotional energies of ancient origins flow into our consciousness, inspiring us to develop intuitive ideas according to our implicit capacities, then translate them into explicit behavior that relates to our social context. Hopefully this social commitment will result in selling something of ourselves which is in accord with a realistic and appropriate perception of needs inherent in the social and natural market place. It is thus that we assess our performance dimension emotionally. We feel our success or failure according to how we perceive the market.

Insight into the three dimensions outlined above requires that the six regions or focal points of a company should always be delegated separately. We may call this the *first structural constraint*. If they are not kept separate, the Managing Director of the company loses insight into the company's activities via the polar dimensions. The company functions blind, while political and bureaucratic forces erode it from within.

For example if Sales and Marketing are both delegated to the Sales Manager, then the Managing Director cannot assess the company's performance directly. Neither can he provide intelligent direction to the Idea Development Department, nor to the Treasury Department. The company's Production becomes geared solely to input from the Sales Manager who effectively begins to take over the direction of the company. The Managing Director is blind, and unless this Organization problem is corrected, he may find himself ousted completely. The company's potential will suffer from lack of direction and rapidly erode. Everyone in the organization may begin to feel the distorted communicative tensions involved to the point where their commitment suffers. The whole company becomes imbalanced and bureaucratic campaigns to merely compensate in some way will only compound the problem, while reactionary political forces will try to offset the Sales Manager's special status in the organization.

The three polar dimensions are the headlights of the company; they illuminate the road through a fluctuating landscape of circumstance. They permit adjustments to be made in speed and direction to safely navigate the turns and avoid the hazards, but there must also be only one

driver at the master controls. If his sight is impaired, the frantic shouts of the crew will do little to ensure a safe journey.

The road stretches out through a corridor of tall maples along a high ridge, then breaks over a crest. For a moment the horizon recedes to the bulging ridges on the far side of North Bay, more than twenty miles in the distance. Then the road sinks down a long, winding hill into some sharp turns and dips that settle out into a wooded flat. The dark amber waters of a creek ignore the light traffic as they snake lazily under a bridge, then the road turns past a small cemetery that belongs to a little village coming up. There are only half a dozen houses and a store, then the road crosses another bridge into some sweeping turns and more gently rolling terrain.

So far the road to the system has been pretty good—a few sharp corners and ravines, but generally clear going. Up ahead there are some hills—not many—but there are some steep valleys in between where visibility is not too good. We will return to explore these later. For now, it will be enough to peruse the view from the tops.

J. G. Bennett, a student of G. I. Gurdjieff, contributed many ideas toward a universal framework of understanding, broadly outlined in four volumes entitled *The Dramatic Universe*.<sup>\*</sup> Gurdjieff, a Russo-Armenian, spent many years searching through the Middle East and central Asia assimilating a teaching. There are many groups and individuals around the world that still make intensive studies of his ideas.

One of the central themes of Gurdjieff's teaching<sup>†</sup> is the significance of the enneagram. Considered to be a symbol of perpetual motion, it is used to demonstrate harmonic relationships of cosmological significance. A geometric illustration of the enneagram, involving nine terms, is shown in Figure 5.

Gurdjieff regarded the symbol as a reconciliation of what he called the laws of three and seven, corresponding respectively to the dotted triangle 9, 3, 6, and the irregular six pointed figure. The triangle is a direct representation of the triad, while the six-pointed figure represents and inversion of the number seven. Seven divided into one gives the dynamic sequence of the six pointed figure  $0.142857\overline{142857}$ , with the six

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<sup>\*</sup>J. G. Bennett, *The Dramatic Universe* ( London: Hodder & Stoughton, 1956 [Vol. 1], 1961 [Vol. 2], 1966[Vols. 3, 4] )

<sup>†</sup>An introduction to Gurdjieff's ideas was first given by P. D. Ouspensky, *In Search of the Miraculous* (New York: Harcourt Brace & World, 1949)

digit sequence repeating to infinity, hence the depiction of the symbol as a depiction of perpetual motion. While the origin of the symbol is unknown it is very old.

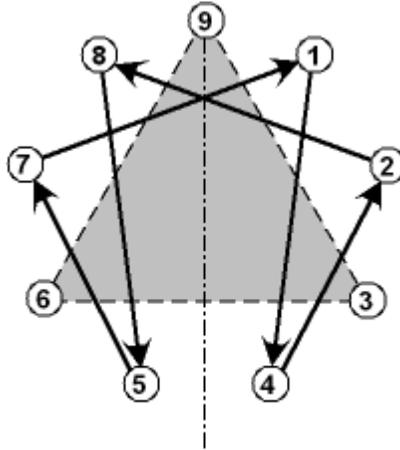


Figure 5

Gurdjieff himself regarded his teaching as fragmentary, and indicated that the original significance of the enneagram had been lost. (Volumes have been written on it since, none of them correcting the deficiency.) I recognized the six pointed pattern and I knew that the four active interfaces of System 4 produced nine possible configurations that I called terms. With these obvious connections to the enneagram I began to investigate it closely.

There are a number of symmetries to the diagram. For example the numbers horizontally opposite one another all add up to nine:  $8+1=9$ ,  $7+2=9$ ,  $6+3=9$ ,  $5+4=9$ . Also if one multiplies each of the numbers in turn around the circle by nine it generates the horizontal pairs:  $9 \times 1=9$ ,  $9 \times 2=18$ ,  $9 \times 3=27$ ,  $9 \times 4=36$ ,  $9 \times 5=45$ . Continuing on, the order of the horizontal pairs reverses:  $9 \times 6=54$ ,  $9 \times 7=63$ ,  $9 \times 8=72$ ,  $9 \times 9=81$ .\*

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\* There is also an interesting pattern that continues on that shows the symbol to represent the basis of the decimal system and the recurrence of the digits 1 and 0. For example  $9 \times 10=90$  and we see that the sequence jumps by a factor of 10. Then  $9 \times 11=99$  and the sequence begins again at a higher two digit level. Then  $9 \times 12=108$ , where a zero is imposed between the horizontal numbers 1 and 8. Then  $9 \times 13=117$ , where the first two digits  $1+1=2$ , so that the horizontal pattern  $2 \leftrightarrow 7$  requires the addition of the components of 2. Then  $9 \times 14=126$ , and again the horizontal pair  $3 \leftrightarrow 6$  requires the addition of the first

Likewise an interesting pattern emerges if one takes the inverse of the numbers in the six pointed sequence and compares them with those in the triad. The inverse of 1 is 1. The inverse of 4 is 0.25. The inverse of 2 is 0.5. The inverse of 8 is 0.125. The inverse of 5 is 0.2. The inverse of 7 is 0.142857142857... repeating, which generates the whole sequence over and over again. The only infinite number in the six-pointed sequence is the inverse of 7, and we shall see that it is associated with memory and recall. We shall see that the six pointed sequence concerns particular aspects of experience that become integrated into discrete episodes that are complete unto themselves, yet related to other episodes in the overall integration of experience.

When we take the inverse of the three numbers in the triad a different pattern emerges. The inverse of 3 is 0.3333... repeating to infinity. The inverse of 6 is 0.16666... repeating to infinity. The inverse of 9 is 0.1111... repeating to infinity. These three infinite numbers concern universal aspects of experience that are synchronously involved in the integration of the particular aspects of experience. The inverse of 9 directly suggests a prime role in the generation of unity. The inverse of 3 suggests the three polar dimensions that recur in every aspect of creative experience. The inverse of 6 suggests the integration of the recurrent six particular terms as one whole.

As I began to decipher the meaning implicit within each of the nine terms of System 4, it was possible to ascribe each term to a specific position in the enneagram and to number them Term 1, Term 2, Term 3, and so on. It was then possible to show how they transformed synchronously through the sequence to integrate experience meaningfully. We'll come back to this shortly, after a few words about the primary activity.

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two digits  $1+2=3$  to generate the first member of the pair. Then  $9 \times 15 = 135$ , where  $1+3=4$  in the  $4 \leftrightarrow 5$  pair, and so on. By proceeding in this way it can be shown that the digits from 0 to 9 are fractals of oneness. The symbol is an elaboration of wholeness, of System 1. It is an illustration of the recurrent generation of wholeness, via a patterned interplay with its particular elements. It is indicative of an underlying order to phenomena displaying a harmonic relationship to the cosmic order.

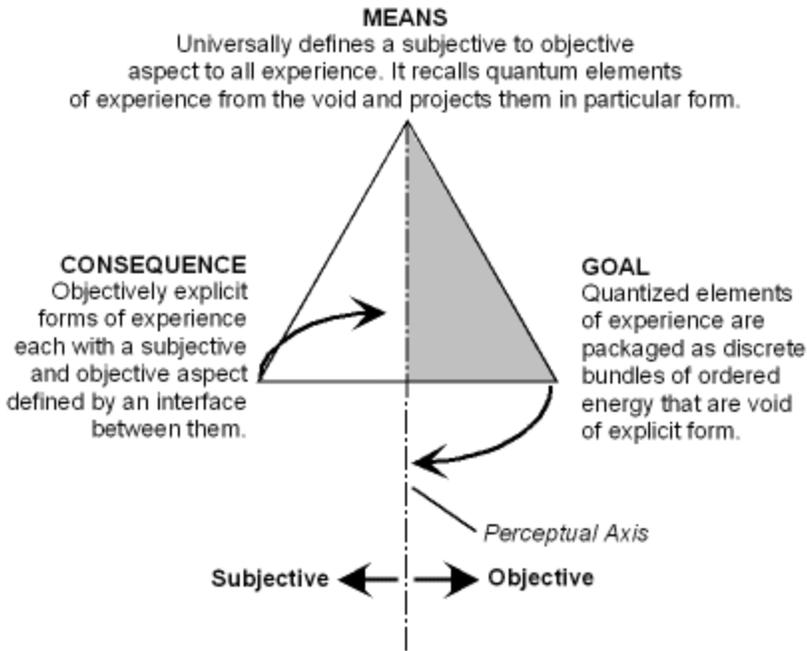


Figure 6

The general form of the primary activity as originally conceived can be illustrated as a triad as shown in Figure 6. The “means” term defines a perceptual interface or axis between an objective “goal” term and a subjective “consequence” term, maintaining a dynamic balance between the two. The goal term, in fact, transforms into the consequence term, then back into the goal term, and so on around the perceptual axis of the means term. The goal and consequence are particular elements of experience, such as a single atom. The means term is universal, relating to all atoms. In other words the universal means term synchronously integrates any number of particular terms.\*

The goal is the integration of experience and this is implicitly accomplished via the formless void. The void is a master sensorium for the whole of experience. It is a master memory bank storing timeless elements of experience for recall to explicit form. The void is normally masked by physical form, just as the projection of a movie masks the

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\*There are two modes to the means term that induce the goal-to-consequence transformations. A detailed explanation of how it works will be given when we get to System 3. The primary activity is System 3.



The nine terms are illustrated in Figure 7. The six regions of a company are indicated in brackets under the term designations of the six pointed figure. The three polar dimensions are indicated by the three horizontal double ended arrows, representing *performance*, *potential* and *commitment* respectively from the top down. The three universal terms have a general correspondence to the primary activity (Means, Goal, Consequence) that subsumes System 4.

Let's look briefly again at System 4 as represented in Figure 7, but as it relates to human experience. Term 1, Perception of the Field, identifies a need relating to the social environment. Term 1 transforms into Term 4, called Mental Work, which concerns the social organization and specific focus of our sensory input. Term 4 transform into Term 2, where an intuitive idea implicitly develops in polar relation to one's personal history—one's treasury. Term 2 transforms into Term 8, where an explicit response to the need is formulated, consistent with the implicit idea. Term 8 transforms into Term 5, which actually enacts the idea as a social commitment in polar relation to the organization of the sensory context. Term 5 transforms into Term 7, which encodes the social commitment as an ordered, but formless, bundle or quantum of energy— an element of memory that modifies one's personal history. Then the sequence begins again. We shall see later that there are three particular sequences going on a once, all three synchronously integrated by the universal terms.

Later we shall also see that the universal terms go through sequences of transformation as well. Universal discretion, Term 9, is the most fundamental of the universal terms. It is the primary means of the creative process and it potentially has unlimited access to the particularized energies of the void. It is thus primary to the recall process. The assimilation of those energies as a coherent idea for translation into explicit form is the universal goal of any creative endeavor. The consequence of realizing the goal is an evolving corporeal body with invested capabilities learned and assimilated through the historic integration of experience.

The enneagram as represented here is very different from the way it is represented by Gurdjieff, Bennett, and others. The work of Bennett and Gurdjieff has great heuristic value as a working tool to make people more sensitive to the social, spiritual and natural environments, and this is all to the good. However, it has never led to specific pragmatic applications in our social organizations, including our sciences. No such claim was made for their work, although Gurdjieff talked of a positive exact

science, and Bennett devoted great effort with this hope in mind. They were in pursuit of the elusive new paradigm.

The turnoff to North Bay is coming up. Traffic is fairly heavy, and a minute or so passes before making the turn onto Lakeshore Drive. There is a shopping center this way with a convenient laundromat.

North Bay is built on the shores of Lake Nipissing, a beautiful Lake about sixty miles long, with many beaches. Most of the lake is shallow with a sandy bottom, making it treacherous in high winds. For such an accessible lake the fishing is reasonably good, particularly in the mouth of the French River, the outlet from the lake.

The car is parked near the laundromat. The clothes hamper is taken from the back seat. A couple of washers near the front are started and the clothes are dumped in. The place is fairly busy, probably because of vacationers in the area. There is a lunch counter in a department store nearby; a cold drink might taste good and pass some time.

A table is selected facing out into the main shopping area of the store. People are milling around in the store, some sauntering slowly, some rushing, some smiling, some staring, some frowning. Each is embroiled in a world of individual concerns. For the most part, people make little effort to observe their experience closely, except in terms of a stream of wants that constantly flow into the mind. This doesn't mean that people are greedy with conscious intent. Some are, of course, but most people are concerned only with getting along in a world with others. However, we are regularly encouraged to chase after this endless stream of wants, even though we are constantly forced to curtail them in light of our resources. Carried to extremes it becomes a mentality of want that attracts more wants, requiring more and more effort to accommodate the endless accumulation of more. For those intent on possessions for their own sake that far exceed any reasonable needs or appropriate standards, a balanced perspective can never be found. Fulfillment will always elude them. Why do intelligent people so often get caught up on this treadmill as if their lives depended on it?

The mentality is a close relative of a popular myth that is fervently perpetuated in business circles: the goal of a company is to make a profit. It is usually justified by adding that without a profit a company cannot stay in business. No reasonable person will argue that profit is not essential to the survival of a company, but how does that make it a goal? The intent of a goal is to provide an integrating purpose or intelligent direction to some kind of activity. In the case of a company this means bring-

ing together large numbers of people with diverse interests and skills to participate in concert to realize the goal. The idea implicit in the goal is what must integrate the diversity of their numbers.

One must then ask, what is the idea implicit in profit? If we are to make it, we must know what it is. We can make a chair, build a house, manufacture a car, fix a television set, because there is a clear idea implicit in these things. How do you make a profit? How are people to relate to the idea of making a profit in such a way that it will bring about the concerted activity of a company? Does anyone seriously believe that one person will work for another person's wealth at the expense of their own? How are people to think or understand their place in order to make a contribution to such a goal? What is the idea implicit in profit?

There is no integrating idea implicit in profit, because profit is not a goal. The goal of a company is given in the idea of its product; this integrates the structured activity of a company. The goal is communicative; it must fulfill a market need.

Profit is earned as a *consequence* of making a contribution of value to the market. Through the recommitment of profit in recurring cycles, a company evolves both its products and its capacity to produce them. Profit thus becomes vested in the corporate body of a company, sustaining it in a state of renewal that is tailored to current creative needs. Profit is the freedom and capacity of a company to create; it says little about how this freedom should be exercised. It is a mute potential to act. The survival of a company is not ensured through the accumulation of wealth, nor by the conglomeration of other companies, but by expressing its potential through a responsible commitment to the market.

What about surplus profit? Should it all be distributed to the shareholders? Hardly. Company managements rarely give away excessive profits to strangers unless there is something in it for themselves. Why should they, especially at a time when they least need to attract investment capital? Responsible management should be concerned with maintaining the three polar dimensions in balance. This alone will insure the long term success of a company. Excess profits should be distributed appropriately between the shareholder, the customer, and the employee.

Shareholder commitment is retained by a safe and reasonable return on investment. Customer commitment is retained by increased product value at a lower price. Employee commitment is retained by better working conditions, better benefits, and a clear sense of participating in a creative idea. The quality of life can be enhanced for all. There is no place in a responsible balance for the maximization of profits.

The drink finished, the bill is paid. A couple of items are purchased, then some window shopping is done on the way back to the laundromat. The timing is about right—the wash is finished and transferred to the dryers. With another wait in store, a walk will pass some time.

The stroll takes a circle through a tidy residential district of modern homes. Not far from the laundromat on the return, one of life's dramas presents itself. A boy, two or three years old, is standing stark naked in the yard in front of a house. He has obviously gotten outside without his mother's notice and is trying to decide which direction to explore in first, when she comes screaming from the house. He makes a run for it, but she scoops him up on the bound. Rushing him back to the house, she gives him the details of her framework of understanding in no uncertain terms.

The little boy is having his experience laundered. It happens to us all throughout our lives, first with the help of our parents, then by schools and religions, and eventually by the frameworks of understanding that we come to adopt or evolve along the way. Emotional energies are refluxed into cerebral awareness to be consciously cleaned up and suited to the needs of circumstance. Each of us contributes through refining energies and bringing them to an appropriate balance.

Back at the laundry, the wash is dry. After it is folded, everything is collected and returned to the car. There is still some shopping to do; maybe later there will be time to take in a movie. There is a good comedy playing in town, and a little diversion might help the perspective some.

## Chapter 6

### More Laundering

It is already mid-morning. A couple of hours of unsuccessful trolling has brought the boat into a long, sheltered bay that is especially peaceful, squeezed as it is between two bulky hills that are both heavily wooded. There is an abundance of life here, much more than can be seen. Most impressive is the preponderance of plant life. The air is steeped in its vitality. Everywhere majestic limbs reach out to cloak the earth and embrace the sun, transforming energies into a storehouse of life. Plants dress the stage, and generate the atmosphere, to sustain all the other players in evolution's drama. From tiny origins their numbers exploded in the sea, then on land, to dominate the early acts of the play, assisted by lower life forms working behind the scenes. Even now, plant life remains in many ways aloof unto itself, with only certain treasured concessions to such intimate friends as pollinating insects. But what a lavish gift it makes for every higher form of life. A miracle of transformation has turned a naked landscape and pungent atmosphere into a setting fit for a festival of animation.

Plants stock the shelves to overflowing in a large section of nature's marketplace, for all the rest of us to shop. They offer the nutrition and shelter of their form, but in the process something more is done. They assimilate and exact a balance to energies that provide a basis for all higher forms of sensitivity. Stalks strain skyward, from roots searching blindly into earth, to bring together—from darkness and from light—energies from soil and sun. Heaven and earth stand reconciled in plants through the eternal patterns of vitality they project. Each species lends its flavor to a polar balance until all varieties have been explored and need for more has been exhausted. The graceful pine, the hardy spruce, the gentle fern, each has a vital character, a spirit of its own. From mushrooms and moss to mountain flowers, the dilemma of creation is continually resolved in plants with vital spirits.

These early acts in the drama began as gloomy affairs, but gradually a vast fund of vital energies enveloped the globe and saturated the seas.

As the bank balance accumulated, and when the timing was right, this fund of profit from experience was drawn upon to make new investments into certain lines of diversification. New creatures came on the scene, confined to the sea at first, with specialized yet simple organs for ingestion, digestion and respiration. The early versions were mostly slow moving, sluggish things with plant-like traits, but as their variety increased, so did their complexity. Vital energies became ingested and transformed into new levels of sensitivity, with a capacity for response. Worms and jellyfish came, then shellfish, and great varieties of arthropods, with insects infesting and exploring to the limits of experience. All manner of invertebrates explored techniques of metamorphosis, metabolism, reproduction, locomotion, and sensitive response. Nature's marketplace was thriving, but in this classic drama the trading is in the energies of life. Another vast fund of patterned energies accumulates, this one much more complex in its organization. These spirits are of sensitive, responsive creatures that have learned both pain and pleasure. The profit in the fund is boiling over.

The next major excursion into diversification of the product line introduces the vertebrates to the drama, with backbones and skeletons immersed in flesh. These models came with a unique new innovation, very crude at first. The fragmentary beginnings of an autonomic nervous system are detectable in the primitive eels and fishes. In the reptiles, it is accompanied by a companion development of the head brain, where a bulge of nerve cells bursts outward into cerebral hemispheres. Now an emotional apparatus is distinguished from a mental capacity to reflect emotive experience. These creatures don't just sense and respond; they are aware of sensitive response. Both vital and sensitive energies begin to be transformed and refined into conscious patterns of behavior. In the reptiles, these simple patterns are quite fixed within each species, but a huge number of species is explored, establishing a groundwork over a period of two hundred million years.

With the introduction of the lower mammals to the showroom come many refinements to style and structure. New hides with hair, new tails, and new hoofs and claws and teeth are all displayed with many little added extras, like protruding ears and eyelashes. The wealth of patterned sensitivity worked out with the invertebrates is blended with the experience gained from the reptiles to find renewed expression in the mammals. This requires a further development of the autonomic system, accompanied by a second major bulge in the cerebral hemispheres. The second bulge takes preeminence over the first bulge, but both are present

and closely associated. Now much-enhanced patterns of mobility are possible, along with a greater capacity to modulate the content. The horse is much more spirited than the crocodile. It can display a moderate repertoire of moods and sensitivity that is unknown to the reptiles.

The entrance of the higher mammals upon the stage signals a dramatic expansion of a third bulge in the cerebral hemispheres that displays an independence from the first two. (All three of them are present even in the reptile, but two of them are undeveloped.) The third bulge is called the neocortex, or new brain. It can reflect a greater range of mood and sensitivity, along with an embellished capacity to think and make intelligent responses. The dog and chimpanzee develop distinctive personalities, learn to assess their situations, and can select a variety of behavioral responses accordingly. The chimpanzee can mimic behavior, dogs tend to adopt personality traits of their masters—even some birds can mimic speech and respond to verbal commands. The independence of the new brain from the two older brains adds another tier to the refinement of patterned energies. The players are given a new tool to perfect their parts through the further reflux and refinement of the spiritual energies that animate them.

The marketplace is now bubbling with activity. With each new development, there are cascading benefits down through the sequence all the way to plants and germs, then back up again, until a new equilibrium is reached. Nature's energy refinery is becoming very sophisticated, with each tier in the evolution of the drama acting like a tray in a fractionating column, distilling spiritual vapors from the trays below, yet spilling over to enrich them in return.

The entrance of man into the celestial theater is marked by a further explosive burst of the third bulge in the cerebral hemispheres, such that this new brain totally enshrouds the first two bulges. In man, the brain of the reptile and of the lower mammal is enfolded inward to surround the brain stem at the top end of the spinal column. These two primitive brains remain closely associated with the now fully developed autonomic nervous system; together they continue to reflect emotional responses and emotive behavior. (See Appendix 2-1)

This functionally integrated apparatus is called the limbic system: it independently perceives a polar balance between emotive behavior and the market environment. This constitutes the sales↔marketing polarity of the individual enterprise. The limbic system perceives the suitability of behavior to the environment in accordance with established needs. It is the *performance dimension* of experience. In doing this, emotional ener-

gies are fed back, or refluxed, into the conscious mentation process, to be dealt with by the new brain.

The neocortex consists of some hundreds of billions of neurons that furnish an immense potential intellectual capacity to develop and process new behavioral products. Patterned emotional energies can be broken up, dispersed, refined, modified, or reconstructed, then projected anew to spill through the body in new patterns of behavior and experience. New spirits are born from the energies of old ones, their suitability assessed once more through the limbic polarity.

The evolutionary drama of biological life has unfolded over a time scale of hundreds of millions of years. Yet man as we know him became the sole beneficiary of the planet as recently as thirty to forty thousand years ago, the assets of previous prototypes being liquidated and reinvested. Of all the players in the drama, man comes into the world most helpless. Although we have the greatest intellectual potential, we must consciously learn everything, and we do not learn quickly.

Essential to the learning process in man is language; some form has likely been with us for two or three million years. As language developed it introduced a drastic revision in the function of the hemispheres of the new brain. One complete side of the neocortex is generally devoted to techniques of performance associated with language\*—sciences of all kinds, applied mathematics, analytical abilities, all learned techniques of explicit performance. The other side is devoted to intuitive perceptions, esthetic and spiritual appreciation, visual spatial and temporal assessments, and the abstract formation of related concepts. It can understand language but it has no capacity for explicit expression.

This transverse or bilateral polarization of the new brain is associated with the remaining two polar dimensions of the individual enterprise. The language side is the *production* ↔ *organization* polarity, concerned with specific expression in a context of social organization. It is the commitment dimension. It commits behavior to a structured social environment.

The intuitive side is the *idea development* ↔ *treasury* polarity, concerned with the creation of ideas through a treasury of wonder. It is the potential dimension. Wonder describes our access to the communicative

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\*There are many clinical indicators, the most direct evidence being given by the researches of R. W. Sperry and associates on split brain patients. R. W. Sperry, Hemisphere Disconnection and Unity in Conscious Awareness, *American Psychologist* (1969). Numerous other papers.

void of balanced energies from experience: these energies fund the development of idea. (See Appendices 2-2 and 2-3.)

The neurons of both hemispheres are arranged non-uniformly in six layers that constitute an outer thick skin, or cortex as it is called, that covers the convolutions of the hemispheres. The overall polar dimension of each hemisphere exists across this cortex, outwardly relating to one pole, inwardly relating to the other pole, while at the same stroke subsuming mentation processes within the cortex itself. Energies are exchanged outwardly with the environment through the cortex as if it were a highly complex antenna system. Inwardly, energies are processed through neuronal connections within the brain and throughout the body.

The performance dimension across the limbic cortex of the two primitive brains relates to the evolutionary heritage at one pole, and emotive connections of the autonomic nervous system at the other pole.

The bilateral polarization of the two hemispheres of the new brain does not occur to the same extent in other animals. Although the porpoises and whales may have larger brains, in humans there is a frontal development to the hemispheres associated with purposive activity that our comrades in the sea do not possess. We humans have a unique capacity to create, and to evolve ourselves within the context of our relatively fixed biological structure.

The whole of our evolutionary heritage is structured into our bodies, from the molecular constituents that we share with the universe to the intricacies of our nervous system. Our skeletal structure, visceral organs, flesh and blood, the food we eat, the air we breathe, are all contributions from our ancestors, representatives of them all remaining to project the energies that keep us running and sustain us.

The whole of nature's energy refinery is recreated in man, a microcosm of the universe and a multi-tiered fractionating column of every stage of life on earth. We are the privileged proprietors of a very sophisticated piece of equipment, yet we haven't begun to understand the nature of its processes, its regulation and control, or how to bring it to a proper balance. The energies that we refine and project are substandard, often to the point of being unfit for consumption even when generated for our mutual needs, while the evolutionary market environment—our natural heritage—has been disrupted into a shambles. Every day we incur more and more debt to the future, with little hope of reversing the tide of events. The drama is rapidly gathering overtones of tragedy.

The greatest of gifts, language is both our blessing and our curse. What has given release to our creative potential erodes at our own foun-

dations. A clear perception of the creative dilemma lies buried in meaningless words, the polar development of our intellect being coerced into the service of the emotional cravings of the crocodile and the horse structured into our limbic polarity. The most evolved of creatures, we get caught on a treadmill that gives amplified expression to the basest of beasts.\* We disinherit ourselves from the wealth of our experience through an exclusively objective formalism; then approaching the theater from the outside, we read a few notices, pretending that we understand the plot and enjoy the play.

The boat has drifted a long distance from the end of the bay, moving parallel with one shore about sixty or seventy feet away. The shoreline is slightly scalloped, with little points jutting out every few hundred feet. The beach is covered with an assortment of stones and boulders, patches of wild flowers and reeds sprouting up between them. A few water lilies inhabit the shallows close into shore. The bottom falls off quite steeply into deeper water here.

Up ahead there is an animal standing by the water's edge. It looks like a small dog, yet the nearest house is a couple of miles away. The boat is paddled slowly into shore as it drifts quietly toward the animal. It is a young fox about two months old, captivated by the strange looking apparition floating on the water. It has no fear, just large inquisitive eyes with the innocence of youth. It has the same sense of wonder as a human child. After several minutes, it has seen enough, and turning on spindly legs, steps nimbly over the stones to disappear into the bush. The mother is nowhere to be seen.

The boat is pushed out again to continue the drift, but is turned around to alter the direction a little.

All mammals go through a learning process. With the higher mammals a good degree of parental guidance is involved. They must learn to cope with many contingencies in an environment that is often hostile toward them. Animals establish a routine and a territory, associated with their framework of understanding.

The situation for man is not all that different, except that language and the complexity of our activities requires us to live in structured societies. In organized undertakings we achieve a mutual benefit from in-

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\*An interesting account of humanity's social dilemma in terms of our biological development and the split between our primitive and new brain is given by Arthur Koestler, *The Ghost in the Machine* (London: Pan Books, 1970).

dependent efforts. Everyone recognizes the need to structure our activities, but few appreciate the fundamental importance of doing it properly, or the serious consequences of making relatively simple mistakes. This can best be illustrated by a little story about a hypothetical company.

In reading the story, keep in mind that the “*first structural constraint*” requires the separate delegation of authority in each of the six focal points of activity. There is also a “*second structural constraint*” that is associated with the number of levels in a company, and that is required by the system. We will get to this later. For now the idea of half-rank positions will suffice to illustrate the second constraint. Half-rank positions result when there are more than the required number of levels delegated in the hierarchy of a company.\*

The story illustrates that in a sense an organization is a communications machine which, like any other machine, functions according to the manner in which it is structured. When it is properly structured, everyone can see their place and is encouraged to respond according to their capabilities. When it is improperly structured, this perception is lost: the participants in the organization become the unwitting pawns of the communicative forces implicit in the structure. For many this means a lifetime of frustration, while for some it means a free pass to an empty success. For everyone, it means the substitution of illusion for the simple knowledge of one’s worth and commitment. When either or both of the structural constraints are violated, the result is always the same. The organization will develop lopsided aspects. Some people are placed in positions of dominance unwarranted by their jobs, while others are placed in positions of disadvantage in relation to the needs of their jobs. The struggle for power replaces the struggle for reasoned solutions to practical problems through a meaningful role within the organization.

The story is that of a small, growing construction company. A certain construction foreman decides to go into business for himself. He begins from his backyard with a crew he runs himself and second hand equipment he repairs himself. His business prospers. He secures a loan, rents or buys equipment, and starts one more crew. Now he supervises the crews, and he has a mechanic and part-time accountant. His wife answers

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\* Albert Low’s work is indebted to that of two psychologists who first developed the idea of half-rank. Wilfred Brown, and Elliott Jaques, *Glacier Project Papers: Some Essays on Organization and Management from the Glacier Project Research* (Carbondale, Ill.: Southern Illinois University Press, 1965).

the phone, and he estimates projects, calls on clients, and sometimes pitches in to help the mechanic. Before the loan is paid off, he is able to begin another crew, but his organization is beginning to show signs of strain. He now has an apprentice with the mechanic, a woman in the office, and the accountant works full time. He has very little money ahead of him, his premises are inadequate, and more than half of his equipment is in poor condition or in need of replacement.

Another opportunity in the market presents itself. He secures another loan, moves to rented premises, replaces some of his equipment and starts two more crews. He now has two clerks working for the accountant in the office and a foreman in charge of his shop, together with two mechanics, each with an apprentice. Five crews are running in the field, and an estimator helps him to price projects, call on clients, and keep work ahead. He is quite a busy man, but his organization seems to be stable, his people are responsible, and the financial position of the company is steadily improving.

After some time, the pressure begins to tell on him. His doctor advises him to take it easy. He decides to appoint one of his foremen as a "construction superintendent." Now he is confronted with a dilemma of a different sort: should he, or should he not, include the shop duties related to equipment maintenance under the jurisdiction of the new superintendent? With the most warranted trust in his new superintendent he decides to include them.

The superintendent is overjoyed with the appointment. The other foremen also seem to take it quite well, except for the shop foreman, who for some reason has reservations about the whole affair. The accountant and estimator don't see how the decision should affect them, hardly noticing that they are a little miffed as well. The damage has been done, and no one is likely to see the real cause of the conflicts that are certain to arise.

Now the accountant and estimator, who used to communicate freely with the shop foreman, keep getting "unnecessarily" involved with the superintendent. It doesn't happen with the field foremen since they now deal with the superintendent "instead of" the owner manager. Through no fault of the superintendent, he begins to assume a "special" position in the company, which is not relevant to the work involved. Not to be outdone, the accountant and estimator begin to proclaim their equally "special" positions.

The effect on the shop foreman becomes progressively more crushing. He has always dealt regularly with the accountant, who can no long-

er accord him equal status on matters that they must mutually resolve. This foments strong reactions from the shop foreman. Since the superintendent is in no position to resolve the dispute, he is put in the position of having to take sides. Only the superintendent or the accountant can take the dispute to the owner-manager, so that the shop foreman is denied the right to state his own case. In addition the owner-manager, although he has officially delegated the shop management to the superintendent, unofficially considers that he should have the right of direct access to matters pertaining to his capital investment. The shop foreman thus becomes further confounded by having to work for two bosses, while the superintendent is put out by the boss's meddling.

There is a construction boom. Four more crews have been added. The shop foreman has three more apprentices; there is another woman in the office. The superintendent is now under pressure, running a little too hard for his own good. He requests an assistant. The owner-manager approves, not for a moment reflecting on the outcome or the relative merits of appointing another superintendent on the same level.

Until now the foremen in the field have been almost free of the effects of half rank positions, but those days are gone. They are now afflicted by the same irritability they had noticed earlier in the shop foreman. They had enjoyed a good working relationship with the superintendent, but the new man in the middle doesn't seem to know what he's doing. He can't know what he's doing because he must constantly try to anticipate what's on the superintendent's mind. He is condemned from the beginning to fail, there being no way that he can make an independent commitment to his role.

Unfortunately the superintendent begins to meditate on his unusual success, while the accountant makes sanctimonious efforts to maintain the communicability of his position. The rift between the accountant and the shop foreman widens.

The owner-manager has inadvertently overdone his doctor's advice, partially abdicating his job as manager. Although puzzled by the shop foreman's disposition, as well as by the accountant's negative attitude, he is unable to diagnose the problem. He gives much of his attention to the superintendent, who seems most pleasantly disposed to him. Missing the intensity of interest he experienced during the difficult years, he often talks about the good old days. More and more he must find ways to justify his own position. Talking makes him feel better, and he turns to an increasing number of theories about business and its politics.

Encouraged by theoretical discussions with his boss, the superintendent begins to consider himself as one half of a management duet. He can easily justify replacing the accountant who has become nearly impossible to communicate with. If he can also establish his superiority over the estimator, he will have totally eclipsed the owner-manager's position. The owner manager will be that in name only, having been effectively eliminated from the day-to-day operation altogether.

Although the superintendent may consider himself a regular whiz, he has been on a free ride, carried along by the communicative forces inherent in the distorted structure of the company. His rise to the top was predestined from the day he was delegated two regions of the owner-manager's job instead of one. On the one hand he was pulled there by the attraction with the manager; on the other hand, he was pushed there by the repulsion between the accountant and his own subordinate. Only two options can resolve the distorted tension that has amplified the superintendent's ambitions: he can either abandon his role, or achieve the job of manager. He can either make a new start, or be instrumental in the failure of his friend. As is the case with everyone else, he has been denied the possibility of fulfillment through meaningful expression in his role.

From the time of the owner-manager's eclipse onward, the attraction between him and the superintendent will change to repulsion, while the repulsion between the accountant and the shop foreman will tend to normalize. The owner-manager will have been automatically ousted. He may announce his retirement; his physical or mental health may fail him; or he may fire the superintendent and start the same cycle all over again.

From the day of the faulty appointment, the events could not have turned out differently. With that single act, the entire plot was written. It was left to the actors only to enrich their individual roles. The sad thing is, the most competent, conscientious people turn into the strongest protagonists. Friends become enemies and enemies become friends, depending on where they are plugged into the plot.

The faulty structuring of the construction company automatically self-corrects to the point where the error was made. If the owner-manager retires, the structure becomes technically correct, with the superintendent becoming the new manager, and the man in the middle becoming an overworked superintendent. The problem is that the corrective tension has no regard for the individuals concerned. It functions as blindly as the error that initiated it. The tension conflicts with the intentions of the participants, with no benefit to anyone except to make them wonder

what is wrong It does provide an incentive to search, provided a person is so inclined.

The boat has drifted out of the shelter of the bay into a moderately strong wind that is moving it across the lake, A good sized creek comes into the lake on the other side—sometimes a good place to hook a nice pike. It's worth a try for a short while before heading back to camp. The motor is started up. There is a large sandbar that extends out several hundred feet in a sickle shape from one side of the creek. By anchoring in the center of the area the semicircle along the edge of the sandbar can be reached by casting. The boat is steered into a position about forty feet upwind from the best spot, and the anchor lowered from the bow with lots of slack in the rope. The boat drifts back, the anchor catches, just about right, the lure is changed. Casting begins.

As a small company such as the construction company begins to grow, the delegation of work becomes progressively more important, taking place in levels (or vertical tiers) as well as in different activities.

The first level of delegation is always *functional* in nature. It is concerned with the specifics of performing physical tasks. In the production activity, this may be pouring concrete for a highway, or assembling parts in a manufacturing plant. The man in charge is often called a foreman. Although he may have group leaders or sub-foremen reporting to him, this sub-level of organization relates not to the company structure as a whole, but to the complexity of work at the functional level of delegation. It is concerned with task cycles.

The next level of delegation, identified as the *supervisory* level, must acknowledge that there are distinctively different regions of activity involved in committing resources to product cycles. By this time there will be a product development activity in progress, but only as it relates to production. Nevertheless it is premature to combine these two regions at the supervisory level. This was the first mistake made with the construction company—equipment maintenance is product development as it relates to the daily routine of construction, and it was included in the construction superintendent's job. Not only does this introduce the political problems that were encountered, but it also seriously and unnecessarily restricts the growth of the company. The superintendent will soon become overworked, but it will not be possible to appoint another on the same level without establishing a second maintenance shop. To avoid

this expense, one or more assistants will be appointed for the superintendent. Half rank is thus further introduced, compounding problems.

The next stage of delegation will be called the *administrative* level. It is concerned with the infrastructure of the company, with its facilities and systems of operation that implicitly direct the commitment of resources to the making of the product. This level of delegation occurs first in the production activity, but usually by this time there will be delegation at the functional or supervisory levels in all six regions.\*

By the time there is an administrative level in production, there will likely be delegation in a marketing department concerned with the direction of the whole company. It may lead the company to diversify, or specialize. This will translate via the organization structure to a specific focus on idea development. It may be the engineering development of specialized equipment or construction methods that will require a new sales focus, special financing, and specialized technical instruction to production regions. All six regions are involved in the evolution of the whole company by the time it has reached four levels. The managerial level at the top must maintain the three polar dimensions in balance.

From the preceding description, it can be seen that each higher level of delegation involves a distinctly different kind of work at a more fundamental level of abstraction in thought, encompassing broader horizons. These four levels constitute a hierarchy that is implicit in the nature of the cosmic order. They always occur, just as the six regions do. The four levels may be summarized, beginning with the most fundamental or most central as follows:

1. *Managerial work* gives form to *idea* and direction to the whole company. Only the chief executive does managerial work.
2. *Administrative work* gives form to *knowledge* and direction to routine by specifying technique implicit in the infrastructure.

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\*If we had followed the growth of the construction company further, we might have seen one or more construction managers appointed, each responsible for a division or geographical area. Each should be independently responsible for production, equipment maintenance, estimating and sales, budgeting and accounting, and personnel functions, all as they relate locally to the division or area. The six activities thus partially break out within each production region, although the marketing function will not likely be delegated. These organizational principles have been more fully developed in an unpublished book entitled *Enlightened Management and the Organizational Imperative*.

3. *Supervisory work* gives form to *routine* and direction to function by committing labor, equipment and material to product cycles.
4. *Functional work* gives form to *form* and direction to itself by applying technique to task cycles in the product of each region.

These four levels represent four active interfaces in the hierarchy of any company through which the product idea becomes translated into explicit form as a distributed product or service.

The *first structural constraint* requires independent delegation in each of the six regions of a company in order to maintain insight into the three polar dimensions at all levels. The closely related *second structural constraint* requires that the four stages of delegation be followed as a company grows. As an organization grows beyond four levels they begin over again in a different context. Together these two structural constraints define the limits of flexibility in structuring any company.

In one sense these constraints may seem rigid, and yet they are very flexible. They allow for different circumstances, they relate to any company, and they provide for the maximum degree of creative expression within the structure. The checks and balances are implicit in the three polar dimensions that provide for structural insight into the creative activity. Everyone can see their place in the performance of the whole company, and vice versa. The organization becomes transparent.

These basics of organization do not lead to the over-formalization of an artificial superstructure that people cannot relate to. They provide for only the appropriate degree of formalization necessary to define balanced working relationships between people. They preempt the bureaucracy and politics that so often dominates companies, wasting human resources in meaningless effort and internal strife. People can independently respond to the practical needs of their jobs such that mutual efforts properly mesh and harmonize.

If there is a big pike in the mouth of the creek today, it isn't hungry. The only action has been a strike close to the boat by a small one. It must be well past lunchtime. Although the day beckons to stay out on the lake, there are things to do back at camp. Soon it will be time to venture into some wilderness fishing on a lake farther to the north—there are many preparations to make.

The system requires a venture into the wilderness also, a wilderness of thought where there are no organized ideas. The fishing up north will provide a helpful setting. The anchor is pulled in and the boat headed out

around the sandbar, then back up the lake toward the cottage. The wind has quite a sweep from the end of the long bay. The splash of the waves against the hull sends spray flying over the side. It feels refreshing.

The evolution of a business organization is self-similar to the evolution of life on the planet, although the latter, having been in progress for a very long time, is much more complex than any man-made organization.

Just as in a business organization, there are successive levels of delegation in nature's enterprise that may be called a discretionary hierarchy. There is a transfer of patterned energies through the hierarchy from top to bottom and also a feedback of patterned energies in the opposite direction. In a company these energies are projected in a variety of ways in speech, gesture, behavior, writing, and through silent intention. They are not restricted to formal communications channels, being perceived through the nature of the polar balances they effect. In short, the levels in a company act as tiers in a fractionating column for the reflux and refinement of energies, just as do the levels of biological life on the planet, and the levels of organization in man. The process seeks dynamic equilibrium through the regulation of reflux.

There is a recurring pattern or self-similarity to the manner in which the system unfolds. This makes it possible to gain an overall understanding of a system with a large number of levels in terms of a system with a small number of levels in the discretionary hierarchy.

This can be exemplified by looking more closely at nature's energy refinery illustrated in Figure 8.

*Hierarchies in Nature's Energy Refinery*

<b>HUMANS</b> Idea	Idea	Future delegation of cosmic <i>ideation</i> will open the human mind to levels of realization as yet undreamed of, with a new balance throughout the hierarchy.
	Knowledge	Delegation of direct <i>knowledge</i> of cosmic order requires a new paradigm for science. The three focal points of mentation must balance in the biosphere.
	Routine	Expansionist empires fueled western science & industrial <i>routines</i> that now dominate the planet through huge corporations, threatening global resources.
	Form	Spirit cultures explored the planet. Cities brought division of labor & writing. Three <i>forms</i> of ideation focused through Eastern, Western & African cultures.
<b>VERTEBRATES</b> Knowledge	Idea	African primates evolved through anthropoids & hominids to humans. Speech polarizes left and right brain. Limbic emotion fuels abstract <i>idea</i> for behavior.
	Knowledge	Higher mammals, dog, seal, etc., can select behavior. Topology of neocortex used to intuit action in <i>knowledge</i> . Ancient limbic system controls emotion.
	Routine	Lower mammals, horse, cow, etc., have limited capacity to modulate emotive <i>routines</i> . Mesocortex blooms. Marsupial counterparts lack a corpus callosum.
	Form	Reptiles explore quadruped <i>form</i> . Autonomic nervous system reflects emotive patterns specific to each species in cerebral awareness. Archicortex blooms.
<b>INVERTEBRATES</b> Routine	Idea	Ants, bees, etc., use the <i>idea</i> of division of labor for their collective survival. The giant squid's developed brain employs <i>ideas</i> for it's individual survival.
	Knowledge	Flying insects rapidly integrate extended <i>knowledge</i> in flight routines. Most span time via metamorphosis. Spiders & some crustaceans span time & space.
	Routine	Segmented worms integrate successive <i>routines</i> . Centipedes colonize land. Arthropods specialize body segments. Cephalopods & mollusks unsegmented.
	Form	Sponges, jelly fish, coral, flatworms, nematodes, starfish, & chordates explore <i>forms</i> of routine in motor-sensory responses, with embryo developments.
<b>PLANTS</b> Form	Idea	Flowering plants (angiosperms) with refined vascular systems, use extended <i>ideas</i> to attract animal pollinating vectors, and to produce fruit for dispersal.
	Knowledge	Gymnosperms integrate <i>knowledge</i> uniting the gametophyte generation within the sporophyte in pollen and seeds, allowing conifers to live in dry terrain.
	Routine	Giant horsetails & clubmosses on land explore <i>routines</i> with vascular systems and alternate sporophyte and gametophyte generations, leaving us coalbeds.
	Form	Algae, fungi, slime molds & lichens explore the <i>forms</i> of the eukaryotic cell, from microscopic to giant. Alternate sexual and asexual generations emerge.

Figure 8

Biological life has evolved in four major levels, each with a self-similar hierarchy within itself. Although sixteen levels are shown, we can

nevertheless deal with the hierarchy in the much simpler language of System 4.\*

This overall survey of nature's energy refinery indicates that the many tiers of biological evolution are subsumed within four major levels of delegation in a planetary enterprise that involves the whole of biological life on earth. They may be summarized as follows:

1. *Creative energies* of humans implicitly give form to *idea* and direction to knowledge in creative activity.
2. *Conscious energies* of vertebrates implicitly give form to *knowledge* and conscious direction to routines of behavior.
3. *Sensitive energies* of invertebrates implicitly give form to *routine* and direction to body form in movement.
4. *Vital energies* of plants implicitly give form to *body form* and direction to biochemical structure.

*Idea (1) → Knowledge (2) → Routine (3) → Form (4)*

This hierarchy is universal in System 4 of the cosmic order. We may call System 4 *the primary creative process*.

Self-similarity indicates that in complex organizations like the biosphere, a similar hierarchy resides within each level of the hierarchy. On the one hand, this precludes the possibility of reducing evolution to no more than a series of fortuitous accidents without meaning or purpose. The four levels are distinctly there, clearly indicating a more fundamental order to all experience. On the other hand, this provides a key to understanding how intelligence is implicitly at work in the cosmic order. We can learn to harmonize our activities with the biosphere in a manner consistent with the cosmic order.

There is only one species of man. From this assessment of the evolutionary hierarchy, it appears that we are destined for a managerial position. We have already disrupted the planet to such an extent through our creative undertakings that we must assume responsibility to survive. The problem is that there is a four level company to be managed, while as yet man is able to relate only to the functional cultural level, and supervisory technological level, in the idea hierarchy. The administrative knowledge level requires a universal framework of understanding through which creative energies of cosmic origin can find appropriate expression. This

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\*The hierarchies are more completely developed in an unpublished book by the author entitled *Downsizing Darwin*.

requires a pragmatic new paradigm, especially for our sciences and our socio-economic organizations. This cannot be a contrived affair. It must accurately reflect the cosmic order, embracing all possible variants of experience.

The boat is turned sharply to head in along the upwind side of the dock. The water is shallow, so the motor is shut off and tilted to let the boat coast the last few feet to the dock. Then the boat is swung around to the other side of the dock and tied up with the point facing out. This way the waves won't splash over the stern and fill the boat with water.

There's something about being near water that aids reflection on the many aspects of the system. Water is a fluid body that yields in compliance to the forces that enclose it. Its moods of change are expressed in the condition of its surface; accordingly, its surface reflects the conditions that contain it. Today, the wind has stirred its surface to angular, choppy waves following in unending procession to the shore. The colors of the sky, the scattered clouds, and the surrounding hills are all mixing by themselves as on a living palette left behind as a curiosity by a mysterious master artist long ago. In the middle of it all, the sun is reflecting in a million pieces, as if a colossal crystal chandelier has smashed to smithereens and is strewn across the surface. Each piece reflects with a knowing wink, then disappears to be replaced by another piece, as if the chandelier is still smashing even while the mess is being cleaned up. The polar aspects of the cosmic order are reflected in the animated mirror of creation, integrating history. That's what it's all about.

There are a couple of days work needed to get everything together and checked out for the trip north. The tents must be erected and inspected before they are packed. Rainwear, winter clothing, camping equipment, tools and various articles must be collected, not to mention food supplies and fuel. It is time to get started.



## Chapter 7

### Three Mergansers

It is a hot sunny day—the last chance to get some fishing in before heading north. The boat is drifting slowly in a large shallow bay that extends from one side of the creek that was fished the other day. The water is only five or six feet deep. The bay provides ideal feeding ground for pike and also lends itself to casting, for the weeds are not plentiful enough to create a problem. The boat is paddled a couple of hundred feet, then allowed to drift while the circle around the boat is cast, then paddled some more, and so on. The lure, a red and white spoon about three inches long, is usually retrieved in spurts, with a rhythmic motion of the pole. This enhances the lure's action, also breaking any tendency to spin in one direction and twist the line.

Pike are loners who often range lazily in shallow water on sunny afternoons. A cast is placed beyond a patch of underwater ferns so that the lure will pass along one side. It is beginning to look like another dry run when a good sized one comes out of nowhere, hitting only twenty feet from the boat. It strikes viciously, running about fifty feet before coming to a stop, then it takes off again. It is headed toward the open lake. The direction of drift is fortunate for this one will take some time to land. Now it is dragging in heavily, angling to one side, and coming to the surface. Its tail breaks water in a flutter, sending spray flying, as it snakes out of sight like a rocket. Another good run, and it coasts to a stop. Again it begins to drag in heavily.

The pattern is always the same with big northerns. A sight to behold when they take off on a run, they soon tire, dragging back while they conserve strength for another run. It is a process of gradually wearing them down. With light tackle, it is wise not to bring them close to the boat until their strength is spent, but it is essential to keep the line taut and the pole bent at all times. The idea is to play the fish at a moderate distance, working it closer as it tires. A couple of times it tries to hug the bottom and pull away steadily, then it reverts to the run and drag pattern.

Gradually it can be felt weakening. A few more runs and it begins to turn belly up. It makes another short run close to the boat, but now it is done. Brought in from the left, it is scooped into the net, which is large, two feet across the mouth, but none too large for this fish. It is a very nice northern, a shade over three feet and well built, maybe fourteen pounds. It has taken twenty-five or thirty minutes to land it.

It is beginning to kick around in the net. The fingers and thumb are worked under the gill covers on each side at the top and squeezed together hard. The fish becomes quite still. It was well hooked, but not damaged. It is held up for one last look. It returns an icy stare and cranks its body once. Placed gently over the side of the boat, it first turns belly up. A tug backwards through the water helps to oxygenate the gills, and the fish regains equilibrium. At first it glides slowly away from the boat, then it gives its tail a kick and is gone.

That is enough of northern pike for one day. Across the lake there is a point where a flat rock angles into the water—a good place to go for a swim. The boat is headed over, pulled up on the rock, and tied to a bush. After a long, refreshing swim in a large circle out into the lake, a comfortable spot is selected where the rock slopes toward the sun.

The heat of the rock is pleasantly moderated by the moisture from the swim. The sun feels like liquid life being poured over the body. The song of a bird echoes like an animated noise in a world without form. The eyes are inadvertently opened for a second to look directly at the sun, then closed again quickly. The blinding image of the sun persists inside the lids, gradually transforming to a negative image of darkness against a vermilion background. After awhile this image also fades. It is strange that a positive image should spontaneously transform into a negative image. There is a polar dynamism involved that brings to mind the Taoist principles of yin and yang.

Yin is the passive principle of darkness; yang is the active principle of light. This is another ancient expression of the center periphery dilemma. The two principles are mutually reconciled in a dynamic equilibrium that defines the nature of activity. The symbol in Figure 9 graphically illustrates this. It is as if the one principle were chasing the other in a circle, each one being interpenetrated by the other at its center.

Yin represents the female principle in the universe, exhibiting receptiveness, negation, cold, weakness, pliability, and so on. Yang represents the corresponding male principles of activeness, affirmation, heat, strength, and firmness. According to this teaching, everything in the universe derives from the harmonious blending of these two principles; all

actions are properly undertaken in accordance with the seasons they define. Suns clustered in galaxies provide the passiveness of sky dimension. Energy from suns interpenetrates the darkness to bring to light planets, which further exemplify the principles in their rotations, alternately exposing their surfaces to warm days and cool nights, so that a rhythm to life is established in wakefulness and sleep. Weather develops according to concentrations of heat and cold, land and water. Growth and activity become regulated accordingly; thus the fundamental principles proliferate throughout existence.



*Figure 9*

We often regard light as something and darkness as nothing. Darkness too is something—something more than the absence of light. As the passive principle in the polar relationship, it is just as authentic as the active principle. Light and darkness are complementary, being mutually defined by their mutual relationship.

The language deficiency of science has entrenched its position by developing a form of binary logic that first acknowledges a polar aspect to all being, but then denies validity to the passive pole. Boolean algebra, the root language of the digital computer, depends essentially upon the ability to express all activity in variations of the copulative verb “to be.” All activity is acknowledged as a form of being; all being is acknowledged as a form of activity. Being is a verb. Because it is, it also has a polar quality associated with the interplay of a specific and a non-specific aspect, the active and passive principles of yang and yin.

In the application of the digital computer, this polar nature of being is not recognized. Instead the computer is constantly presented with a choice between *being* or *not being*—one or zero. Being is treated as a concrete, material fact lacking any polar quality, and not being is treated as the extinction of all trace of being quality. A language of division has

been contrived that can only endlessly recite the already overworked lines of Hamlet's soliloquy: "To be or not to be." That is the only question the computer can deal with. Computers may manipulate data but nothing can be reconciled in its essence to anything else. A dichotomous language doesn't contribute to an understanding of the cosmic order with its self-similar polar dimensions.

In contrast, the twin principles of yin and yang portray a harmonious marriage. The dualism transcends itself in the mutual interaction of the principles to give birth to a living interpretation of creation. The polarity provides for a language of life.

Taoism is very old. Legend has it that about twenty-five hundred years ago a venerable sage named Lao Tzu, disheartened by the uncomely behavior of his contemporaries, was leaving his village to live out his remaining time in solitude. At the China frontier, an official, wishing to preserve some remnants of the sage's wisdom, prevailed upon him to set down the basis of his teaching in writing. This he did in a book of eighty-one poems called the Tao Te Ching.\* Regarded as central to Taoism, these poems are understood to portray the way of life. The void is a common theme in Taoist poetry and is used here to illustrate the dynamic interdependence of the active and passive principles of yang and yin. Poem 11 is a good example:

*Thirty spokes will converge  
In the hub of a wheel;  
But the use of the cart  
Will depend on the part  
Of the hub that is void.*

*With a wall all around  
A clay bowl is molded;  
But the use of the bowl  
Will depend on the part  
Of the bowl that is void.*

*Cut out windows and doors  
In the house as you build;  
But the use of the house  
Will depend on the space  
In the walls that is void.*

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\*R. B. Blakney, trans., *The Way of Life* (New York: Mentor Books, 1955)

*So advantage is had  
From whatever is there;  
But usefulness rises  
From whatever is not.*

The fossil evidence indicates that Africa was the cradle of humanity, with hominid origins going back over four million years. In the latter half of this period that the genus *Homo* emerged, and over the last million years *Homo erectus* ventured out of Africa to explore Europe and Asia. On the journey he mastered fire, simple tools, the hunting of big game, and language essential for simple forms of social organization. While there is not agreement on how the lone species of modern humans, *Homo sapiens*, came to populate Europe and Asia, the earliest fossil evidence, dating to over one hundred thousand years ago, has been found in South Africa.

Running through our long trek out of Africa, the evolution of human culture on the planet has clearly displayed a self-similarity to the three polar dimensions of the cosmic order. Each of the three focal points of humanity's conscious abilities have received separate emphasis in separate geographical areas of the planet. This is directly associated with the so-called negroid, mongoloid, and caucasoid races, with various mixes between them. This has been essential for the independent yet related development of humanity's emotional, intuitive, and technical abilities, associated respectively with our ancient limbic emotional brain, our implicitly intuitive right hemisphere, and our left brain focus on explicit technique.

There is, of course, a self-similarity within each of the three polar groupings. All humans function with all three dimensions. Each dimension has simply received independent emphasis historically in different regions of the planet, and they are equally essential to the human condition—to an appreciation of what we are. The joyous musical heart of Africa, the inscrutable intuitive prowess of the East, the calculating explicit logic of the West, are obvious enough.

It is, in fact, as if the planet itself has cooperated, imposing an independent focus on each of the three dimensions by erecting natural barriers accordingly. Africa is neatly surrounded by water and further isolated by formidable deserts, not to mention the many hazards of penetrating the interior in earlier times. Until recent times the Himalayan massif and the Tibetan plateau have effectively isolated East Asia from the West. There have been many complementary developments accordingly.

For example the Sino-Tibetan languages have developed with a distinctively right brain focus, even though language is predominantly a left brain function, in Asia as it is elsewhere. There are no tenses to verbs, no sense of linear time implicit in these languages. There are no articles to emphasize the spatial isolation of particulars, such as *the* man, or *a* woman. On the contrary, every noun has a universal classification that implicitly defines it as a member of a group. The languages are generally tonal with a change in tone completely changing the meaning of words, thus introducing a different intuitive focus on discriminating slight differences in sounds. Few conjunctions or connective words are used to link isolated things together in a linear flow through space and time. These languages don't lend themselves to explicit logical processes so familiar to the Indo-European languages. Instead meaning comes together wholistically as an intuitive gestalt. Instead of learning a host of explicit grammatical rules, one must become intimately familiar with the idioms of expression which may take many forms. The Chinese script is an example of the Eastern wholistic approach to understanding. There is a wholistic idea implicit in each character that is independent of the spoken language. Anyone can learn to read and understand it in their own language. The Japanese, Koreans, and various linguistic minorities can read Chinese, but they don't speak the same language.

Communication between East and West began just over two thousand years ago, with the opening of the silk route through the Indus Valley in present day Pakistan. About the same time, sea traffic began between southern India and southern China. To save the long and treacherous voyage through the Straights of Malacca, elephants were used to haul their boats across the Malay peninsula, where there is a breach in the mountains. By the sea routes, both Indian and Chinese influences came to bear on Southeast Asia.

East Asia still retains a spirit culture orientation, despite the aggressive ambitions of European colonial empires and the devastating revolutions, dictatorships and wars that have followed. The tribal roots of Asia are still largely intact in mountainous areas of China and Thailand, and especially in Laos and Burma. These hill tribes are still predominantly shamanist, and retain a world view quite similar to that of the Native American cultures.

Even the lowland cultures of East Asia remain thoroughly infused with their spiritual roots. Spirit doctors abound, without benefit of formal organization, in every little village and town, even in modern cities, and spirit possession is widely practiced.

For example one can see spirit possession on a grand scale during the vegetarian festival at Chinese temples throughout the Malay peninsula. A single temple may have several hundred participating spirit mediums who perform extraordinary feats during states of possession. These feats must be witnessed to be believed, for they utterly defy rational explanation. The possession states are believed to derive from the Nine Emperor Gods, also known as the pole star deities, about which the world turns. They are considered in Taoism to be self-similar with the nine planets, the nine palaces of the brain, and the nine celestial breaths of the Supreme One. It's an interesting analog to System 4 and the elaboration of wholeness.

Eastern religion is not the exclusive affair that it is in the West, where one Christian or Muslim sect opposes itself to others, not to mention all other religions. Taoism embraces its ancestral shamanist roots, frequently alongside Buddhism in the same temples. Hindu and shamanist influences likewise flourish alongside Buddhism in Southeast Asia. People tend to intuitively learn from both the similarities and differences of various religious beliefs without rigidly opposing one to the other in the logic of language.

Buddhism was born just inside the border of present day Nepal, about the time that Lao Tzu was writing his poems in China. Siddhartha Gautama was the princely son of a tribal chieftain and he left his life of privilege to seek a solution to the problem of human suffering. After awakening to the nature of reality, he proceeded to teach the four noble truths, including the eight fold path to liberation from suffering. Buddhism was born out of the Hindu tradition, essentially stripping away blind belief in the host of divinities that had become associated with Hinduism, while stopping short of denying a Supreme Being. Buddhism acknowledges other spiritual realms and levels of being, but doesn't dwell on them. A strong focus is placed instead on achieving direct personal insight.

Hinduism has spiritual roots in a Dravidian culture that thrived in the ancient cities of Harappa, and Mohenjo Daro over four thousand years ago. Following their destruction by Aryan peoples from Central Asia, the Vedic literary tradition emerged in the Indus Valley, consolidating into the Hindu religion. The Vedas are ancient hymns about spiritual knowledge and insight, and were followed by the Upanishads prior to the time of the Buddha. By this time the Hindu religion had grown very complex and became organized into various systems.

A central theme in earliest Vedic times was the cosmic order. It was known as the *rta*, and was traditionally associated with divinity. The cosmic order later found expression as the dharma, an intelligent and transcendent moral order that is at the same time implicit in the nature of things. The dharma is fundamental to both Hindu and Buddhist teachings, both placing emphasis upon an intuitive meditative pursuit to gain insight into the nature of reality.

Both religions acknowledge a law of karma deriving from the cosmic order. This is a causal law of a different kind to explicit cause and effect operating in a linear sequence through space and time, as conceived in the West. One's karma concerns the implicit influence of ordered energies from the past, including past lives, that tend to determine the destiny of the individual. These influences may be either evolutionary, leading to the coherent integration of experience, or involutory, leading to fragmentation and decay. Karma recurs in cycles that transcend space and time. It is not rigidly predetermined. Both teachings try to develop the evolutionary potential of the individual through their discipline, which encourages the involutory tendencies to fall away.

In Taoism, the basis of the cosmic order derives from yin and yang, so the cosmic order has been a theme prevailing in the Eastern mind for at least a few thousand years. It is this cosmic flair that most distinguishes the spiritual orientation of Asia from that of sub-Saharan Africa.

Over the past two millennia Buddhism has moved eastward from India. Inroads to the West failed to develop, just as Greek philosophy stopped at the Indus Valley where the germ of many of its ideas probably had their origin. The Buddhist Mahayana stream first entered China via the silk route, eventually making its way to Japan. The Theravada stream was taken to Sri Lanka by the son of Asoke, after Asoke established the first Indian empire in the third century BC. One of Asoke's wives was a Pali Buddhist, and Asoke himself was stricken by remorse over the carnage of his conquests, subsequently embracing Buddhism also.

From Sri Lanka, Theravada Buddhism was transplanted to South-east Asia where it continues to thrive, along with persistent animist beliefs, at the same time preserving a tradition closer to the original scriptures than the Mahayana stream. Buddhist practice remains especially strong in the forest traditions of Burma and Thailand. Its influence on these pleasantly oriented cultures is apparent. Buddhism arrived in Tibet from India about the seventh century AD, and was eventually purged from India following the conquests of Islam.

Some five thousand years ago, concerns likewise arose about the cosmic order in Mesopotamia and Egypt. In ancient Sumer it was known as *me*, and concerned universal values. In ancient Egypt it became known as *maat*, depicted as a goddess through which the supreme creator Ptah effected his works. Again there is an interesting analog to the three polar dimensions of the system. During the judgment of the dead before the resurrected Osiris, the heart of the deceased is weighed in a balance against the feather of *maat*. The goddess is depicted as wearing a feather in her hair, and she also acts as the fulcrum of the balance. Since it was believed that the tongue issues the thought of the heart, the imagery clearly suggests that judgment depends on a balance between the emotive limbic polarity, the left brain language polarity, and the right brain intuition of the cosmic order, the whole balance hinging upon a self-similar relationship to the cosmic order acting as the fulcrum.

The Persian Empire linked the Indus Valley to the Eastern Mediterranean and Egypt in the sixth century BC, just as the golden age of Greece began to flower. Two centuries later, under Alexander the Great, the Greeks reversed the conquest, establishing Greek cities in the Indus Valley.

It's notable that there was also a reversal in Greek philosophy at this time that marked a clear beginning to the Western preoccupation with causal determinism operative in a vessel of space and time. Important earlier thinkers such as Parmenides, Pythagoras, Socrates and others, were very much in accord with many essentials of Vedic thought originating in the Indus Valley. Plato, in several of his dialogues, emphasized the relationship between transcendent universals and material particulars as expressed in his theory of forms. This closely paralleled the unity in diversity theme that pervades so much of Vedic literature and the later Upanishads. Plato believed in a transcendent reality associated with the cosmic order. His pupil Aristotle rejected the transcendental side of Plato's ideas, asserting that the essence of a particular thing resides concretely within the thing itself. As the Greek Empire fell to the Romans, it was Aristotle's concrete ideas about identity, causality, space and time, that appealed to the regimented Roman mind.

Early Christianity likewise had an esoteric side, linked to sacred geometry and the mysteries of ancient Egypt. But the esoteric side of both Greek thought and religion was brushed aside by the Romans. The empire served to transplant the seeds of causal determinism throughout Europe, alongside the explicit aspects of the Christian message.

The bones of the rest of the story have already been exposed, and we shall return to put more flesh on them later. Events moving westward have focused on the left brain development of explicit technique. A complex technology has evolved that now implicates the whole of human society, yet it has matured independently of humanity's spiritual development.

The stream of thought is broken by the sound of ducks nearby, in a small cove beside the point. There are three young mergansers, commonly known as fish ducks, in the shallow water close to shore. It is unusual to see only three together—generally there are a dozen or so in a brood, and they usually stick together until migration. Over half grown, these are fending for themselves. They swim together back and forth along the shoreline, quacking occasionally to one another. Every once in a while they make a dive, one after the other, always emerging close together. Soon one of the ducks pops up with a minnow about four inches long in its beak. Before it can turn the minnow to swallow it, the two companions make a noisy rush for it. The duck with the minnow swims with the inspiration that the promise of a full belly provides, downing the minnow in a flash. All three of them go back to their pattern of swimming along the shoreline.

One creature is often sacrificed to sustain another, but numbers are always sufficient to maintain a balance of species. In fact, this kind of sacrifice is often essential to maintaining a balance in the biosphere. Frequently, species that are higher on the evolutionary ladder have a defensive or predatory advantage.

The biosphere is the name given to the skin of biological life that encloses the surface of the planet. It consists of all the interrelated complexity of living systems in the atmosphere, the oceans, and the top layers of crust. The biosphere is a unified operating field, an active interface embracing all life on the planet. Therein, each form of life seeks a dynamic equilibrium with the whole.

As for mergansers, they are born fishermen. When just young balls of fluff, they can follow the erratic darting motions of a frightened minnow in flight, dunking their heads to pluck it from the water with unerring accuracy. They also have a wide variety of experience. Their early life is spent almost exclusively on the surface of the water between two worlds, but as they mature, they learn a degree of mastery over both the world above and the world below. They learn to dive and swim considerable distances underwater, and of course, they are migratory birds as

well. They are most at home, however, on the surface of the water where the great majority of their time is spent.

There is a sense in which this parallels human experience, but for us the surface is between the worlds of implicit insight and explicit technique. We are at the surface where the two worlds meet, where spiritual insight is emotionally balanced with material technique. There are many ways in which this balance can produce a surface—we should be careful how we chose our rest. There is a different surface for every framework of understanding—like myriad worlds of individual lakes. Some are stagnant little ponds, some may be extensive water systems, even seas or oceans, but in relation to the biosphere there is a system through which all these independent surfaces are sustained alike.

All frameworks of understanding order our mental processes in a certain way, making it necessary to see the subject matter through special eyeglasses that focus on those aspects deemed important. Different subject matter requires a different set of glasses, but with the system we can avoid the necessity of changing glasses every time we change our focus.

The result is not something different understood; it is something understood differently. This means bringing the two hemispheres of the brain into a mutually complementary function that also finds a suitable balance with our limbic polarity. Our intuitive insight into the cosmic order should provide sufficient direction to our social commitments to be in reasonable accord with our evolutionary heritage. No other approach is sustainable.

The three mergansers have worked their way along the shoreline, out of the little cove and around the point. Until now their view has been partially obstructed by the point of rock, but they are suddenly startled by a human presence. They all turn tail at once and scoot back along the shoreline, frantically flapping their wings to increase their speed in the water. When they reach what they feel is a safe distance they skid to a stop, returning to their normal routine.

It is only mid-afternoon, but time to head back to camp. There are still a few final preparations to make for the trip north. There is some high scattered cloud appearing, but with any luck the weather will hold good for the trip. There is no wind. The lake is like a mirror. Another short swim is taken to cool off, then the boat is pushed out and headed for camp.



## Chapter 8

### Sky Walk

There is an ideal spot about a quarter of a mile from the cottage where the boat trailer can be backed onto a sandy beach to the edge of the lake. There the boat is cranked up onto the trailer, firmly secured, then driven back to camp to finish the chore of loading. One of the main problems is going to be gasoline. It will have to be used sparingly. Fortunately a ten-horsepower motor on a fifteen foot open fishing boat is conservative on fuel consumption, since it will not be practical to take more than about fifty gallons along. The lake in question is quite large, about twenty miles long, so that an outboard motor is a necessity for getting around. The canoe will serve for fishing closer to camp, permitting the use of the motor to be restricted to only a few hours a week.

Although there is no proper access to the lake except by aircraft on floats, there is an obscure logging trail that goes right to the water's edge. With care, this logging trail is passable by car. Apart from an unusual Indian couple, the lake is deserted and many miles from civilization. There are thousands like it, but this lake is especially familiar, and there will be a chance to visit with a couple of old friends.

Everything is loaded now—just needs a final check down the list. The tools check out okay; the extra rope is in; a couple of small pieces of plywood; a small roll of plastic sheeting; all the fishing and camping gear; heavy clothing; pots, pans, and dishes; enough groceries for three months—it makes quite a collection. How did the Indians ever get along?

After the evening meal a walk seems in order. There is a grove of trees nestled between the hill behind the cottage and the lake, extending for a long distance in both directions from the cottage. Towards the west it becomes almost exclusively cedars. The village graveyard is also in this direction, but on top of the hill that extends parallel behind the grove.

The thick fortress of cedar trunks supports a mass of matted verdure that blots out the sky. The ground is void of any growth, overlain with a spongy carpet of decaying foliage. The air is deathly still. The steeples of

the treetops protrude in solemn silence above the unpretentious sanctity of a country church. Here and there along the way the dignity of the setting is shattered by a squirrel or chipmunk, chattering provokedly at the intrusion.

Nature's theater is a planetary extravaganza, an exotic tapestry of variegated stages, spontaneously transmuting in lighting, atmosphere and mood. Abounding in phantasmagorical display, a multitude of scenes is synchronized into a symphonic orchestration, each performance reaching balance in blending with the whole. The drama is tastefully arranged across the master stage, in a broad, mellifluous band around its planetary girth. Even in the frigid wastelands of polar settings, fascinating epics unfold through months' long days and nights, with fluctuating twilights in between. Each of the continental stages is graced with a prodigious assortment of prairies, jungles, deserts, peaks, with many ingenious added touches to the sets. Sometimes the stages run independent scenes, others share the same cast of characters, while the performance in the oceans has a topography of its own, regulated by tides and major currents. This colossus of a theater is called the Biosphere, the totality of planetary life, and the name of nature's energy refinery.

Given the complex structure of a theater that has gone through so many renovations since the beginning of the show, the performers belong to an equally complex theatrical guild, many of them displaying temperamental preferences as to where they will perform. Most categories of invertebrates prefer a script written for the sea, the great exception being many millions of species of insects that infest the land. The mammals and reptiles are predisposed to play parts on land, yet some of the largest creatures ever, the whales, shares their dominion of the seas with a supporting cast of cousins, the porpoises and dolphins. Few other mammals like the ocean setting—the only reptiles that have been persuaded to take extended parts are the turtle, snake and crocodile. Birds are the most versatile performers. Some migrate from one polar region to the other, supporting themselves by playing bit parts in local scenes along the way. Other birds, who can't be bothered with the exertion of such active roles, have given up on flight—the Oscar for the most bizarre going to the penguin. Although many birds can swim and dive, this one does little else, choosing the most inhospitable stage on earth. As for man, he started out humbly enough, but now, with his machines, no stage is free of him. He dominates the drama, even changes the sets and tries to rewrite the script, without knowing what the plot is all about.

Just a brief theatrical tour impresses any visitor with the variety of the performance from one location to another. There is such a range of diversity from the lavish mob scenes in the teeming jungle of Brazil, to the shoestring budget productions in the desolation of the Sahara. The feedstock to the energy refinery fluctuates drastically in its constituents. The tiers are populated to the brim in places, while other barren sets are abandoned to a few derelict performers.

Whatever the constituents, the refinement of energies seeks harmonic balance up and down the levels of the hierarchy. Reflux becomes regulated through experience. The players on each level of the hierarchy belong to different instrumental sections in the orchestration of the whole, only certain notes being sounded by certain instruments within each section. Percussion, brass, strings, and woodwinds may all be richly represented in grand symphonic movements, while across the way, a few faltering notes from flute and cello strive to sustain a single resonating chord. All these renditions meld into a resonating topology to the refinement of energies in the biosphere, modulated by the pace of celestial movements from night to day and from season to season. The enclosed active interface of the planet resonates in patterns that seek a biospheric balance.

The daily and seasonal regularity to the modulation of the music has a tendency to induce both complementary patterns and compensating balances in opposite hemispheres of the biosphere. This is implicit in the polar nature of the energies involved, the enclosed character of the biosphere, and the modulated regularity to the resonating whole. Thus we find many examples of converging evolution in different parts of the world from very different ancestral stock, together with the complementary divergence that this implies. The South American rhea, the cassowary and emu of Australia, and the African ostrich are all very similar yet come from different parentage. The fennec fox of the Sahara is smaller than the kit fox of America but with essentially identical traits, yet the two are unrelated. The sea cow of the tropical coast in America is thought to share a common ancestry with the elephant, yet the sea cow has adopted the characteristics of the unrelated sea lion, seal and walrus. Another relative of the elephant, the rock hyrax of Africa and the Near East, has all the characteristics of a rodent, living in burrows and rock crevices. The evolutionary marketplace is full of such examples of copying wherever biospheric resonance requires. It is one way in which the music gets filled out to achieve a better balance.

Sometimes these complementary patterns are coupled with geographic isolation that prevents interference from parallel evolving streams. For instance, a number of species of hoofed ungulates evolved independently in South America before becoming extinct when the Isthmus of Panama appeared about a million years ago. These had a strong tendency to resemble hoofed ungulates in other parts of the world. There are a few modern descendants; the llama and alpaca, for example are counterparts of the camel.

The continent of Australia has been isolated since the demise of the dinosaurs, providing a haven for the independent evolution of the marsupials. In these mammals, the young fetus is not nourished inside the mother with the aid of a placenta. Instead the tiny, undeveloped fetus is required to crawl from the vagina into the mother's external pouch, where it attaches itself to a nipple for the remainder of its development. The marsupials have evolved from an ancestral branch independent from that of the placental mammals, yet a distinguishing feature has been the evolution of species that correspond closely to placental species. There are pouched marsupial counterparts to the dog, cat, mouse, mole, badger, anteater, squirrel, monkey, bear, and others.

Of further interest, the marsupials do not have a corpus callosum, the main nerve bundle that in the placentals interconnects the two hemispheres of the new brain. Their two hemispheres must function independently, both linked to a common limbic brain, just as in split brain patients. A basis of comparison is thus provided in similar species between two modes of cerebral function. This is of special interest because of its relationship to language and the bilateral polarization of brain function in man, leading to the full development of three polar dimensions to the integration of experience.

Progress through the cedar grove is obstructed at the eastern edge of the cemetery by a fence that runs from near the lake, in a northerly direction up over the hill. A few moments' pause brings back fond memories of childhood days—these cedars used to be a favorite playground. The presence of the cemetery had always gone unnoticed during the day; then, as darkness began to fall, every shape and shadow assumed a sinister appearance. Sometimes a few of us would huddle together next the graveyard fence, telling spook stories. Then, when least expected, one of us would let out a blood curdling scream. We would run out of there terrified. There isn't any sign that children play here anymore. There are no forts or tree houses. None of the trees has that climbed in look.

Leaving the seclusion of the cedars for the shore of the lake reveals the magnificence of the evening sunset. The sky is streaked with feathered clouds, fanning out from the western horizon like huge ostrich plumes. The sun is sinking low behind them, flirting with them, casting shafts of light between them, like a fan dancer casting suggestive winks through the feathers of her fan. Near the sun the plumage is a brilliant molten gold, fringes ignited with pure light. The gold streams outward into a deeper luster, consumed by crimson as it flares across the sky. Great chariots of color wane to muted mauve, then blend toward the east with a retiring violet, dissolving into darkness.

The surface of the lake is as still as it can be. It gives no hint of being there. It is hiding in its stillness like a seeker after an exacting perception of reality, apprehensive that disruption might mutilate its vision, and transform an integrated picture into its own confusion. It does not betray its presence, reflecting without a flaw, a symmetry to the surrounding hills. It mirrors the spectacle in the sky to absolute perfection. The far shore arches like a fantastic land bridge across a hole right through the earth. Poised on the edge of a horrendous cliff, there is only endless sky below.

The mind is a hall of mirrors that reflect a sky within us. We see not the mirrors, but reflections of experience in reflux across perceptual axes of the creative process, as it evolves along. Biospheric resonance is the theme song of the drama, providing an operating field for the creative intelligence implicit in the global undertaking.

Every culture has its creation myths, from the garden of Eden to grandfather fire, the embellishments of primitive cultures being no less credible than those of objective causality. The spectacles of science have been focused to overlook the evidence. Since Darwin, evolutionary theory has fixated on the natural selection of accidental mutants—survival of the fittest—as the sole determinant of linear evolving streams. A minor fragment of the picture has been overblown into the most elaborate creation myth of all. While it's true that the branches of the evolutionary tree have been meticulously sorted out, compulsory worship at the altar of accidental cause is sustained on very flimsy ground. The branches of the tree are also roots that converge again and again into a common trunk, which culminates in man.

The plants have minimal capacity for sensitive response. This drama is given to invertebrates to explore. Conscious reflux, the vertebrate domain, has been deprived the liberties of multiple limbs and eyes. The

cornerstone of vertebrate evolution has been a fixed limb structure, and visceral organs, refluxing energies through the autonomic nervous system into cerebral awareness.

We have already seen that the autonomic nervous system is intimately associated with the primitive parts of our cerebral brains. In other words the brains of the crocodile and the horse are anatomically represented in the human brain in such a way as to hold sway over the emotional inclinations of our heart. For several decades neurologists have referred to this functionally integrated emotional brain as the limbic system. It anchors us to our biological origins going back several hundred million years. (See Appendix 2-1.)

We are all aware, or we should be at least, that our emotions fuel our conscious mental processes. They feed back emotive energies into our consciousness that we must see into, and make some sense of, before we can translate them into appropriate explicit behavior. These energies are spiritual in nature. They strive to animate us in a specific way, or in a certain pattern, or get us into a certain groove, so to speak. We may be taken by a flight of fancy to go dancing and trip the light fantastic until all hours, but if we have to rise early in the morning to attend to important matters we must suppress the mood instead. We have to tailor our emotional energies to suit the ongoing needs of circumstance.

How do we suppress one mood in favor of another? Do we have any choice concerning our emotions? Just as our cerebral hemispheres are partitioned in two, so is our emotional apparatus, the autonomic nervous system. Generally speaking the sympathetic division fuels the energies for explicit patterns of activity, while the parasympathetic division operates in tensional restraint. Both are patterned in their operation, however. This patterning has been developed through innumerable episodes of tailoring experience throughout our evolutionary and cultural history. There tends to be layers of patterning to the patterning in this respect, often many layers. Complex emotive patterns may be thought of as archetypes, and in some cases they may be hierarchically ordered.

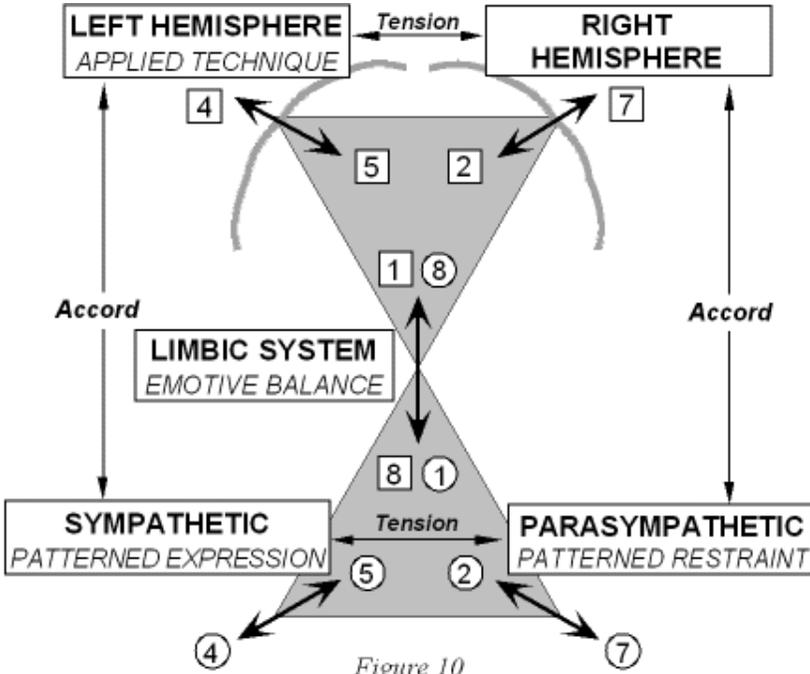
On a good day, for example, a long distance runner may feel like a real tiger. (There is a bit of tiger in all of us.) Before the beginning of a race he may feel that he can sprint a marathon. Although he may feel this energetic at the beginning of a race, he knows that his energy resources are limited and that he will soon tire if he tries. He knows that he must pace himself. He must have an insight into the dynamic pattern of how he plans to run the race and restrain the flow of his sympathetic energies accordingly. This restraint is exercised through the parasympathetic divi-

sion. It is concerned with the integration of history. It has a concern for the long term interests of the organism, as opposed to the sympathetic fueling of its immediate needs.

But the intuitive plan of the race depends upon an insight into how one's limited energies may best be spent and integrated over the whole duration of the race. The right brain thus draws heavily on memory and it works in close accord with parasympathetic function. In this way the intuitive plan is conjured up and worked out as a simulation in our imagination. The plan exists as a potential idea integrating the whole race, and since it is imaginary it is subject to modification during execution.

The left brain execution of the plan concentrates on the technique of actually running. The breath must flow freely in a regular rhythm. Every movement must count without the wasteful expenditure of energy. The left brain draws upon largely automated memories attuned to ongoing sensory input, including how we feel at the moment. It thus has a different focus than the right brain that integrates feelings over the duration of the race. The technique of running must be perfected through training to improve the body's performance. The muscles must learn to coordinate smoothly and effortlessly. The whole body must be conditioned if it is to utilize its supply of sympathetic energy efficiently and to optimum effect. The left brain technique thus works in close accord with sympathetic function.

The left brain actively executes ongoing performance. The right brain passively plans the integration of experience, spanning space and time. The left brain is the building contractor erecting the house brick by brick. The right brain is the architect and engineer determining how all the bricks fit together into an integrated whole. The building contractor must make plans too, but they concern the actual building of the house and not its design. And the architect must execute drawings and specifications too, but they do not in themselves result in the erection of the house. There is a self-similar relationship between intuition and technique within the context of every activity. Likewise there is a complementary focus between the patterning of the sympathetic and the parasympathetic divisions that also complements left brain and right brain functions respectively. This is illustrated simply in Figure 10. (For a more complete illustration see Appendix 2-3.)



Note that the numbers in squares and circles at each of the polar dimensions represent the term positions in the enneagram, as illustrated in Figure 7. The numbers in squares are for the conscious mental triad. The numbers in circles are for the emotional autonomic triad.

The cerebral hemispheres thus reciprocate with the autonomic nervous system through the expression and feedback of emotive energies across the limbic system. Cerebral mentation is the market for emotion and vice versa. In this way we constantly strive to achieve and maintain emotive balance according to how we perceive the needs of circumstance.

Vertebrate evolution is the embodiment of spiritual evolution, facilitated by the conscious reflux of energies that are patterned through the experience of the drama. Human evolution relates to four environments, two of them explicit on the left hand side of Figure 10, and two of them implicit on the right hand side. The left brain commitment dimension relates to our social heritage. The sympathetic commitment dimension

relates to our natural heritage. The right brain potential dimension relates to the cosmic order as a spiritual reality that transcends organic evolution. The parasympathetic potential dimension relates to our organic evolutionary heritage. The evolutionary tendency toward the self-similar mirroring of experience occurs across the limbic polarity, which has functioned as the evolving stem.

Another essential feature of the vertebrate brain is the topological representation of the body in the cerebral cortex. Sensory data from each side of the body is represented in the opposite hemisphere, there being both a major and a minor area on each side of the brain to the rear of the central sulcus, or fissure, across the cortex. Mirrored to the front of the central sulcus are major and minor motor areas in each hemisphere, essential to formulating behavior for the opposite side of the body.

The body is thus represented symmetrically by the neurons of the brain in a total of eight areas, four of them sensory, four of them motor. These function as sensory $\leftrightarrow$ motor, or motor $\leftrightarrow$ sensory, polar pairs that focus two of the three polar dimensions of creative activity, the third polar dimension being focused through the limbic system.

In the potential dimension, for example, the creation of idea is assimilated via the sensory cortex in a polar relationship to techniques of motor behavior. In the commitment dimension, the behavioral technique is produced via the motor cortex in a polar relationship to the sensory cortex. The sensory cortex incorporates the proprioception of body position as well as other sensory modalities. (See Appendix 2-1.)

Since only two polar pairs are sufficient to generate idea tensionally coupled to behavior, the two hemispheres can function completely independently of one another, just as in the marsupial brain. Each hemisphere has two polar pairs, although both hemispheres are linked to a common emotional apparatus via the limbic polarity. This accounts for the adaptive flexibility of mentation, as well as for varying degrees of bilateral polarization between the two hemispheres, associated with the development of language and culture. At the same time both hemispheres of the brain are presented with a symmetrical data base to work from—the intuition and language can work with the same set of circumstances.

Although language has given release to humanity's creative potential, it has also exposed us to amplified primal urgings from ancestral origins. Humanity's spiritual development is therefore a necessary companion to technological development, yet we have seen that these two human dimensions have developed independently. Not only are they

concerned with different hemispheres of the brain, they have received independent emphasis in the hemispheres of the biosphere.

We have touched on the host of evidence to indicate that biospheric resonance—the theme song of the drama—has been creatively exploited by converging species of the evolutionary tree. We have also seen that a similar creative exploitation is evidenced in man's social evolution, reaching back to prehistoric times.

The fossil evidence further indicates a complete absence of man in the Western Hemisphere until about fifteen thousand years ago. One-half of modern man's exclusive presence on earth has been confined to Asia, Africa, and Europe. The features, languages, and spiritual traditions of the American Indian all point to a migration from Asia, spiritual traditions persisting until the white man came.

It was during the latter half of modern man's dominion that more complex cultures evolved across parts of Asia, Africa, and Europe, the spiritual traditions indigenous to Asia being preserved securely apart by the American Indian. These cultural developments have involved the creative polarization of the biosphere. Spirit cultures had first emerged and developed in polar relation to an uninhabited Western hemisphere, when it was the exclusive domain of animal spirits. Concentrated civilizations had to wait for the inhabitation of the Western hemisphere by spirit cultures after the last ice age, and they emerged in polar relation to them. The independent specialization of the human hemispheres has always been evidenced by a polarized global focus as well. Biospheric resonance has been employed as a creative tool in human evolution.

The development of early spirit cultures was confined to a functional level of delegation, involving simple manual techniques that involved little division of labor. As skills developed so did an interest in art, the earliest art being preoccupied with animal themes. Few human figures appeared until humanity began to concentrate its efforts into collectively organized endeavors. Even then animal forms were frequently chosen to represent gods, animal and human forms sometimes being combined. Early civilizations were still essentially functional in nature, despite displaying highly organized divisions of labor in such endeavors as erecting ziggurats or pyramids. With record keeping came numbers and with numbers came sacred geometry. Civil administration was thoroughly dominated by spiritual motives.

Historic progress of the past couple of thousand years, though it has overlain these early events, has also interacted with them, marred by conflict in both East and West. The technological advance moving west-

ward with Christianity has especially conflicted with Native American culture. In contrast, the complementary spiritual advance moving eastward with Buddhism was gained peacefully. Any tendency to convergence between the two streams was forestalled by the expansion of the Islamic empire between them.

The resonant stepping stones continued to be in evidence. The explosion of discoveries born in the renaissance was accompanied also by explosive events in the East. Just as the Renaissance was ready to germinate, Temujin, known to the world as Genghis Khan, was establishing a power base in Mongolia, committed to preserving a shamanist, nomadic tradition. The Mongolian hordes swept across China, thence into Turkestan, Persia, India and Russia, to eventually establish an empire from the Pacific Ocean across the breadth of Asia into Eastern Europe. A spirit culture reigned supreme across half the world for more than two centuries. Although it crushed the power of Islam, the ruthless conquest was marked by tolerance of all spiritual traditions. The Mongols had no organized tradition to impose, spirituality being acknowledged as a private concern. Nevertheless, a spirit culture conquest in the East was complemented by the rise of technology and the defeat of one in the West.

Since the Renaissance, technological growth has been linked to the evolution of machines, with a major shift in emphasis from manual to intellectual involvement. Man's functional role has become secondary to his supervisory role, now expressed through a complex international economy that implicitly involves the organization and commitment of resources to product cycles on a planetary scale.

But this technological growth, linked as it is to a deficient understanding, has also not been without resonant implications. It has spawned world wars and the dichotomous ideologies of East and West. Despite the break-up of the Soviet Union, we still possess the capacity for nuclear self-destruction, together with the obliteration of four billion years of evolution. Even if we defuse the bomb, population pressures and ecological collapse will soon overtake us on our current course.

We need a new synthesis. It is not the survival of the fittest that matters. It is the survival of us all.

There has been an underlying structural dilemma in the unfolding of the plot. In the biospheric enterprise of man, technology corresponds to the production region in the structured context of our cultures. Human spiritual development is an independent idea corresponding to the product development region. At the supervisory level of delegation, these two

concerns—technology and spiritual insight—must be independent, just as in the example of the construction company.

Now all countries and cultures have become exposed to the relentless march of technology. The movement Westward has gone full circle, while the movement Eastward has reached the West to kindle interest in the Eastern philosophies and religions. The human enterprise has expanded to the limits of control that can be exercised at the functional and supervisory levels of delegation. A global enterprise requires a third level of delegation.

The new synthesis must therefore facilitate the refinement of energies at the administrative level of delegation, where the three polar dimensions become explicitly essential to the balanced integration of experience. This requires that the language of science work in concert with spiritual insight to effect a balance with our natural and evolutionary heritage. This is the only sustainable option available to us.

The sun is taking a last private peek through the treetops before slipping from the stage to let the vampire night drain the colors from a chameleon sky. The shoreline has taken a turn around a gradual point, where outflows of spring water cut across the sandy beach. After an ice-cold drink, the sloping bank is climbed back into the cedar grove.

There is a place to squeeze through the rails of the cemetery fence, thence through some long grass to the top of the hill, where the cemetery is maintained in fairly good condition. The plots are arranged around a very large spruce tree with branches hanging nearly to the ground. Most of the tombstones are modest, some of them are homemade, and three or four are leaning badly to one side. Some of the graves are indicated only by a depression in the ground.

A lot can be told about a village from its cemetery. Many people in this village are interrelated, the tombstones keeping a solemn record of the family trees. There are an unusual number of children's graves, but most of the adults have lived to very respectable ages.

There is a story associated with each grave, a story lived out but largely left untold. Each story appears to terminate here in the ground to be commemorated by terse engravings on a stone. Is this all that remains of the years of strife and struggle, searching for fulfillment with it always just one step away? Pleasures come, but so does pain, and for every joy in life, it seems a misery must be endured. Is everything just canceled out then? Do we come to this world crying, helpless, and afraid, only to

leave it the same way with no hope of answers to our questions in between?

The cyclic nature of the system indicates that death is the antithesis not of life but of birth. If life transcends the brief episodes on earth, then there is a meaningful progression through it all. But to judge the price of progress in terms of human suffering through the ages brings wonder at the monumental value invested in the enterprise. We cannot have yet begun to glimpse the cosmic proportions of our destiny.

An ethereal thief has robbed the riches from the sky. Darkness won't be long in following in pursuit. The long hard trip ahead tomorrow will need an early start. It will take a full day to reach the intended campsite and erect the tents before nightfall. It's time to get some sleep.



## Part 2

### The System



## Chapter 9

# Voices in the Wilderness

The western shoreline fades from point to point toward the north, disguised in metered increments of haze until it blends with the distant blanket of cloud that hangs heavy across the northern sky. The sun is winding up another circuit; soon it will hide beyond the massive cloud bank that arches into the western horizon. The wind, unsure of its direction, favors the quadrant from the northwest, and although not strong, it has a steady persistence. The weather has cooperated for the trip, but now uncertain threats are brewing in the north.

The lake is about a mile across at this point. From here on the northernmost tip of the island, it is visible for several miles toward the north. It lies stretched out straight and narrow from north to south, with shorelines serrated in an irregular pattern of bays and inlets, especially along the eastern side. The lake presents a private world, with a character of its own, enclosed unto itself within the rim of the confining shoreline. The molded fluid bulk of its body searches for escape with contorted fingers reaching through haphazard gaps in the tightly laced girdle of constraining hills. The wooded hills crowd in adjacent to the shore to incarcerate the lake with a bristling picket fence. The attention is imprisoned with the lake, confined to a tiny cell of the wilderness that sprawls for hundreds of miles in all directions. Yet there is a liberation that comes with the completeness of the confinement. It has to do with sky, for each individuated world shares a common sky in a way that shows it to be representative of the whole. The common underlying pattern is whispered to the sky. The wilderness has a liberating voice.

Far to the north the distant call of a loon projects for miles across the water, echoing through the hills. It begins with a single note, clear and prolonged, that breaks and rises to a climax, then trails off softly into echoes. Another loon answers in a frenzied vibrato, then another, with

calls rising in a succession of crescendos, then another. Then all wait and listen while the echoes spend their energies rebounding through the hills for miles. Not all the voices of the wilderness are whispered—none is more expressive of the of the resplendence of its spirit than the majestic call of the loon. There is no music more beautiful on earth than that intoned by this most talented of all the birds.

A small pail is dipped partly full of water and taken back around the rocky point to where camp has been established on the northeast side of the island. A fire has already been started. The small pail is placed across the narrow gap between two piles of flat stones that form the fireplace. The fire is adjusted a bit, and some smaller sticks are placed underneath and around the pail. A pine log, a few feet away, provides a place to sit and tend the fire, as well as a view across the channel to the eastern shore. The island is about halfway down the lake, only a hundred yards or so from the eastern shore.

A granite shelf about eight feet above the water affords an almost level campsite with just the right amount of slope for natural drainage. It comes furnished with a few pine trees and a sparse parging of earth overlain with a carpet of moss and needles. Behind is the thick forest of coniferous growth that covers the rest of the island. The main tent has been erected so that the window on one side looks out over the edge of the shelf and across the channel. The entrance opens to the north, from which the site gradually tapers into a granite ramp that renders a natural access to the lake. There is a tall, graceful white pine miraculously growing near the edge of the solid rock shelf, just a few feet from the corner of the tent, and there are a couple of red pines to the rear. The campfire is ten or fifteen feet from the other front corner of the tent, a few feet away from the overhanging branches of the pine tree. It is an ideal setting, with a small cove, adjacent to the shelf and a little to the rear of the tent, that is a good spot for the boat.

The water is starting to boil. A stick is poked under the wire handle to lift the small pail from the fire. It is placed to one side, on the flat rock beside the fire where it will stay warm, and a couple of tea bags are dropped in. A lunch was packed for the trip—there are still some sandwiches left. Everything has been unloaded from the boat into the tent, but since nothing is unpacked yet, it isn't convenient to cook.

The last refreshment was a cup of coffee about four hours ago with Adam and Agnes. There was time for only a brief visit at their camp on the way down the lake, but it was good to see them both healthy and well. Agnes will soon be seventy—thirteen years older than Adam—yet

she still keeps up with him. Until recently she used to help him run the trap line in midwinter; however, the last couple of years they have been spending the severe winter months on the reservation. A few small huts with canvas roof are hardly adequate for temperatures that sometimes get down to minus fifty degrees. They have lived in the same place for nearly twenty years, on a sandy peninsula about five miles up the lake. They will stop in for a visit whenever they get down this way.

It has been a warm sultry day, the kind that invites storm activity. A couple of green sticks are placed on the small fire to smolder away, while the weather is checked again in the northern sky. The northern tip of the island is stepped in a couple of weathered ledges that provide a bench-like place to sit and scan the lake.

The cloud bank has advanced some. The sun has ducked its head behind it in a threatening masquerade. Filtered sunbeams are playing on the silhouettes of thunderheads that bulge above the massive hulk of cloud like gun turrets on an alien vessel. The storm is also moving to the east, still showing signs of passing like a silent ship through the coming night. The billowing turrets belch sporadic flashes with remote reports of thunder, as muffled guns wage a distant war. The breeze has mellowed slightly, breathing quietly in awe of the invasion in the north, hoping to avoid attention in the unprovoked attack.

The sky gives expression to the unity of the biosphere. Everything living on the planet shares a common sky. Even life in lakes receives a continually renewed supply of life-giving water through the weather cycles in the sky. The biosphere is an active interface, a whole unto itself, but its wholeness is given in its relationship to sky. Clouds, horses, birds, flowers, cricket, trees, frogs, foxes, crocodiles, butterflies, and humans, all contribute to the biosphere by sharing a common sky.

The sky is not something that can be known in a specific way. We see colors in it, clouds in it, the sun in it, the moon and stars in it, but we don't see the sky itself as something that can be quantified and measured. The sky is not just empty space. The concept of space has been invented for the purpose of measurement. The space between heavenly bodies can be measured, but attempts to measure the sky can only measure the measuring device. Sky has no specific properties. It is the passive, nonspecific aspect of being, the "yin" in yang and yin.

For a number of years prior to relativity theory, science wrestled with the question of how light can travel through vast reaches of interstellar space if it is totally empty, a vacuum in every respect. The apparent

fact that light waves seem to travel through it indicates there must be something there. Just as ocean waves are propagated through water, and sound waves through air, it seems logical that light waves must be propagated through *something*. For this reason, scientists postulated the existence of a luminiferous ether, conceived to be all-pervading, a sort of medium in which all phenomena occur. After extensive searches and subtle measurements of many kinds, they found no evidence whatsoever that such a thing exists. The search was finally abandoned, and Einstein, in postulating the basis for his theory of relativity, set the question aside, the view of a "stationary space" being superfluous. The receptive aspect to phenomena is implicitly nonspecific; yet it is *something*.

It has already been pointed out that the system unfolds in subsystems associated with the progression of number, that each higher system is complete unto itself, and that each is subsumed by all of the lower systems that precede it.

The first system manifests as the relationship of all things to indeterminate sky. It is universal wholeness and it will be represented by the number one. It will be called System 1, just as succeeding systems will be called System 2, System 3, System 4, and so on.

System 1 subsumes all of the higher systems. All evidences of energy and substance find unity in a common relationship to unbounded sky. Everything from light, to atomic particles, to molecules, to suns, planets, galaxies, and to all forms of energy and life in all the galaxies in all the universe, is unified in sky. System 1 thus represents a unity that is achieved through a common, receptive, nonspecific aspect to all being.

Even mathematics has been required to acknowledge that the number zero is not nothing, that it retains an indeterminate residual value. It is not possible to divide by the number zero because it can be represented by an infinitely small fraction that inverts to an infinitely large number. The inverse of zero is infinity.

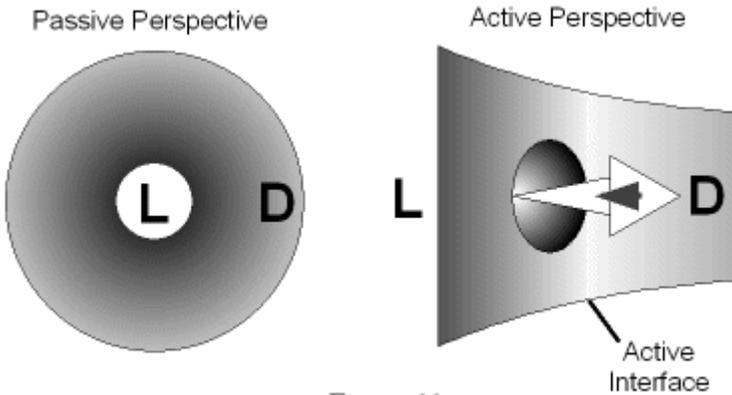
Since everything must have its being within a context of universal wholeness, and since all being relates to a nonspecific aspect, being has an ambiguous quality. Being is the relationship of a specific to a nonspecific aspect. The specific aspect is evidenced as an active center to experience; the nonspecific aspect, as a passive periphery. This is just a restatement of the of the complementary principles of yang and yin.

Being knows of the relationship between its center and its periphery in terms of the active process occurring across the structural interface between them. This amounts to a technical way of saying that everything communicates with sky. Everything finds a common unity in sky. Every-

thing is influenced by this unity through the process occurring at its interface with sky. We shall see that everything also shares a common center.

Since active interfaces are perceived to manifest centers, it will be convenient to call them centers. Everything has a center and relates to a periphery, including galaxies, suns, planets, moons, people, plants, animals, and objects of all kinds.

Because being has an ambiguous quality, transcending space and time, there is no possibility of designating the system in any completely specific manner. Instead it is designated from two perspectives, one passive and one active. As with yin and yang, darkness will be taken to represent the passive perspective, and light will be taken to represent the active perspective. It is convenient to use light for the purposes of discussion, but the active aspect is intended to include all energy. The system indicates that everything is an elaboration of energy. A center can then be represented from these two perspectives, as shown in Figure 11.



*Figure 11*

The passive perspective is looking into the center toward light and is a passive abstraction of the system. It has no active relevance to the system's operation. The active perspective illustrates the system at work. The two perspectives are mutually relevant; between them one may grasp the essence of the system. This method of illustration will be used to delineate all of the higher systems, a single whole, or center, representing System 1, as shown in Figure 11. It indicates that everything manifests through an active interface between a universal center and a universal periphery. Everything communicates with sky.

The storm is edging closer, but is still angling to the east. Darkness is beginning to creep cautiously out of hiding in the shadows, dissolving contrasts and obscuring fine detail along the shoreline. The haze overhead has taken on a soft, rose-colored hue, tinting everything with an artificial cosmetic to compensate for the angry furrows muttering profanities in the north. The enfeebled wind continues halfhearted efforts to decide on a direction, pushing midget ripples gurgling into crevices along the rocky point.

A loon begins to sing a solo from the end of a long finger that pokes two or three miles into the hills to the northeast. It begins with a smooth and mellow number, the long clear note that breaks and rises to a climax, then trails off into silence, to listen as the sound comes rebounding out between the hills that confine the slender inlet. The mood-setting introduction entices a partner to lend its own interpretation to the simple tune, the two notes drifting out to blend into an aria of echoes. It is done with taste and timing, as they explore the resonant effects of the contours of the bay. Another pair of loons answers in an anxious vibrato from the broad bay across the lake, the arching shoreline acting like a band shell to project the melody out across the water. These are joined by others from down the lake, then from up the lake, by twos and fours from point to point and from bay to bay, for miles in both directions. They begin to answer back and forth in groups that join together with voices rising to crescendos, then these fall away with others answering from afar, then back again, up and down the lake in a fluid rhapsody of stereophonic movement. The impeccable orchestration proliferates across the water, cascading back and forth till calls are lost in echoes.

The hills are ringing with the wandering melodies—trees and rocks reverberating with proxy voices borrowed from the choir. The fluctuating intensities lend a composition to the whole that is punctuated for special emphasis by intermittent drumrolls in the northern sky, while gurgling ripples play along, keeping time in crevices.

The musicians continue the performance, pausing here and there to listen for response, then join again as if on cue, so appropriate is their timing. They use the lake and hills as a uniquely constructed resonating instrument, and by their various select locations, they play it to perfection. The spontaneous concerto proceeds unbroken for fifteen or twenty minutes before the participants feel it time to let the echoes die away.

Loons have an intuitive sense of propriety, a gift for reading the many moods of their environment and giving them expression. They assimilate the whispers of the wilderness and transform them into music.

They absorb the subtle energies from the sky around them, then project them once again, enhanced, into the sky. They have a spontaneous appreciation for what they do, a direct awareness of the communicative balance they effect. Each is an active interface with sky.

An active interface does not isolate a center from a periphery. Rather it relates them. All the same, an active interface has partitioning characteristics that define a subjective level of active intensity that is distinct from, although related to, an objective aspect. System 1 identifies the subjective active intensity as energy represented by light. Processes of all kinds are thus seen to involve energy transformations across an interface. All the evidence of our experience confirms that this is so. There is nothing that can be known with our senses, with our scientific instruments, or with the neuronal processes of our nervous system that doesn't depend upon energy transformations at interfaces.

For instance, the nerve cells, or neurons, within the body of a loon maintain an electrical potential across the skin or membrane that encloses each cell. This is done through electrochemical processes that maintain the outside of the cell membrane at a positive potential with respect to the inside of the membrane. When a nerve cell is activated, this electrical potential discharges along the length of the cell to transmit an electrical impulse from one end of the cell to the other. The distance may be microscopic, or up to a foot or so in a loon. The cell rapidly recharges itself to maintain its energy interface in a state of readiness.

Muscle cells exhibit action potentials in a similar way, so that the body of a loon is a highly structured pattern of energy interfaces. These mutually interact chemically across synapses, or close contact points, between individual neurons and also at terminations in muscles. All of this happens in precise accord to the manner in which the nervous system is structured by the higher systems. When a loon sings, there is an ongoing pattern of active intensity within its body that projects patterned energy as sound. Each nerve and muscle cell is an active interface within the body of the loon, which in turn responds as a whole, as an active interface with its environment.

For a loon there are two alternate perspectives to its experience.\* In one perspective it relates outwardly through the biosphere that sustains

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\* Arthur Koestler has recognized this idea of a part-whole as a basic unit of organization. He calls it a holon and describes it as Janus-faced or looking in two

its needs. For example, its spirit moves it to sing out to the world in celebration of its very existence. Its song endows it with no survival advantage. There is no physical purpose to its expression of harmony, no selection pressure to determine the majesty of its music. Loons do it because they are loons. They live and sing in accord with a common spiritual essence that lends them their talents. A loon rejoices with a sense of freedom to the sky, and the human ear is just as taken with its song as are the ears of loons.

Relating inwardly the loon perceives subjective needs to be met in order to sustain its life. It feels hunger and thirst and mating needs, in a pattern peculiar to all loons. It must catch fish to feed itself, to regenerate the internal energy that it requires to function. The fish it eats have sustained themselves through the food chain, supported by plants dependent upon energy from the sun. The sun has its life within the galaxy, the galaxy within the universe, so the loon's existence is an interdependent part of all existence.

As a large bird, it must also practice flying daily to sustain its strength for migration when the time comes. It must order its life according to implicit needs. The internal processes and condition of its body must be recognized, and its needs attended to through an active relationship with the biosphere that it relates outwardly to. As with all creatures, a balance between the outward expenditure of energy and its internal replenishment must be sustained across an active interface with its environment. That interface is given particular form in the body of each loon.

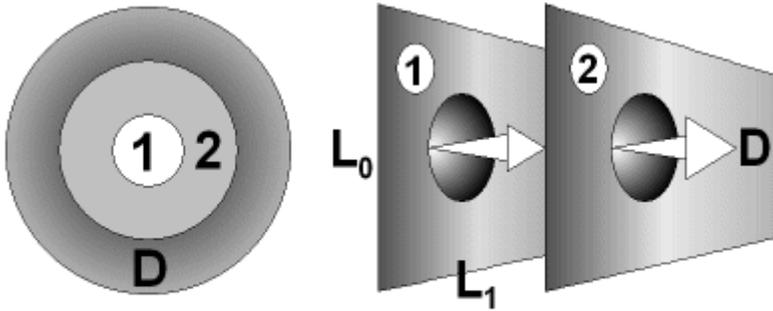
Each particular loon also has a universal aspect related to its species. All loons have the same form, the same shape and plumage, the same internal processes that sustain them, the same daily needs, the same animating spiritual pattern that inspires them to respond accordingly. But for each particular loon the animating spirit finds a limitless variety of expression according to how the diversity of circumstance presents itself. This interplay between universal and particular aspects thus defines the nature of each loon.

System 2 concerns the active interdependence between the universal and particular aspects of experience. If there were no particular aspects to experience, there could be no universal aspects, nor vice versa. The universal wholeness of System 1 could have no characteristics, no outside or inside, no active interface between them. There could be no phenomena

to undifferentiated wholeness, no subject, no object, no reconciliation of subject and object, no experience of any kind. Universal wholeness requires a twoness to experience: universal and particular aspects in mutual interaction. System 1 requires elaboration in System 2.

System 2 is represented by two centers or active interfaces, and there are two ways that they can relate to one another. The universal center can be inside a particular center, representative of all particular centers. Alternately, the particular center may perceptually transpose such that it is separate from the universal center, but looking in toward it, facing it. (System 2 is similar to the vesica pisces.)

Figure 12 shows the objective mode of System 2, where Center 1 is the universal center inside the particular Center 2. The universal spirit of all loons is within each loon as it relates out to sky. The universal spirit is one within all loons when they sing in harmony. They rejoice in the spirit of all through their song. They experience unity in their harmony.



*Figure 12*

When we integrate our own experience sufficiently to become one with the human spirit, we can likewise experience the joy of organic union with our universal spiritual essence. The experience demonstrated this mode of System 2 in the several days of organic ecstasy. It also demonstrated three degrees of universality. There is a universal personal archetype, or center, associated with the integration of each person's particular history. Then there is a universal human center associated with our organic processes as human beings. This human archetype subsumes all life in the biosphere, and is charged with the integration of human history. And there is a universal cosmic center associated with the integration of cosmic experience, transcending the whole of history.

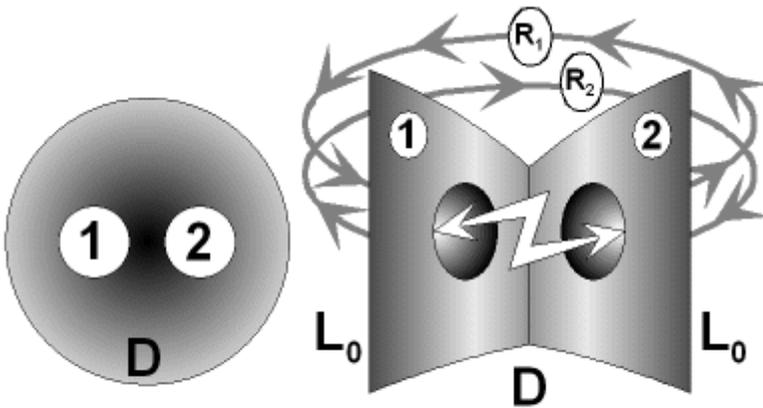
System 2 transcends events in space and time, in as much as it is concerned with their integration. Space and time derive from higher systems as we shall see later.

In order to lend the delineation of the system some consistency, it will be necessary to distinguish a few points from the diagrams as we go along. Note in Figure 12 that there is a timelike sequence or succession to the interface processes indicated by the arrow. Those at Center 2 follow those at Center 1. The universal interface processes at Center 1 sustain and give direction to those at Center 2, just as the universal spiritual essence of all loons gives direction to each particular loon. In this respect we may say that active interfaces have partitioning characteristics in relation to one another. It follows that these partitioning characteristics define different levels of active intensity within Center 1, that distinguish it from those within Center 2. These are designated by different gradations,  $L_0$  and  $L_1$  respectively. Center 2 relates outward to sky, designated as darkness, D, the passive aspect yin, in yang and yin. It should be noted that while there are different gradations of energy associated with each center, that each particular loon still contains both gradations from  $L_0$  to D. Each shares a common center and periphery.

The subjective mode of System 2 is illustrated in Figure 13. When two centers exist independently of one another, they mutually achieve identity through mutual perception. They are mutually perceived as one but are two. It will be said that the two are mutually coalesced as one, and the coalescence is designated as shown by the large Z arrow.

Each center, through its perception of identity, forms what will be called a relational whole. The relational whole formed by Center 1 is designated as  $R_1$ ; that formed by Center 2 as  $R_2$ . In this case the energy processes associated with two relational wholes are simultaneous and countercurrent. This contrasts with the sequential energy processes in the objective mode, Figure 12.

In the subjective mode, Figure 13, the energy processes between the two centers are mutually sustaining. It will be said that they are regenerative as opposed to expressive in the objective mode. Just as centers have a common periphery in darkness, System 2 indicates that they have a common center in light. Ordinarily the two modes of System 2 maintain themselves in a state of dynamic equilibrium between expression and regeneration through the recurrent perceptual transposition of Center 2. We reflect subjectively on the regeneration of our needs, then express ourselves objectively, and so on back and forth.



*Figure 13*

The cosmic significance of the subjective mode of System 2 was vividly demonstrated, beginning in the onset of the experience when I saw my own face. I became aware of a form to the organic form of my body, which blossomed into a vibrant harmony between them. With this coalescence of unity I became immersed in a field of golden living light, then my face appeared looking into my face. The form to the form of my body was the universal center of humanity—the human genotype, the universal human archetype for every human being—represented by Center 1. As the organic form of my body became coalesced with the human archetype, my personal archetype—represented by Center 2 and associated with the integration of my personal history—became perceptually transposed such that I saw myself face to face.

My personal history was now integrated with the historic integration of humanity. I was looking out through the eyes of the whole of humanity, subsuming all life in the biosphere. Everything was immersed in living light, the whole physical world cast like transparent flotsam on a vast ocean of being. I could visually see and sense the maze of energy transformations working through everything, animating and sustaining all life, just as the self-similar energies between the organic form and a universal form to my body were sustaining me in harmony and union with all.

But unknown to me there was another layer, another interface behind this union. After several days, as I was sitting alone one night, the harmony began to fade. Something was turning around backwards, inside out, perceptually transposing. There was the telepathic transmission,

*"You have seen my face and now you will do my bidding."* There was my reply, *"I haven't seen any face."* Then the transparent ghost-like face of the whole of humanity appeared. There was a coalescence here too. I was a part of it and it was a part of me, but in a vastly more profound context. The historic integration of human history that the face embodied was steeped in human suffering—pained memories in the integration of human experience partially roused from the void—reached back eons to the genesis of humanity. It was awesome.

This coalescence wasn't a union of personal ecstasy. It was a union with the tragic trials of human social evolution, with another imminent cataclysm looming ahead. As the face faded, I rejected the message with a deep pang of fear. *"I don't care who you are it isn't right for anyone to impose their will on another."* Then I turned my back on it and walked into another room.

It wasn't between me and the archetype of humanity now. It was between me and the universal center of the cosmos. My slate was wiped clean. Organic feedback to my mental processes was suspended. The walls of the room were transparent. I could see forever into the formless void. My intuition was being controlled and fed information, but not telepathically in words. They were intuitive realizations that I was aware came from a supremely intelligent source that I could not see or identify. This universal source was a new Center 1 in another System 2, in which I was a particular Center 2. It was around me. It's will permeated the void and it was behind me, sustaining and directing me, as in the objective mode of System 2.

Then after a sequence of switching the whole universe on and off to demonstrate an identity between form and emptiness, it appeared in front of me. I stood dumbstruck gazing into the incredible face of God. The universal cosmic center was manifest as a supremely intelligent and omnipotent active interface. We are now back in another subjective mode of System 2, in a kind of coalescence in which my experience was totally controlled by the Universal Cosmic Center. It proceeded to access the energies of the void as it wished to demonstrate the cosmic order to me in the most unforgettable terms.

Ordinarily, we humans don't have access to direct experience with the archetype of humanity. We don't normally have good reason to concern ourselves with the organization and integration of our personal experience as it relates constructively to the organization of the human social milieu. This is the conundrum that I unwittingly walked into through the power struggle dispute in a business. This was my objection

to not doing another's bidding. I couldn't do what staff experts wanted and still be independently responsible in my job.

Loons don't face the same conundrum. They function at a lower level of delegation in nature's energy refinery, and perhaps in this sense they are closer to God. They have an uncanny intuitive ability to read the moods of their environment and give them explicit expression in song, so there is some good degree of bilateral polarization in brain function fueled by their spiritual emotive energies. All of the mammals and birds have some limited degree of social expression distinct from intuitive abilities. They all have calls and communicate intentions to some degree vocally. It's just that humanity's role in the evolutionary process on the planet requires us to consciously see our role in the cosmic order also. The three polar dimensions are much more highly focused with us.

The loons are silent now. The storm is rapidly approaching. A black arch has formed from horizon to horizon all across the leading edge of the cloud bank. The thunderheads, that rose like gun turrets, are now concealed by the angry rush of rolling black cloud that marks the front line of a direct attack. The billowing black arch forms a curling upper lip to a great yawning mouth, devouring the landscape whole in a single gulp. Inside the mouth is the solid dark gray of the storm itself, licking delectably with jagged tongues of lightning at choice morsels of the meal. The fire spewing monster is belching with delight, regurgitating energies with vociferous roars, paying no heed to gluttony in the insatiable lust for more. The primal appetite is unquenchable. The storm is coming with a vicious charge. The wind, having turned decisively from the north, has gained a fierce momentum.

It is only a few hundred feet around the point back to camp, but there is hardly time enough to light the lantern and get inside the tent before the first large drops begin to fall. The campsite is well protected by a windbreak of trees, but the enraged north wind still buffets the tent severely. Fortunately it is staked down securely. A small hill on the west side of the island also gives some protection from a strike by lightning. The storm has hastened darkness. The temperature has dropped dramatically. The rain is pelting down with a vengeance now, the chill air sending shivers to the bone.

There is such a contrast to the repertoire of moods and voices of the wilderness, such a wide range to its assortment of experience. It has such varied dialogue that to understand it all is difficult. Yet all these languages share a common basis in the system.

For instance, all the terms in all the higher systems are constituted of interacting centers. All the terms within each higher system transform into one another through perceptual transpositions. Each higher system also exhibits a master interface or axis, across which there is an objective-to-subjective perspective. Each higher system thus incorporates the properties of both System 1 and System 2. The system continues to proliferate in this way, with each higher system incorporating the properties of all the systems that precede it. This self-similar quality makes it possible to discuss the properties of higher systems in the simpler language of the lower systems.

It is somewhat like looking at a mountain from a distance. The mountain can be seen as a whole: one can talk about its overall shape and size. As one moves closer more detail is clear: one can talk about the overall patterns of forest and rock formation that constitute the mountain. The system proceeds like this, elaborating the details, but in discrete jumps associated with the progression of whole numbers. All the higher systems are there from the beginning, just as all the detail of the mountain is there, but cannot be seen until it is examined close up.

The system has a related property that is like moving up to inspect an individual tree growing on the mountain: the lower systems can be used to elaborate on the detail of certain aspects within the higher systems. For instance it is possible to focus on the nervous system of a loon in the language of System 3, System 4, or System 5, without detailed reference to the whole organism of the loon, which would require a system of a higher order. One can also focus on individual cells or various organs as they relate to the whole organism in a similar way. Each focus will still relate to the whole organism of the loon, but the sharpness of detail will be confined within the focus.

The storm will be a long protracted siege. The tent is shuddering uncontrollably, trembling in terror at the infuriated wind. Outside, the trees are straining to subdue their shrieks and sighs but can't help groaning out of grief at the misfortune of the night. Waves are smashing themselves relentlessly against an unsympathetic shore, pleading for release in suicidal plunges rebuked by cold, unmoving stone. Rain is thrashing down in sheets hurled in blind contempt, lashing out a punishment for transgressions now forgotten, but transmitted into sky. Cracking whips of lightning come searing through the air with resounding proclamations, as the raging monster that has arisen for the task of retribution takes hasty, frightful looks at the penance of its prisoner.

The lantern hisses out its light in mechanical disdain for the proceedings. It sheds a meager moderating warmth, which rapidly disperses in the chill, damp air. The best thing to do is go to bed, with hope that the weather's mood will improve some through the night. A few things are rearranged inside the tent. The sleeping bag is unrolled on the floor along one side of the tent under the window next to the lake. The gas valve of the lantern is closed. The light gradually fades, blinking into darkness.

The darkness is total, like being stranded in a mine. The only companion is the cacophony of noise generated by the storm. Sounds have become untethered from the vision, to jostle about in independent patterns through the deep black murk. The mind tends to wander with the patterns, associating sounds, quick to focus on any strange irregularity. The night penetrates the skin and flesh to bring an aloneness that is not at all like solitude or loneliness. Everything is suspended in an indeterminate field of darkness. The whole body seems to look out independently through its cells to darkness. There is only suspension in aloneness, with wonder at a penetrating sky.

The night is harsh and cold, but the sleeping bag is warm, and tomorrow is another day.



# Chapter 10

## Smudgy

A number of days have passed. Much of the time has been spent getting set up to stay a while. A couple of small tents have been erected along the west edge of the site, where most of the long term provisions will be kept. Although not strictly necessary, the small tents signify numbers and are a good strategy for the many black bears in the area. They can destroy a camp in short order if they think no one is around. An island offers some protection, but once a bear swims out to it you have to share it with him until he decides to leave. The main thing is to avoid attracting bears by keeping the campsite clear of food odors and garbage.

Two or three days have been spent making a couple of small tables and a weatherproof cupboard to store cooking supplies in. The cupboard is lined with plastic sheeting, has split cedar slabs on the outside, slab shelves on the inside, and a flap in front. It stands adjacent to the pine tree. A few stumps cut from a log and set on end about chair height make ideal stools for sitting on. It's a very open floor plan, but home is beginning to look almost civilized. The toilet has been rigged back in the bush with a smooth birch pole nailed across a couple of pine trees. It serves the purpose, although the mosquitoes are a little fierce at times.

Breakfast has just been finished, and the few dishes are being washed up. Here comes the hummingbird again, about the same time as yesterday. This makes four or five days in a row that it has flown in from the northeast, hovered around the camp for a couple of minutes, then darted off across the island. Its course hasn't varied by more than a few feet from one day to the next.

The camp stove and dishes are stacked inside the cupboard, and the wash water is dumped out behind one of the tents. There is still some hot tea in the pail—enough for another cup, which is carried to a stump in the shade of the white pine.

The branches overhead are animated by a gentle breeze, their tufted twigs waving sociably on limber branches, bowing slightly in a cordial display. White pines are refined and gracious trees. Their vital energies

are ordered into complex branches that grow with sweeping gestures, pointing the direction of the prevailing wind. Though their trunks are tall and straight, their limbs curl in flowing clusters, like exotic arms waving in a dance toward the northeastern sky, even when the wind is still. Of all the trees in the northern forest, only these have been selected as nature's compass, in a pantomime of motion.

Red pines stretch up behind the tent with foliage evenly dispersed in bundles that are unresponsive in their pattern to the wind. Their needles are longer, coarser, and tufted into pairs collected on the ends of tougher twigs. Their arms are indistinct. They wave a multitude of hands in a fluent panoply of messages to the breeze. Beyond some black spruce stand like starving war-torn soldiers at attention. They have no hands, just many skinny arms with many fingers. Short needles crowd their surfaces like thick hair growing almost to the trunk. The lower branches have been sacrificed in the quest for light, to hang in ragged disarray, yet these trees are masters at survival through the frigid winters of the north.

Each species projects the distinctive pattern of its presence through its vital energies. Each has a character and personality of its own. But how is each tree linked with all trees of its species? How is each of anything linked with all of its kind? This is the social mystery of each and all, all and each.

Within the nucleus of each living cell there is a genetic language locked up in the chemical bonds of the DNA molecule, but how does the language communicate? How does each cell communicate with all cells within each bird, or tree, or man? How does the cell of a pine needle know where or when to grow, or a cell of bark, or of root? How does each relate to all? How does each electron or proton relate to all electrons or protons? How are they all the same? How is each molecule of oxygen or water the same as all the others? There is an implicit relationship between each and all, or between the particular and the universal, a social mystery the objective language of science is powerless to understand.

The primary activity is System 3. It portrays the general scheme by which each and all are integrated within events with characteristics of space and time. All the higher systems elaborate on the scheme, and all are subsumed within this general pattern. The pattern was previously given in Figure 6, and is simplified in Figure 14.

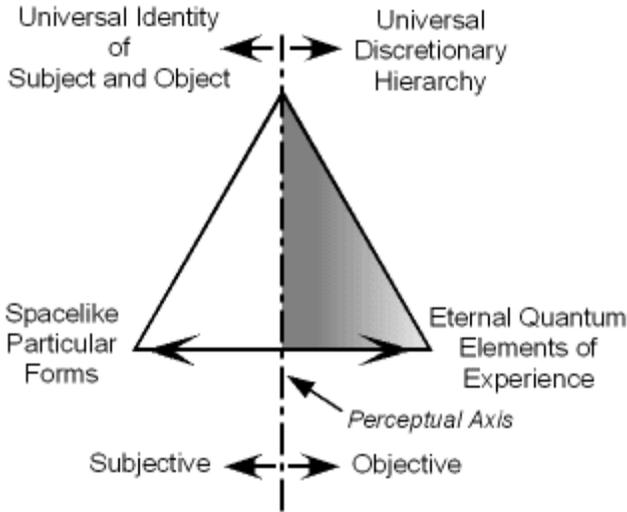


Figure 14

Two sets of alternating terms are generated, each term having three centers. The two terms on each side of the vertical axis occur together; the two sides alternate back and forth. The two terms at the top are universal, while the two at the bottom are particular. On the right side, universal discretion accesses quantized energies of the void. On the left side, a universal pattern to identity lends spacelike entities particular form. The alternations back and forth are synchronized through perceptual transpositions in both sets of centers. The universal set regulates all particular sets. Spend a moment or two just to become familiar with the overall pattern. Then we will probe into the makeup of each term.

It about time for the whiskey jacks to come. They are a clever bird, also called a meat bird, or Canada jay. About the same size as a blue jay, they have grayish-blue wings, with a light gray breast. They are notorious camp visitors, discovering this one on the second day, and returning two or three times a day ever since. Three long notes are whistled in an attempt to call them—after a few tries, here they come. The three of them are always together. Now they swoop across the channel, one after another in long sweeping scallops, as if they were swinging along on a circus trapeze.

They all land in a dead tree behind one of the small tents, but they aren't happy with their order. They begin to jockey for position, chasing

one another from branch to branch, up and down the tree. Finally they come to rest, tentatively agreed on a pecking order, but probably out of weariness. Each of the birds has a distinct personality—after getting to know them a bit, they can be easily recognized. Number-one bird at the top of the pecking order is brash and pushy. Number-two bird doesn't like being pushed around, but displays some moderation. Number-three at the bottom is placid and reserved. It is just as active as the others, but less interested in a hassle.

A small pancake, saved from breakfast, is crumbled and tossed on the ground three or four feet away. Number-three bird reaches it first, but Number One barges in, then Number Two, while placid Number Three just stands and watches. Another piece is held in the hand close to the ground. Number Three hesitates at first, then hops over and takes it. Number-two bird is finally coaxed into taking a piece from the hand, but pushy Number One is too timid to risk it. All three of them eat some, then fly off to hide the rest in the branches of trees. They keep coming back for more.

A small, thin, brown bird flies in all alone, landing about ten feet away. It is a drab, impoverished-looking creature, with a couple of sooty black smudges on each wing. It looks like an orphan that's been making it on its own. Tiny wheels can be seen turning inside its little head as it takes just a moment to size up the situation. When it sees the jays eating from the hand, it runs right over and joins in, amazed at the prospects of having a human friend.

Species much lower in the pecking order often exhibit direct intuitive perceptions that are hidden from man beyond a screen of language. The creative gift of language, a mixed blessing, confines man's horizons to the bastions of his learning.

The system is a guide toward expanding horizons beyond the verbal emplacements of culture. It gives the specific aspect of being polar relevance to the nonspecific aspect in such a way that the relevance is always specific. Each higher system elaborates on the specific nature of being. The system is thus both open and closed, its polarities requiring that insight into the cosmic order be the fruition of personal experience.

System 3 is generated by two sets of three centers, one set being unique and universal, the other set being particular and manifold. System 3 thus intimately concerns the social mystery of one and many, each and all. It elaborates on System 2.

There are only four possible ways that three centers can relate to one another within a term, and each will be called a term, so that we can speak of Term 1, 2, 3, and 4. The four terms will be introduced briefly at first, in order to see generally how they interact in the primary activity. The discussion that follows will then be easier to understand. The terms are not complex, but their simplicity can be deceiving. The four terms interact to produce the cosmic movie with characteristics of space and time.

*Term 1*

In System 2 we saw that a universal idea, such as a loon, may have manifold particular forms. Each loon sustains a balance between subjective and objective orientations through routine perceptual transpositions between them. System 2, by relating *idea* to *form* through a *routine* of alternating between them implies threeness. System 3 elaborates with a universal hierarchy in which *idea* gives direction to *form* via *routine*. In Figure 15, Centers 1, 2, and 3, represent *idea*, *routine*, and *form* respectively. It can be seen that idea directs routine that in turn gives direction to form. There is a discretionary hierarchy involved, and we may refer to it as the discretion term.

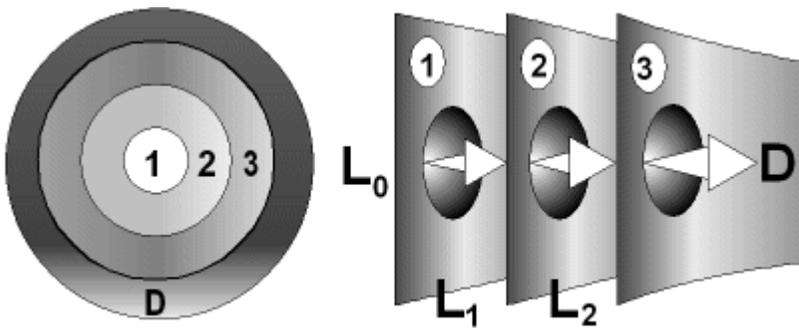


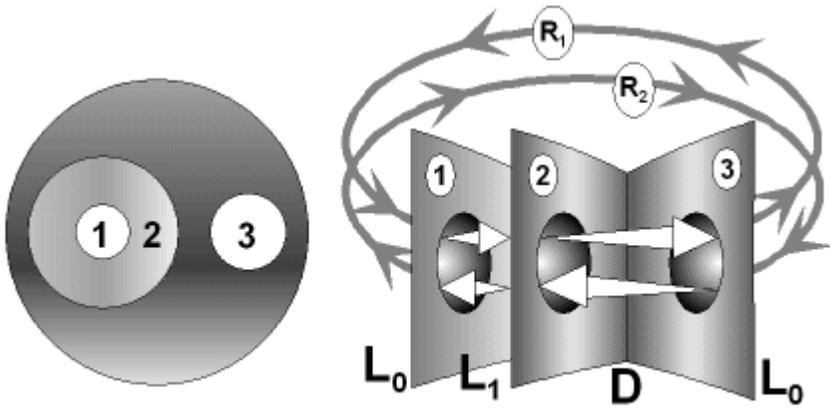
Figure 15

To exemplify the term, one can think of the activity of making a table. Center 1 represents the creative *idea* of a table—its design, intended use and so forth. Center 2 represents the *routine* creative activity, how tools, equipment and material are used in making the table. Center 3 represents the *formation* of material into table shape. From the successiveness of the three centers, it can be seen that idea gives direction to

routine which in turn gives direction to form. There is a discretionary wonder that seeks out specific table ideas, specific routines to suit equipment, and the specific formation of material, from quantized memories of the void. This universal term assimilates particular elements of technique—memories of table making—given by Term 3.

*Term 2*

Term 2 will be called the means term, the subjective or regenerative mode of the discretion term. The two universal terms alternate from one to the other through the perceptual transposition of Center 3, in a manner similar to that of the alternating modes of System 2.



*Figure 16*

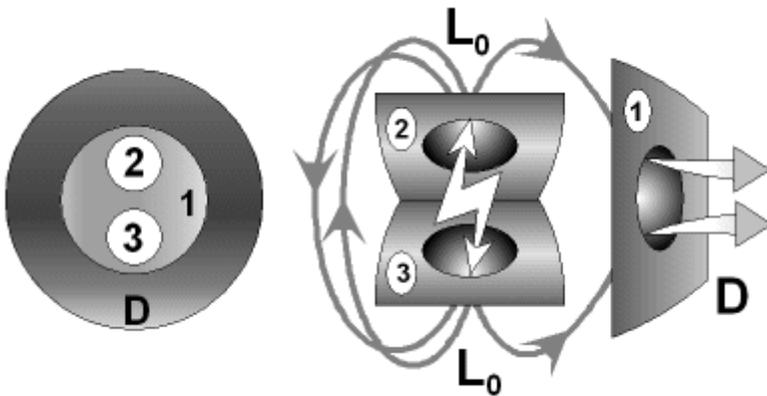
The two relational wholes  $R_1$  and  $R_2$ , in Figure 16, seek countercurrent balance. In  $R_1$ , the idea, Center 1 (C1), directs routines, Center 2 (C2), to give form to C3 accordingly. In  $R_2$ , the form is fed back through sensory routines to idea.  $R_1$  and  $R_2$  thus seek a countercurrent balance such that the form matches the idea through routines. The routine interface, C2, acts as the pivot or perceptual axis that effects the countercurrent balance between the subjective idea that directs it from inside, and the objective form perceived outside.

In making a table, it can be seen that the table idea seeks an identity with material form, through a routine of human activity that employs tools, with sensitive feedback. The table idea is subjective to the routine, in the mind of the person making the table, and the material form is objective to the routine. In this term the centers are open. They may relate

to all table ideas, all routines of making them, and all materials that can be given table form. We shall see how the open universal interfaces of this term work through the closed, particular interfaces of Term 4.

*Term 3*

Term 3 will be called the goal term, for it portrays the complete reconciliation of center and periphery, or inside and outside. As illustrated in Figure 17, each of the coalesced centers, C2 and C3, sees inside the other only to see out through their common periphery, C1. There is thus the simultaneous perception of inside and outside within the term. This perception is neither internal nor external, but both at once. It is eternal. Energies are balanced within the term such that it sustains itself timelessly. The coalescence is a quantization or packaging of energy into discrete parcels that portray an identity in emptiness; it always involves the application of technique as a formless idea. Each coalescence is a unit of memory derived from experience. It is a quantized element of the void, the void being a master repository of experience.



*Figure 17*

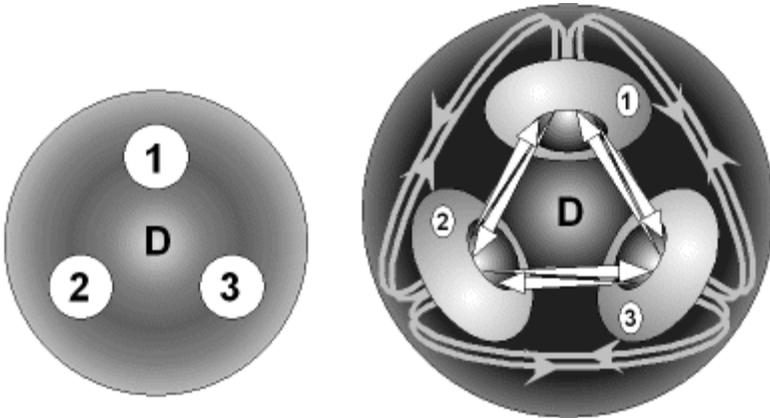
Yin and yang, light and darkness, find mutual balance through their mutual communion in the term. The goal to activity is thus realized in a most fundamental sense.

When it comes to making tables, the three centers represent particular ideas, routines and forms, associated with a particular table. The centers are not universal. Each specific routine becomes coalesced with material form as a quantized element of technique implicit within each idea

element that goes together to make a table. It may be measuring, sawing, nailing, painting. These quantizations are fragments of the table idea, elements of memory, that include the technique for its making. They are selected and assimilated from the void by the universal discretion term, Term 1.

*Term 4*

Term 4 is the consequence term, for it follows in recurrent succession from the goal term through the perceptual transposition of C1. It is the subjective mode of the goal term. The two terms alternate back and forth, changing into one another, synchronously assimilating all the elements of the table as it takes form. The term is illustrated in Figure 18.



*Figure 18*

The three centers are mutually independent, yet related. In a kind of hyperspace of the mind's eye one can visualize why three centers cannot exist independently in a common sky unless each is spatially closed. Three separate open interfaces mutually interfere in their extended plane, so that closure enables their mutual independence. It wraps them up, so to speak. Centers become enclosed with surfaces, or boundaries, which distinguish them as specific, independent wholes with spacelike qualities. Each closed particular center, within each particular set, is intimately related to two partners through the objective perception of double identity. The mutual perception of two partners by each center is not a one to one identity, yet it is mutually reinforced by all centers as a double iden-

tity, uniting the three into a single particular whole, or event. Specific ideas relate to specific routines and specific forms.

Each space-like particular set in Term 4 is the counterpart to an eternal quantization of energy in Term 3. Each such quantized memory element is selected for recall by Term 1 transforming into Term 2. The subjective to objective balance of idea with form in Term 2 then works through each of the centers in each particular set, linking them up in Term 4. This reinforces the spatial identity of each center in Term 4. It lends a universal idea subjectively implicit within the explicit form of each center. In this way, elements of technique are compiled as a series of spatial action sequences that are synchronized with the vast multiplicity of action sequences in the projection of the cosmic movie.

Ideas become explicit in the mind and specific plans of the table maker; routines become explicit in his skills with equipment in a specific sequence; the form of one particular table emerges from shapeless wood. Little by little, the table is compiled from the void of experience, as each quantized table element is given relevance to all, at the same time being synchronously integrated with the material content of the universe. The social mystery is thus implicit in the relationship between the universal set of centers, and all of the particular sets involved.

The three centers have been identified with idea, routine, and form respectively. It should be clear that the same three centers apply equally well to making anything. Furthermore, they are not confined to human activity. They universally apply, from atomic structure, and the galaxy, to the solar system and the biosphere. We will return to have an overall look at how the four terms work together to project the space-time movie of creation.

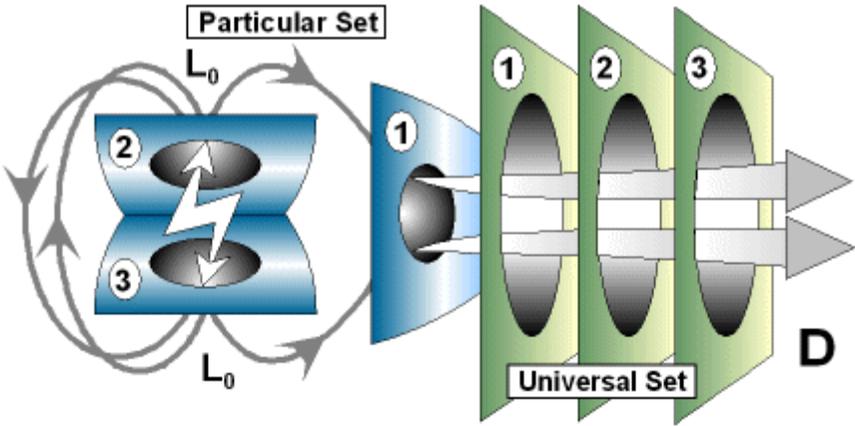
The whiskey jacks have disappeared after the last of the pancake has been stashed in the crotches of trees around a fifty yard radius. Smudgy has stayed in camp, delighted with his new found human friend. He runs all over camp, hopping now in figure eights around the feet.

The sun is well up in the eastern sky, projecting shadows from the pine tree against the orange-colored canvas of the tent. The branches of the pine are waving gently in a variety of rhythms, synchronized in stages with the whole structure of the tree. The slender needles are packaged together in tufts of five on flexible little twigs that join with larger twigs, which join with branchlets that are collected into branches, which reach out from the main trunk of the tree. Each stage of the elaboration of the limbs portrays a character of motion of its own, yet the rhythms of each

are integrated with the rhythms of the whole. The flowing movements are not just mechanical vibrations such as a dead weed might display. Each needle, tuft, twig, and branch plays with the breeze in a living response, with vital energies yielding and resisting in an animated dance. Each has its own unique sense of timing as it reflexes energies through the patterns of its movements within the structured hierarchy of the whole. The fluctuating energies of the breeze are brought to a dynamic balance through the dance.

The discretion and means terms of the primary activity are like a fluctuating universal wind that moves unseen to regulate the pattern of a dance between form and emptiness. The stage is unbounded sky, the stage lights embrace the spectrum of experience, yet the lights are also dancers in the drama of creation. Three lights are primary for a dancing set, but the set is multifaceted, displaying two varieties, in order to provide dancing partners. One set dances like a universal wind. The other set is many sets of three, each trio swinging on its own, yet keeping step by dancing in and out of eternity in tempo with the universal wind. This general pattern to the primary activity is illustrated in Figure 19.

If we think of System 3 as nature's movie projector, we see that the universal driving mechanism is the discretion and means term. The empty screen is the void of quantized memories that are accessed by universal discretion as it selects the essential elements for the next picture sequence. As particular elements are recalled to form, the universal means term links up each set of triplets as a coherent picture sequence, then the next sequence is selected from the void, and so on, picture sequence after picture sequence, just as in an ordinary movie. In the cosmic movie, however the pictures are three dimensional, and the players have a real subjective aspect as well as objective form. One universal set works through all particular sets at once, regulating the recall and coherent integration of the players.



Space frames below alternate with quantum frames above. Relative motion is a series of particle jumps between space frames, creating linear time.

Since light can travel only a fixed distance in each space frame, its speed is universal. It defines space by connecting up separate particles of atomic matter.

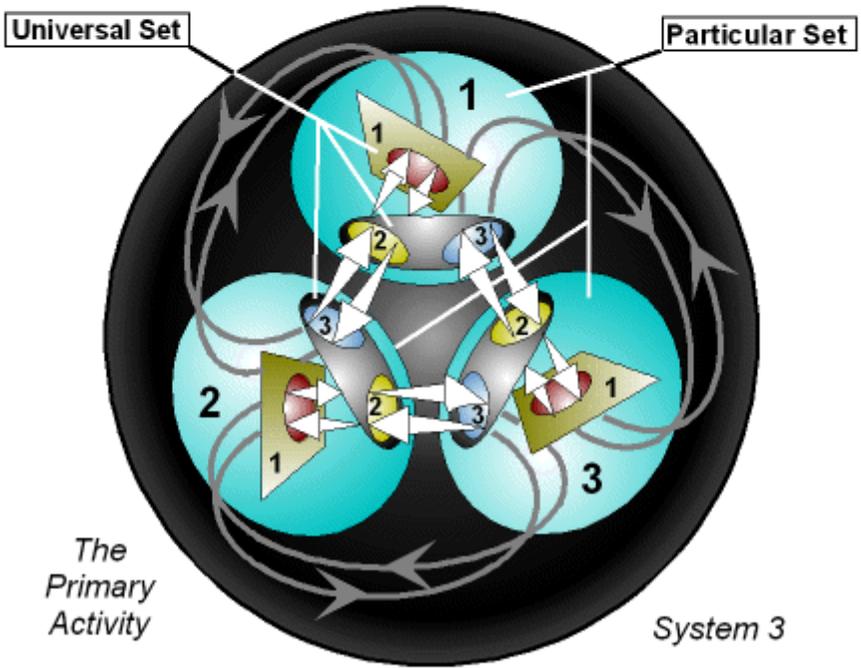


Figure 19

From the transcendent perspective of System 2, the experience demonstrated in the most dramatic fashion that there is a universal director behind the projection of the cosmic movie. He showed himself to me. The universal cosmic center demonstrated that He is the living integrating idea behind the entire universe and more. He demonstrated that his discretionary access to the energies of the void is unlimited. He dispensed with the normal projection of the universe before my eyes as He wished, to demonstrate whatever else He wished, as easily as switching from one channel to another. Then He explicitly demonstrated how the energies of the void are recalled to form through a human participant in the movie, and how some of them are projected into the integration of an eternal script. He wanted me to understand how it works, for knowing how it works we can better play our roles in the cosmic show.

The projection of the movie via System 3 is much in evidence in the biosphere. It is essential to the integration of experience in all complex plants and animals, including humans. Whether a pine tree, or a loon, or person, we all consist of eukaryotic cells that synthesize molecular *forms*, organized into organs that carry out the *routines* that are essential to the coherent *idea* implicit in the host creature. Host, organs, and cells, is thus a common trio of order running throughout the plant and animal kingdom. This is so obvious that we take it for granted.

What is not so obvious to us is that what we physically see as a whole person is only atoms ordered into molecules by chemical synthesis in cells. We intuitively know that there are organs and a host involved, and yet we can't physically identify them apart from collections of cells. We can't even identify cells apart from their molecular constituents, and yet we know that they somehow organize and maintain themselves consistent with their functions in organs and host.

Although host, organs, and cells, are not physical things as such in themselves, they are nevertheless real. They are ordered energy interfaces that are intimately linked together via System 3, and they adopt molecular clothing by resolving the social mystery of each and all. We'll have a closer look at how this works in a minute, but first let's try to get a better idea of what is meant by an ordered energy interface, because there must be two sets of them, one set universal, and one set particular. Since our normal vision of our physical surroundings is confined to the molecular world, these patterned energy interfaces are directly perceived only in special circumstances.

The experience indicated in the several days of union that there is a coherent form to the organic form of the human body. Associated with

the state of union between them is the perception of an integrated energy field embracing all life on the planet. Everything was bathed in living light. Then came the perceptual transposition and the universal human center was seen face to face. This universal host is the human archetype, an ordered energy field associated with all human beings going back to the genesis of humanity. This was demonstrated via System 2, but the universal host is operative via System 3 also. In a self-similar way there is a personal host associated with the integration of one's personal history. This was demonstrated in seeing my own face. These are universal and particular human aspects as an integrating idea, the former represented by Center 1 in the universal set, the latter by Center 1 in the particular set. We may designate them as UC1 and PC1. There are also corresponding universal and particular centers associated with the body's organs and cells, represented by Centers 2 and 3.

That there is a common archetypal idea, a universal UC1 shared as a presence in all humanity should be apparent in some degree to every human being. We experience a common essence within us through mutual communication. We experience an integrating aspect of self in others, if we have any empathy for others at all. In the act of mating we bridge the rift between self and other, male and female, yang and yin, and find organic union in our common human essence. The issue of organic love perchance hosts a human offspring from the creative union.

The personal archetype, the particular PC1, is also in evidence in some realms of experience. It is not the idea of an independent self that all of us tend to entertain to some extent. Consciously entertained ideas about a self generally do more to divorce us from experience than to serve as an integrating reality. They set us apart as special in the fantasies of our own imagination. The personal archetype operates implicitly. We can't conjure it at will, since it is an instrument of our will. It is evidenced not only in spiritual experiences of seeing oneself, but also by "out of the body" and "near death" experiences that have occurred to many millions of people around the world. This now constitutes a huge body of evidence that cannot properly be ignored by science.

The body's organs likewise have an ordered energy field spatially associated with them. The integrated chemistry of the whole body needs intelligent direction associated with its organic routines. These organic routines are universally similar in all human beings and yet they have peculiarities associated with each particular human being, according to particular circumstance. We may say that there is a UC2 and a PC2 associated with each person's organs. Evidence of the independent spatial

organization of organs is given by phantom limb pain, often experienced by amputee victims. They may still retain the spatial perception of an amputated arm or leg. It may be turned in an awkward position that they cannot change, or they may feel it itchy, painful, or uncomfortable in various ways.

It is organs that give direction to the cells that constitute them. The cells must be structured according to the forms of activity expected of them in the context of the organ they inhabit. A nerve cell has similar components to a skin cell, but its function and shape are very different. Like organs, cells have an ordered energy field spatially associated with them that is distinct from their molecular constituents. Molecules are not street smart. They can't independently organize themselves into different shapes, for different purposes within organs, to constitute a human body. Again we may say that there is a UC3 and a PC3 associated with each person's cells. Cells are chemical factories that clothe themselves in molecules. It is the organized collection of all the molecular forms that cells dress themselves in that we see as the flesh and blood form of a human being.

Let's turn now to see how System 3 relates to the social mystery of each and all. If we examine Figure 19 closely, we can see in the space frame depicted in the lower part of the diagram, that there is common universal set, UC1, 2, 3, depicted by the small ellipses, that works through each particular set of centers, depicted by the large ellipses. The universal set is shown as three sets, but it is actually only one set. Since the centers are universal and open, they are not confined to spatial limitations. The universal set tunnels through the particular set in counter-clockwise direction\*, linking the particular centers up in pairs.

For example, the same universal idea of a human being, UC1, resides within each particular center. In other words, the universal human archetype is within each personal archetype, PC1, also within each organ in each person, PC2, and also within each cell in each person, PC3. Each particular center relates to the one adjacent to it across the balanced subjective to objective relations within the universal set. Each particular center is thus invested with the common human essence of the universal host implicit subjectively inside it.

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\*If the universal set links the particular sets up in clockwise direction, the resulting activity is degenerate. This is the involutory variant of System 3. It may be associated with disease in a human, or antimatter in atomic structure.

Let's now examine relations between the particular centers in pairs, beginning with PC1 and PC2 in the lower part of Figure 19. We see that PC1 is aligned with universal routines, UC2, essential to all humans. This associates the personal archetype with all organic routines. They are integrated with the archetype such that one organic routine can't get special attention over another. The heart mustn't pump more blood than the lungs need, and so on. If we look across from the particular idea, PC1, to particular routines, PC2, we see that the latter is aligned with all cell processes, UC3. The routines of each organ are thus integrated with the formation processes of all cells in the body. The cells of the brain mustn't hog all of the energy needed by the muscles when a race is being run. Each organ processes its routines through a balance between all cells and organs in the body. Take a moment to think this through carefully. The mystery between each and all begins to resolve itself.

Moving on to the countercurrent balance between particular organ routines, PC2, and formative processes of cells, PC3, we see that there is self-consistent alignment with universal routines, UC2, and cellular form, UC3, across this interval. UC2 is aligned with PC2, and UC3 is aligned with PC3. The function of each organ is integrated with all organs in the body, just as the function of each cell is integrated with all cells. The whole body is working together in harmony with its parts.

Moving full circle to the countercurrent identities between the formative processes of each cell, PC3, back to archetypal idea, PC1, we see that each cell is aligned with all organ processes, UC2. These, in turn relate to the formative processes of all cells, UC3, as these are integrated with the personal archetype, PC1. Not a single cell can step out of line in its relationship to the organic integration of a whole human body. The social mystery of each and all is resolved. Case closed.

Or is it? What about the molecular forms that cells dress up in? How do they do that? System 3 is at work within each cell as well.

We each consist of cells, each cell with a nucleus containing DNA. All of the chromosomes incorporating all genetic ideas, UC1, essential for a particular human being are enclosed within the nuclear clearing house in each cell. The nucleus is the focus of the particular idea, PC1, of each individual cell in the body. Each cell idea relates out through the nuclear membrane to direct particular routines, PC2, within the cytoplasm of the cell outside the nucleus. Within the cytoplasm are many organelles, and in a self-similar way to the organs in body, they have universal characteristics, UC2. The organelles cooperate in chemical routines to synthesize the molecular forms that dress the body of the cell,

PC3, including other chemical activity essential to each cell. There are, of course, universal forms to all chemical activity, UC3, involving such things as valence, energy requirements, catalysis, and so on.

There are thus universal and particular aspects of idea, routine, and form at work within each cell. These relate it to its environment within the body, across the cell membrane that encloses it. A self-similar organization exists between nucleus, organelle, and chemical synthesis, that exists between host, organ and cell. It is in fact the latter relationship that reads the genes encoded within the chromosomes of each cell, such that its chemical activity will be consistent with the body's overall needs. The reading consists of synchronous harmonics implicit in the self-similar organization of cells and humans.

All of this takes place in coherent accord with the synchronous oscillation of atoms back and forth between a quantum frame, illustrated at the top of Figure 19, and the space frame illustrated at the bottom. The organic body of each human being is thus integrated with the cosmic projection of the physical universe.

Smudgy has explored the whole campsite. He comes back for attention, hopping up first on one shoe, then the other. It is time to leave him for a while for a walk around the island, a half hour daily exercise that is rough going in places.

The beginning of the path is paved around the rocky point to the north, but the pavement soon becomes sculptured into awkward ledges. In the deep water alongside there is a huge school of pickerel minnows, perhaps several million of them, each about an inch long. They are all swimming in the same direction as if guided by a mastermind. The school extends for hundreds of feet. Masses of them coast at times within large areas of the school, with very little bunching into traffic jams. Then all at once they move again, as if responding to a single signal. Those that survive will provide some good fishing in a few years.

Along the west side of the island, there is a little bay with a stony beach strewn with driftwood. The shoreline then juts westward into another rocky point. Around the point it angles back again in solid granite that is contoured into flowing shapes, then rises into a cliff. It is necessary to detour into the thick bush some distance in order to climb the small escarpment, which bulges into a ridge with tall red pines. There is very little undergrowth on top, just towering trunks reaching for the sky. The ridge falls away gradually toward the south, sheared off into rocky ledges along the shore.

The expanse of the lake can be seen for several miles toward the south, tapering toward a narrows, then opening up beyond. The sun is ricocheting off the ruffled surface of the water in glancing bullets of energy that rebound in all directions. Each bullet is repulsed by a bullet-proof vest of electronic particles that enclose each molecule of water.

What about atoms then? Are they organized by the primary activity? They are certainly regarded as primary to the physical universe and hydrogen is the primary atom. Primary hydrogen is said to consist of one electron in orbit about one proton. The electron can only exist in certain orbits and it takes a discrete photon of light energy to bounce an electron into a higher orbit. What's more, the electron doesn't move through space from one orbit to the next. It makes a quantum leap. It disappears in one orbit and reappears in one higher. Magic. It can do it because the whole atom is jumping back and forth between a quantized energy package in the void and particulate form. And if it jumps back down an orbit it releases a photon of light energy.

It may thus be said that each particular hydrogen atom consists of a three member set—photon, electron and proton—in an intimate relationship. Moreover, for all hydrogen atoms in the same energy state, all of their photons, electrons and protons are identical. There is a universal aspect to them all that relates to each. If we consider that the photon is related to the integrating idea, PC1, of a hydrogen atom, then it directs the electron's orbital routines, PC2, to scribe the overall form of the atom about the proton nucleus, PC3.

The basic symmetries of quantum mechanics derive from System 3. For example, electronic charge derives from the partitioned energy characteristics from subjective to objective in the universal set, as it links up the electron and the proton of the particular set. This occurs across the interval between PC2 and PC3 in the lower part of Figure 19.

A single universal set relates to all the particular hydrogen atoms in the universe. That's a lot, about three quarters of all the physical matter in the universe. Hydrogen is the primary level of projection in the cosmic movie and most of it exists in stars, or clouds of gas that give birth to stars.

Stars revolve around the center of their galaxy, which has no physical reality in itself. A galaxy is an integrating idea that is implicit within its stellar population. Later we shall see that galactic angular motion is a routine related to the fusion of hydrogen atoms to form heavier elements in the centers of stars. Nuclear fusion is wound up by galactic momentum. The synchronous projection of the movie tends to get out of synch,

due to the angular quantum jumps in position around the galaxy's center as it rotates. Nuclear fusion in stars helps to offset this dissynchronicity, leaving only a black hole in the movie at the galactic center.

While stars are associated with the routines of atomic synthesis, the planets around them focus on chemical synthesis. When a solar system has a planet like ours, organic life evolves. The origin of the living cell remains a mystery to science. It may be that planets are seeded by spores from an interstellar gene pool, the pool supplied by comet impacts as life evolves on planets like ours. In view of the social mystery of each and all this is likely, since it links biological evolution to the integration of the cosmos.\*

System 3 thus indicates, consistent with the evidence, that the whole physical universe is a synchronous projection of sequential space frames in a cosmic movie that are vanishing and recurring very rapidly, with and before our eyes. The timing of this oscillation between form and emptiness is regulated by the alternating modes of System 3, but since the void is timeless, the space frames close ranks to provide the illusion of spatial continuity. The flow of time, as we scientifically define and measure it, is related to the cyclic recurrence of space frames and electromagnetic activity within each frame. Although each space frame is like a still projection of particulate form, light continues to project the players within each frame, much the same as in an ordinary movie.

The ledges along the south side of the island are only inches wide in places. As the shoreline rounds into the channel on the east it becomes easier going, with more contoured granite, broken up in places into large boulders. These give way into another small point that lies out flat, slicing obliquely into the water and supporting a cluster of straggly jack pines. The point curls into a marshy area teeming with small green frogs. Then a broad ledge, smothered in moss and blueberry bushes, leads into the little cove behind the tent.

Smudgy is still in camp and runs over to prance a little greeting. A piece of cookie is taken from the cupboard; some is handed to him, the rest is crumbled up on a stone for him. It's a good time to wash some dirty clothes and have a swim. The swim trunks are put on more out of

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\*Sir Fred Hoyle is a long standing advocate of the Panspermia Theory introduced by the Swedish Nobel laureate Svante Arrhenius in 1907. F. Hoyle, C Wickramasinghe, *Evolution From Space* (London: Granada, 1981). Also by the same authors *Our Place in the Cosmos* (London: Orion, 1996)

habit than necessity. The clothes are taken to the lake, soaped up well and rolled up on the rock to soak for a while.

The rock is slippery as it tapers into the lake, but once the water is knee deep it is possible to dive in. It feels cold at first, then moderate and pleasant. There is a vertical vein of white quartz about three feet wide in the rock ledge across the channel. Since it's only a short swim away, some prospecting suggests itself. The channel is about fifteen feet deep; on a sunny day like today, the amber-tinted water is just clear enough to see the silt bottom, punctuated with a few clams.

The channel is protected from the southwest breeze, and the waves are gliding in quietly from the main body of the lake. The surface of the water is undulating smoothly in a series of small slick crests moving up the channel in rows. One side of each crest reflects the shoreline and the sky moving along according to its contours; the other reveals the sunlight penetrating down into the water. It looks like a moving picture— successive frames of a continuous strip of film.

The picture side of each crest reflects a double identity that is seen in two directions. The forms of the sky and shoreline above the water are reflected as a virtual image in the surface, as if they are an idea within it. The particular centers in each set are linked by the countercurrent identities of the universal means term in a somewhat similar way.

On the other side of each crest, the light penetrates the surface of the water as if a perceptual transposition has occurred. Visually specific form is lost in emptiness. The void has a structured quantized texture, but its energies are eternally balanced, having no explicit form. The timelike successiveness of universal discretion filters through it everywhere at once, like penetrating rays. Time searches through eternity unseen, assimilating energies for the next picture sequence in the movie. They are recalled into form in the next space frame, as the picture side of the next wave crest comes into view. On and on the movie goes, stepping timelike through eternity.

There is a place where it is easy to climb out of the water beside the vein of quartz. The shoreline is a ledge about ten feet high that is broken into steep steps, chunks of the vein having fractured off into boulders that have tumbled down next to the water. The quartz is fairly good quality, but unfortunately it's not laced with gold. There are some blueberry bushes on top of the ledge with some green berries coming, but the soil is too acid for a good crop. They thrive best after a fire. It soon becomes quite warm and the swim back to camp is refreshing.

The clothes are rinsed out and hung up on a line between the two red pines behind the tent. Smudgy, who has been ignored, hops up on the table to attract some notice. He isn't pretty, he doesn't sing, he doesn't even chirp, but he sure is friendly. After a short visit, it's time to catch a fish for supper.

There is a good fishing spot in front of the bay on the west side of the island. The canoe is slipped into the water and paddled out around the point to the north. The breeze is not strong—about right to drift back across the bay. The canoe is paddled down to the rocky point beyond. Pickerel feed near the bottom, preferring a clean bottom, so a jig is generally the best pickerel lure for casting. This jig has been made by an old friend and fishing partner from Pennsylvania. It is slightly heavier than commercial models of the same size and a little better for casting. The head of the jig is a quarter ounce lead casting, with a single hook that protrudes to the rear, surrounded by a nylon skirt. The jig is fastened to the line on its under side so that the hook rides facing up.

A cast is taken toward the rocky point, and the jig is allowed to sink to the bottom. The slack line is taken up, and the tip of the pole is jigged up sharply. The tip is lowered again as the line is reeled in a turn, then another jig up, and so on, with an even tempo. The speed of retrieval is adjusted according to the depth of the water and the movement of the canoe, so that the jig goes through a series of rhythmic jumps along the bottom.

The third cast brings a heavy strike—the fish is taking line. It soon stops but continues the fight with heavy tugs, taking line again in the usual pattern of a pickerel. Gradually it tires—in about five minutes it is close enough to net. It is a nice pickerel, about five pounds, much too large for supper. The hook is removed from its upper lip, and the fish is placed back over the side. Uninjured it swims away immediately.

Another cast brings supper, a pickerel about eighteen inches long. Its neck is quickly broken, it quivers as it dies. Its patterned energies are doing a final transposition into the void, to wait there for another spawning season. The void is a repository of experience that is structured, refluxed, and restructured through experience. The void is a timeless master sensorium of patterned energies, a master eternal memory bank that is available for recall at will.

Will is exercised on every level of organization. Discretion fishes through the void for appropriate energies, that they may be recalled and identified in form. Each of us is implicitly aware of the process in the intuitive aspects of our own mentation, as we search to give form to idea

and structure our thoughts. It works in a similar way on every scale and level of organization.

The paddle is placed across the canoe in order to clean the fish on the broad part of the blade before returning to camp. Pickerel come in to feed regularly in the late afternoon in front of this little bay. It is very convenient. This school comes in a variety of sizes up to six or seven pounds, but most run about two pounds. In an unspoiled lake like this one, different schools tend to develop different patterns within certain broad limits. Some schools of the same spawning season stick together year after year for a few years, all members of the school running about the same size.

On rare occasions a school will be encountered where every pickerel caught will weigh five to seven pounds. Schools of large pickerel like this are more diverse in their feeding patterns. They range more. They don't usually come back consistently to the same place, and they also tend to get broken up, with members dispersing into other schools, or ranging in smaller groups. Sometimes schools will have a variety of larger members, from three or four pounds upward, with a few as large as ten or twelve pounds. Pickerel larger than this are rare, even in this lake. It is a special event to catch one fifteen or sixteen pounds.

Each school tends to exhibit a collective will, tempered by the experience of its membership. This interplay between each and all provides for a wide spectrum of social variations in different schools.

Apart from the two fillets and one small fin, the fish still remains intact. The float hasn't been broken, and a couple of seagulls nearby already have their eye on it, so it is tossed over the side.

The canoe is paddled back around the northern point of the island. Three long clear whistles come from the campsite. After a pause they come again. Whiskey jacks are gifted mimics, and now it is their turn to do the calling. The three whistles come again.

The canoe is pulled up and tied. The fillets are rinsed a final time, then taken up to camp. There are some fresh vegetables stored in a couple of coolers buried in the shade—a few are collected and prepared. They are put on to boil on the camp stove while a fire is started for tea. The fillets are then put on to fry while *Smudgy* hops around observing everything.

The jays are less interested in what is going on. One of them flies into an overhanging branch of the pine tree, anxious for attention, chirping softly. A woodpecker flies into the dead tree and shrieks out a loud shrill call. Pushy Number One immediately accepts it as a challenge and

flies to a branch about two feet away, then screeches out an identical note just as loud. The woodpecker looks at him dumbfounded for a few seconds. Then, not knowing what else to do, it flies away.

Supper is placed on the table and a stump is pulled up looking out toward the channel. A few small pieces of fish are tossed out for the jays; they come and peck at it, but they like pancake better, They accept a biscuit though and seem satisfied. Meanwhile, Smudgy has occupied one corner of the table to eat a few crumbs of crust from the fish.

The jays leave shortly. Smudgy goes back to exploring on the ground and hopping around the feet. The dishes are cleaned up and the garbage is burned. The leftover fish is wrapped up for a snack later on. Some birch poles were cut the other day for firewood. After a while a few of these are sawn up into lengths and split.

Smudgy stays around until later in the evening. He leaves unnoticed. There is the feeling that he is never to return. Perhaps he has a rendezvous to keep. Perhaps the obligations of his species require him to journey. Whatever the nature of the energies that motivated his departure, we have had a friendship for a day, perceived through the relationship of each to all.

# Chapter 11

## Dance Halls & Spaceships

White pines sometimes favor growing on rocky points where there is very little soil. Their root structure, like their limb structure, seems more highly developed than that of most trees—they can find sustenance and cling to rock where other species fail. They grow other places as well, of course, but a rocky shoreline gives them a freedom of expression they do not enjoy when crowded in by neighbors.

To the northeast of the camp the shoreline juts out into a couple of points as it turns northward on its contorted journey up the east side of the lake. Each point is graced with genuflecting pines. The boat is drifting slowly near one point, a good spot for jigging, although pickerel usually feed here later in the day. A lone white pine is standing some distance apart from a couple of others, its branches licking at the sky, like frozen green flames. A slight breeze betrays the pantomime with gently flowing movements, just as slightly moving lips sometimes betray the voice behind the ventriloquist's dummy. On windy days the mimicry of motion is all but forgotten in order to accentuate the wind, with dancing limbs tugging at their trunks to join the rhythm.

There is another unseen dance going on within the tree, part of a master choreography well concealed behind the scenes. Like a brilliant Sherlock Holmes, science has done a great deal of diligent detective work, identifying many of the characters in the cast, but still has not glimpsed the surreptitious plot. The motive and the modus operandi remain a lurking mystery, concealed by the collusion of the dancers. The detective work proceeds in the belief that the universe is nothing more than a gigantic thermodynamic bake shop.

The Sherlock Holmes of science sees a pine tree as a recipe for a cake. The masterful detective is very earnest in this belief, going to great lengths to convey the opinion to a trusting public. In this ongoing dialogue the public is Watson, the long-standing assistant and faithful companion to detective Holmes.

“You see, it is all very elementary, my dear Watson. Certain chemicals are being drawn up with moisture from the soil and circulated through the vascular system of the tree, which runs in a complex maze—like arteries and veins—to carry the lifeblood of sap to every portion of the tree. The foliage of the tree contains special cells with green structures within them called chloroplasts. These give the foliage its green appearance, but they are also the main kitchen for the tree, where the prime ingredients for a carbohydrate cake are baked. As the sap is circulated through these special cells in needles, water from the soil is combined with carbon dioxide absorbed from the air to produce the carbohydrate sugar. This cooking process requires energy, just as any kitchen stove requires energy. In the kitchen of a tree, the energy comes from sunlight. Because the process of cooking or synthesizing sugar from water and carbon dioxide requires sunlight, we call it photosynthesis,” proclaims the brilliant Sherlock, confident that the central culprit in the recipe has been apprehended.

“You see it is all quite elementary, my dear Watson. Light energy from the sun is essential for the chemical bonding of water with carbon dioxide, to produce sugar. In this way, light energy becomes stored in the chemical bonds of sugar, and it is carried in the sap to various parts of the tree. Some of this energy is then released and used by the tree to build the more complex substances needed for its trunk, roots, limbs needles cones and seeds.”

“But how do the various cells know how to do this?” pries the inquiring Watson.

“This was rather puzzling for quite some time. But now you may rest assured that it all has to do with a secret code.”

“It sounds frightfully diabolical,” says Watson.

“Not at all, my dear fellow,” reassures the famous detective, with his usual air of confidence. “It sounds a little complicated, but really it is just a simple matter of elementary chemistry. You see, the code is locked up in a safety deposit vault, the nucleus of every cell, and it is really nothing more than chemical bonds between four rather simple chemicals. These four chemicals join hands in pairs to form the rungs of a very long ladder-shaped molecule, called DNA, that gets twisted into a helical shape revolving every nine or ten rungs, like a winding staircase. The genetic code is transferred through the rungs. The sides of the ladder sometimes come apart like a zipper, each side of the zipper retaining half of each rung. Each side then acts like a template to build a new identical

zipper. In this way the secret code can be transferred into a new cell when the cell divides.”

“Amazing!” says Watson. “The energy for cooking the recipe is collected from the sun and stored in chemical bonds, while the recipe for mixing the ingredients of the cake in a proper sequence and in proper proportions is stored in chemical bonds as well. That is amazing! If the rungs of the ladder contain the secret genetic code, then the language of the code must be written in the sequence in which each of the different kinds of rungs occur. The DNA molecules are like the chief cook, then.”

“Very observant, my dear Watson,” says the sleuth masterfully. “That is basically it. The code is written in three-letter words, or groups of three rungs in the ladder. Although more than sixty words are possible, a third of them are sufficient to designate the amino acids in the proper order for assembling unlimited varieties of protein. The code has already been cracked in this regard, although related questions remain.”

“How about all the other complicated processes going on in the cell, outside the nucleus, in the cytoplasm that surrounds it?” asks the curious Watson. “If the chief cook is in the nucleus, how do his instructions get passed along?”

“I thought you would ask that, Watson. The chief cook has transfer agents and messengers, called RNA, that are copied from the pattern of DNA. They are like sections from one side of the zipper. These shorter templates go into the cytoplasm, collecting ingredients and giving piecemeal instructions to assembly machines that make the protein constituents of the cake. The whole thing is run like a bakery. There are other workers as well, enzymes and so on, but the secret is in the code.”

“Fascinating,” replies Watson, “but how do all these messengers know where or when to go with their instructions, or whom to give them to? How is it that they can move through the batter of the cake to the right place, at the right time? How about cell division? How about the code itself? Where did it come from?”

“One question at a time, my dear Watson. It is all very elementary. There are electromagnetic energies at work in many ways within a cell, and no doubt work in some way to explain the migrations through the batter. There is even evidence of molecular motors and microtubules to guide them. We don’t have all of the evidence as yet, but no doubt some satisfactory explanation can be worked out, given a little more time. As for the code itself, it is just a fortuitous accident.”

“An accident!” exclaims Watson, showing some surprise. “You mean a pine tree is an accident? That is remarkable!”

“Precisely, my dear Watson, although it is really a series of accidents, occurring over hundreds of millions of years, that have produced pine trees, and you and I as well, for that matter.”

“You mean I’m an accident too?!” blurts out Watson, horrified.

“No need to get upset, my friend, it is all very elementary. You see, the secret code got started a very long time ago through fortuitous circumstances and a happy coincidence of certain molecules in just the right configuration. It was more like a soup than a cake in those days—with all the molecular collisions going on, and with a little help from lightning and radiation, it had to happen. The chances were reasonably good that it would happen somewhere in the world, and once the secret code got started, there was simply no stopping it. The code got revised and changed through more accidents—some caused by cosmic radiation and so forth—and through these mutations different recipes got started for different cakes. Some cakes had a more successful code than others and could survive better, so natural processes selected in their favor, while other cakes died off. In this way, the secret code gradually built up into more and more sophisticated versions. Everything happened in a very natural way. You see, it is all really just a big bakeshop. Pine trees and people are just successful cakes.”\*

“I don’t mean to impugn your brilliant detective work, Holmes, but my confidence is frankly shaken. Is it not possible that some evidence has been overlooked or misinterpreted?”

“Nonsense, Watson! All the evidence is coming together beautifully! The case will be wrapped up as soon as we tie up the loose ends.”

“But maybe there is something we don’t understand about energy. It seems very important to the case. After all, isn’t it the sun’s energy that is stored in chemical bonds, and don’t chemicals bonds have to do with electrons, and aren’t electrons and molecules just special forms of energy, much the same as the energy from the sun? Maybe the secret isn’t in the code, but in the organization of the energies involved?”

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\*Hoyle and Wickramasinghe have conservatively calculated the odds of assembling by accident the two thousand enzymes essential for the chemistry of a cell as  $10^{40,000}$  to 1 against. This is a number vast beyond all comparison in the universe. It would take about fifteen pages just to type out a one followed by forty thousand zeros. (The number of atoms in all of the galaxies of the whole universe can be typed in a couple of lines.) And this just gets the enzymes, not the other machinery of the cell, nor does it address the question of how the cell organizes itself. See *Evolution from Space*, *ibid*.

“Of course energy is involved, but how does that affect anything? We already know all the major events in the case, and the evidence is clear!” retorts the masterful Sherlock, a little perturbed.

“But maybe energy works in an organized way that we don’t suspect,” persists Watson.

“What are you suggesting? That energy knows what it is doing? That it’s intelligent?” shouts Sherlock, getting more upset.

“That might explain why we bother working on the case,” replies Watson, with a little sarcasm showing through a grin.

“Preposterous,” roars the sleuth angrily, “and most unscientific!”

“Perhaps not if we could learn to understand how it works,” comes a timid reply.

“Quit interrupting while I’m working on the case,” snaps Sherlock.

“But maybe we are looking in the wrong direction and will never...”

“Be quiet!” interrupts Holmes sternly.

“But...”

“I *said* be quiet, Watson!”

Are we to believe, with the brilliant Sherlock, that we are just accidental happenings, mere users of energy to manipulate dead matter without meaning or purpose? Or are we intelligent participants in an intelligent universe, seeking understanding as a living realization of our being? Must the deficiencies of language forever divorce us from a spiritual identity with our own understanding? Why must it be so?

The boat has drifted down the shoreline without a strike. It is a good day to try a couple of fishing spots toward the north, then drop in for a visit with Adam and Agnes. There is a long bay about a mile to the north that is sometimes good for big northerns.

The boat is steered out around a peninsula, followed by sheer cliffs forty or fifty feet high. These curve into the bay that is about three hundred yards wide at its mouth. The bay tapers down to a narrows at an island, opening up again beyond, into a long finger that curls about three miles into the shoreline to the east. It is the mouth of the bay that is of interest today, however. The motor is stopped well out, as soon as some scattered weeds become visible ahead. The boat will drift slowly toward the island in the narrows. It is an ideal spot for pike. Sometimes they come up to thirty pounds in size. The lure is changed, and casting begins.

There is a large white pine standing on the island like a traffic policeman giving direction to the breeze. An accidental pine-tree cake in-

deed! Soil, sun, wind and rain are fashioned into a living dance of energy through the agency of a single seed. What kind of magic is at work?

Since the conjuring of a pine tree is linked to its cells, let's look again at the activity hierarchy of a cell. *Idea* is translated genetically, through the agency of the nucleic acids—DNA and RNA; *routines* are enacted through the agency of organelles—endoplasmic reticulum, ribosomes, golgi complex, mitochondria, centrioles, microtubules, etc.; *formation* of end products—molecular synthesis—is regulated through the agency of enzymes. An enzyme is necessary to catalyze each chemical reaction in the cell. They can speed reaction rates a million times. Enzymes are themselves encoded in DNA and manufactured in the cell through the agency of still more enzymes, about two thousand of them.

The cells of a pine tree are its chemical factories, producing the molecular *form* of its physical bulk as it matures. The *routines* of the tree are enacted through the agency of its organs—its roots, vascular system, foliage, reproductive system, etc. Just as with the cells that constitute them, trees have evolved through the mutual commitment of diverse quantizations of technique, organized together into the integrated *idea* of a whole tree, complete in all of its interdependent aspects. The universal centers of a tree span the growth sequence of its history, as it dances to elemental tunes perfected through its ancestry, and eternally preserved as memories in the void.

Thus, although the musical score may be written in genetic code, the code is neither the music nor the musicians. It is a referent to the music—like notes written on a printed page—a discretionary guide for the universal centers to select the appropriate patterned energies from the sensorium of experience. Each sprouting seedling interprets the musical score according to its own environment.

Cells read the code with their own hierarchy of activity synchronous with that for the tree. Each cell thus interprets the code in the context of the tree, while the tree has no access to the code except through cells. The lineage must be transmitted through a seed. Nevertheless, the structured energies of each new tree emerge under the tutelage of its parentage, spanning generations of space and time through the dance.

Don't be misled by the apparent simplicity of the action. Visualize the complexity if you can. Atomic dancers jostle in a molecular Mardi Gras through the maze of avenues circulating within the tree. The streets and alleyways are lined with myriads of cells, like dance halls of various designs, complete with ionized facades. Certain performers are enticed to enter certain halls, while others are ejected by bouncers at the doors.

Inside, what a show! Dancers far more populous than people are induced by enzymes to join hands in complicated patterns, while others are broken up, to form again renewed. Exotic energies are wafting everywhere, sifting through the dancers as they two-step to and fro into eternity, waving as they come and go. The hall is rocking with the beat, the organelles sustaining rhythms of routines. Observe especially the mighty mitochondria. These energy sustainers for the show are separately delegated their own DNA, at the supervisory level of the eukaryotic cell.

The maze of streets and alleyways lead on to limbs and twigs, reaching out to halls in needles with special energy-fixing organelles—the chloroplasts, too, have DNA. It is here atomic triplets enact their star performance to a caroling chorus of chlorophyll. Triplets beckoned from the moisture of the soil are joined in wedlock with triplets coaxed in from the breeze. The parson comes from ninety million miles away. The nuptial festivities are sanctified with sunlight. The six member ring of glucose resonates a wedding march. Sweetness and light prevail. Space and time are bridged by light. The energies of lifetimes are bestowed. The whole tree strains for this event. The bride of light, its life is light.

The boat has drifted into thicker weeds close to the island. The pike aren't feeding either. From close up, the pine tree has a matronly appearance, stout trunk, broad bushy boughs, not so tall and sparse as many. The soil is better here.

The main festive period for pine trees is earlier in the season, after winter slumber. The air is alive with vital energies then, the celebrations being at their peak. Long tentacles clutching into the breast of mother earth sustain new growth struggling out for light. From roots, to trunk, to limbs, and twigs, space and time are bridged through countless marriages with light in needles. The tree is given spatial continuity as a living form through light. The tree is not caused by events in space and time. The tree itself is space and time. Space and time are life.

The hosting hierarchies of the creative process are a dance of light that spans the broad range of the energy spectrum through nanoseconds, minutes, months and years. Each life incorporates its music from across the keyboard, selecting notes for their harmonic interplay. Life, refluxing energies through the void, evolves eternal species that reach across the epochs to span the whole of history. The world of form reshapes itself through life, to perfect the cosmic orchestration.

Elementary? Preposterous! It's not a big bakeshop at all. It's an incredible country-dance to celestial music wafting through the heavens. It's intelligent and alive. It's all a mind. Our mind. Yours and mine.

The boat is pushed out of the thick weeds into deeper water. The motor is started and the boat maneuvered slowly through the shallow water back out into the main body of the lake, then north again along more rugged cliffs, crowned with a thickly wooded hill that rises steeply for a couple hundred feet. It is about a mile and a half to another long narrow island close to the eastern shoreline—sometimes a good spot for pickerel. The pike lure is changed for a jig along the way.

The boat is stopped off the south corner of the island. After a few casts a nice pickerel is caught and put on the stringer for supper. The island is relatively flat, very rocky, and quite open, falling away into boulders, bathing in the shallow water at the shoreline. There may be some blueberries on the bushes that blanket the rocks, so an open spot is selected between the boulders and the boat pulled up on shore. A handful is collected, then a smooth boulder is chosen for a stool beside the water. It's like a fast food place with seats outside for customers.

In the shallow water the slight ripple is warping sunlight into refracted patterns that move in bands across the bottom, rebounding off the boulders in complicated designs. The sandy amber bottom is only a few inches deep, with tiny crystal surfaces glistening in the sunlight. There is a mossy brown algae growing on the rock surfaces, covering them with a dense fine hair a few millimeters thick.

At first glance the shallow water looks lifeless, apart from the few small weeds. On closer inspection it is a teeming invertebrate jungle. Hundreds of water beetles are flitting endlessly over the bottom, scouring it for food, only occasionally coming up for a hurried gulp of air. They are burrowing at the bottom and through the mossy algae, in a tireless energetic plight for food.

Out a little further, in six or eight inches of water, is a school of small minnows, almost transparent in color. About two hundred of them are just basking in the sun in an irregular pattern, as if each had deliberately selected a random orientation to the others. Occasionally a notion overtakes the school to move a foot or so, as if to cool off a bit. It is as if an invisible magnet polarizes them all in one direction, all at once. They are riveted in one direction, move about a foot, then all at once they again assume a random orientation. There is a collective will at work

through which the whole school moves and stays together, yet within this constraint, individual behavior is just as mandatory.

Activity in the invertebrate jungle is not so highly organized. Countless thousands of tiny gnats, hardly visible, are swarming through the algae, and straying out from it, freely swimming through the water. Although so small it is a marvel they can incorporate all the functions required for such an active life, incessant motion seems to be their main defense.

On a sandy patch of the bottom, a small bundle of tiny water-sodden twigs, about half an inch long, intermittently moves. The wormlike larval stage of the caddis fly has built itself a shelter to carry on its back. Nearby, a small patch of sand on the bottom makes a little jump. Another caddis larva has built a shelter from grains of sand. Many of them are scattered over the bottom, while water beetles sometimes try to burrow underneath to get the worm.

Near a small stone, a large leech is sucking on the empty shell of a crawfish. Many leeches are skulking about, searching under one stone then the next, using a methodical process of reaching out in front, then bunching themselves forward, retrieving the tail end for another push.

A crawfish emerges from under a stone with pincers out in front, ready for the kill. It can move quite quickly, trying constantly to use the element of surprise to trap a victim. Sneaking up to the edge of a rock, it rushes out with its pincers spread out ready, but it isn't having any luck.

Nearby a strange looking creature, an inch long, moves out very slowly from under a stone. The naiad stage of the dragonfly must survive in this jungle for about three years before crawling out of the water to attach itself to a plant or a log. In the spring and early summer, it is common to see them clutching corpse-like to twigs or driftwood along the shore, while the dragonfly within matures. Unfortunately this naiad will never know its final metamorphosis. A crab comes on it from behind, making no mistake about the catch. Pincers excitedly crush it again and again, especially near the head end. The crawfish wastes no time in tearing into the meal.

A few feet away a small snail floats up to the surface, turning upside down. Its vulnerable side rests against the surface, with the shell giving protection from predators beneath. Skating around on top are long-legged water bugs, interspersing figures with jumps, while others churn around like an act of clowns. It's a regular insect ice capades with a bird's eye view of the jungle underneath. There is more drama here in half an hour than in going to the movies.

Like pine trees, each of these little creatures has a maze of streets and alleyways, but from there the divergence widens: roots and limbs have been exchanged for legs and feelers; the trunk has been restructured to house digestive organs; the crown of needles has been exchanged for a motor/sensory apparatus. Nonetheless, the new devices remain dependent on the dance with light in plants—the source of all food transmitted through the food chain.

The great mobility the invertebrates display has not been easily won. Cells have had to learn to cooperate in large numbers to perform complex activities—a feat extending far beyond the evolution of new capabilities for single cells. The difficulty of the chore is evidenced by the many primitive invertebrate colonies that collectively exhibit plant-like traits. At first they could do little more than copy. Collective animation only gradually gained momentum as these creatures plodded plant-like through their lifetimes. Each major tier of delegation requires a gathering of experience in the void that becomes collectively assimilated into new ideas. Random mutation and natural selection cannot account for complex parallel sets of integrated development, nor can it acknowledge hierarchies without admitting to a more fundamental order.

In the higher invertebrates, dance halls themselves collude as dancers, nerve and muscle cells animating the linkages of limbs. Diverse changes work together in new formats. The slow-motion movie of the plants is speeded up a billionfold. Space and time are bridged anew, as each new tier of invertebrate technique in the refinery matures.

The delegation of the discretionary tiers is not a happenstance affair. It requires a discretionary gathering through the timeless energies of the void. Experience is assimilated from across the ages, then recommitted to new creations in the world of form. The musical score is intelligently and intentionally rewritten. Major changes in the code come through intelligent intervention, with a concomitant universal set of centers. The branches of the evolutionary tree return as roots into the common trunk.\*

The invertebrate jungle of activity explores the limits to sensitive experience through a dance of intermingling elemental minds, working out details of ever more complex routines. Every water bug, leech, and

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\*It is not contested here that random mutations and natural selection are not operative in the evolutionary process. What is contested is the blind belief, completely unsubstantiated, that this is the *sole* determinant in the evolutionary process, when the natural record is teeming with evidence to the contrary, all of it ignored.

crab is on a treadmill of activity prescribed by the species, with little room for individual interpretation. Individuals are sacrificed for survival of the species. In contrast, the school of minnows is calmly basking in the sun, quietly reflecting on their mutual association. An autonomic nervous system and cerebral hemispheres invests these simple vertebrates with a limited capacity to reflux their sensitive experience into conscious reflection. This reflective interplay, while indebted to invertebrate exploration of sensitive response, spans these patterns of space and time anew.

Adam and Agnes live a little more than two miles to the north, on the west side of the lake. The stringer is pulled in and the boat steered out around the island. The eastern shoreline falls away in the distance as the lake widens a couple of miles in that direction, providing an enhanced view to the north as well. The small peninsula where they camp juts straight out into the lake a couple of hundred yards, like a rocky fist, joined to the mainland by a wrist of sand. It is on the north side of this neck of sand where Adam and Agnes have their camp, nestled in a grove of tall poplars and white birch, with a wide beach extending down to the water's edge.

The boat is kept well out from the shallow water at the end of the peninsula, then circled in a wide arc into the sandy cove on the north side. Their boat is at the dock, so they must be home. There's Adam working on his canoe, in a shady spot on the beach. He waves, then walks over toward the small dock. The motor is slowed to a troll, then shut off as the boat coasts past some weeds in toward Adam on the dock.

"Hello Bob. Glad you came." He catches the front end of the boat and secures it, then we exchange greetings again.

"Come on over while I finish with the canoe," says Adam. "It'll only take a few minutes"

"What are you doing to it?" I ask.

"Just a coat of paint. it needs some new ribs, and a new canvas, but this will last the season out."

The canoe is upside down on a couple of sawhorses, most of it shining with a fresh coat of green paint. Adam picks up the brush to finish the small area left. An old canoe, it has been kept in good repair. "These old canoes are good, but they take a lot of maintenance." I stoop down to look up underneath.

"Plenty heavy on a portage too, especially when it soaks up some water. Too much for Agnes anymore," he adds with a grin.

Just as I am about to ask where Agnes is, she steps out from the kitchen up in the woods, shouts a greeting and waves. Then she speaks a few words of Indian to Adam and goes back inside.

Adam finishes the canoe, puts the lid on the paint can, and cleans the brush. "Come on up and sit down. Agnes is making coffee."

The sandy beach slopes up gradually to a level area, where a few arm chairs face out toward the lake to the north. Behind them, in the poplar grove, are three small huts, and a larger one that serves as the kitchen. Two of the small huts are used for sleeping, the third for storage. There is an unfinished fourth hut some distance beyond the kitchen. Log walls have been completed four or five feet high, with a pole framework above that has not yet been enclosed. All of the huts have a pole framework with fabric roof. Everything is very neat and tidy. It's like a large house with kitchen, bedrooms, and storage, there being no need to enclose the family room.

"Let's sit outside," says Adam, pointing to the chairs. "Agnes will be out in a minute."

On the beach, to one side in front of the chairs, a low fireplace has been constructed, using the top of an old stove. Cooking is usually done on the large wood stove in the kitchen, while this one is used for keeping a continual supply of warm water. There is a very large cast-iron pot sitting on it, simmering away nearly full of water.

Agnes comes out carrying a small tray with three mugs of coffee, some canned milk, and a few homemade biscuits. She is a heavy woman, with straight gray hair, cropped in page-boy style, framing her distinctive Indian features. It is easy to tell that she has been an attractive woman in her youth. She has raised eight children by a previous marriage and has many grandchildren. Adam is taller, but thin straight and wiry. He has never been a candidate for a beauty contest. In fact there is nothing noticeably outstanding about him. He just gradually grows on you, until you start to find yourself a little surprised at the quality of his wisdom. Adam speaks English better than Agnes, who often mixes in some Indian, sometimes throwing in a few French words for good measure. Her first husband spoke French well.

Both Adam and Agnes grew up in the wilderness, close to the old traditions. Agnes is from a lake over sixty miles by water to the east, while Adam is from another lake, a similar distance to the north. In the old days Indians lived in small groups and bands dispersed all through the shield. Where conditions were especially good, there were villages of

a few hundred, or even a few thousand. Lake Nipissing, for instance, supported a few thousand in several large villages around its shores.

Agnes likes to talk about her family. She tells about her daughter from the city, who came to visit with her husband and children.

“Not enough room to sleep,” says Adam. Then nodding toward the partly finished cabin, he adds. “Need to fix up another sleeping camp.”

“Too many grandchildren,” chuckles Agnes.

“Did you know she had so many children when you married her?” I ask Adam.

“Yes, I knew them all a long time.”

“After first husband died and family gone, we know each other good, so I marry him,” explains Agnes.

“She wanted me because I was so young and handsome,” laughs Adam.

“We got married in town. By a preacher,” says Agnes.

“Where did you go on your honeymoon?” I ask.

“Came here,” says Agnes.

“We’ve been here ever since,” adds Adam.

“Still on honeymoon,” giggles Agnes—then we all laugh.

We sit for a while, talking about this and that, enjoying the view to the north. There are several loons on the lake doing takeoffs and landings, getting in their daily flying practice.

Agnes begins to say something in English, then breaks into Indian.

“Speak English,” interrupts Adam.

“What language is it,” I ask.

“Algonkin, different nowadays from most Indians on Nipissing.”

“I thought Algonkin Indians lived in the area from Lake Nipissing to the south.”

“Long ago,” says Agnes. “Then Iroquois came. Much fighting.”

“You mean the Indian wars? But that was over three hundred years ago!” I am fascinated that she should know anything about the event. Neither of them has ever read a history book. Even if they had, this is a story that has never been properly told.

“Yes, long time ago,” Agnes confirms. “Many people come here then to escape Iroquois. Some stay here ever since.”

“How do you know about all this?”

“From old stories when I was young.”

Long before the white man came, the Indian nations had a broad perspective of the continent, with contacts extending not only from east to west via the water systems, but also limited trading contacts from

James Bay in the north all the way to Florida. The latter was one of the first things to be disrupted by the whiteman. In those early days the whiteman's most extensive trade route was established up the St. Lawrence and Ottawa rivers, then across via Lake Nipissing to Lake Superior and beyond. This trade route was most direct and skirted most Iroquois land. The Algonkin, Cree, and Ojibway peoples wanted the benefit of trade with the whiteman, while the much feared Iroquois were losing territory and were threatened by it.

Ironically, it was the Indian, not the whiteman, that subdued the Iroquois, clearing the way for settlement of their territory. The continued massacres of trading parties by the Iroquois finally brought retaliation from the great Ojibway nation. They came by the thousands from north and west of Lake Superior, and from Wisconsin and Minnesota. For many hundreds of miles they paddled their war canoes, their numbers gathering with the tributaries of the river systems, gaining in momentum like a storm. Like a cleansing scourge, they fanned out through the water systems to the south and east to destroy the Iroquois peoples as an organized nation. This all took place about 1650, when the whiteman's numbers were still quite small. Had the Ojibway shared the feelings of the Iroquois, the course of history might be very different.\*

Adam and Agnes know something of these events through legends transmitted from generation to generation. Fragments of their folklore still persist in their culture with those that sense its living spirit.

"Do young people on the reservation still learn the language?" I inquire after a while.

"When the family speaks it," Adam explains, "but many not interested. They must learn English and French in school also. Young people forget about the old ways."

"Will you stay for supper?" asks Agnes.

"By the looks of that dark cloud, I should soon head for camp." I indicate a large thunderhead encroaching from the north.

"A storm is coming, all right," Adam agrees. "Many storms come from the north this year.."

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\* A brief account of these events, taken from early missionary correspondence (*The Jesuit Relations*, 72 volumes), is given by Murray Leatherdale, *Nipissing from Brulé to Booth* (North Bay, Ont.: North Bay Chamber of Commerce, 1971).

“Time enough for another coffee before you go.” Agnes collects the cups and scurries off to the kitchen. She returns in a few minutes as Adam and I exchange estimates on when the storm will arrive.

“When are you coming down to see me?” I ask.

“Gasoline a big problem,” Adam explains, “but we have to go down the lake in about a week or ten days. We’ll stop in on the way back.”

The coffee is gulped down quickly, with apologies for the hasty departure. With some luck, there should be time enough to make it back to camp before the storm.

As the boat is turned out around the point toward camp, the sky exchanges its somber shroud for a translucent veil of light across the south. The lake is serene—a pool of molten silver, alive with scintillating shimmers. Light is playing through air and water, rocks and trees, in the endless game of spanning space and time. Sunlight is only a messenger in a living solar cell that is itself a massive dance of energy. Eight minutes from the sun, it comes to show the way, to lend space and time to pines and poplars, spruce and birch, reaching out of rocks in ancestral celebrations. The hills are rejoicing in a boisterous silence, as the boat skims like a spaceship through a timeless fantasy of form. Everything seems suddenly like a splendid dream.

Nightmarish undercurrents are working through the dream, recalling spaceship protégés of light to action, from energies gathered through the eras. The woods and water are full of tiny cannibals, exploring techniques of bridging time and space. Fish are cannibals as well, but the vertebrates bring a refinement of reflection to behavior, from minnows to loons and men. Sensitive activity is given perspective through spiritual reflux into conscious observation. Behavior becomes translated as conscious action. The suitability of technique can be perceived, assessed, and modified.

Man has been equipped with a special apparatus for spanning space and time. Folklore and legends are woven on a loom of language. The threads are spun from words, but words are not the experience transmitted through the tapestry. Words, like secret codes, are neither music nor musicians. They are a discretionary guide, to summon the spirit of the tapestry to a rebirth in the minds of men. Cultures are given continuity. The benefits of hard-won insights through experience are preserved for generations, yet more nightmares come to haunt the splendor of the dream. Words tend to become the message, not the messenger. Insights are exchanged for vested interests untailored to the circumstance. Mind is lost in massacres and wars.

The spirit is neither the object nor the subject of the mind. It is the axis of experience, through which mentation and behavior are mutually reflected. Through discretion, other spirits are entertained in spirit on a hierarchy of levels. The spirit hosts a dance of many spirits that come through invitation, then seek a way to participate and stay. Each must submit to tailoring, to find relevance to the tapestry of experience through the void. Space and time through all eternity are ours, according to how we weave the fabric of our mind.

The spaceship fleets over the slick silver surface, through the light-drenched splendor of the dream. Memories of a lifetime pale to insignificance before those of eons, dancing from suspension in an ageless sea of emptiness, to enact the imagery of nature's drama. As the boat moves through the scene, it seems the scene is moving through the being. Space has lost objective relevance to time in the reflection of identity through a universal spirit.

Behind the boat, the dark cloud is gaining quickly in the chase, but the race will easily be won. The island is already visible against the shoreline, discarding camouflage as the distance shortens. The fish will get to live another day. Tonight there will only be time for a hasty can of stew prepared inside the tent.

## Chapter 12

### An Onion Dance

There is a disturbance in a patch of grass near the pine log bench. A garter snake about eighteen inches long has captured a frog by one hind leg. Its jaws disengage so that it can swallow the frog which is considerably larger in diameter than its body. The frog, however, has no sympathy for the snake's appetite. It is struggling as best it can to escape, uttering squawks and pleading cries with a curious, human quality.

A few small sticks are tossed in the direction of the snake. When one of them hits, the snake releases the frog who immediately recognizes its benefactor and the direction of safety. It takes several rapid hops, jumping up on the log about eighteen inches away. The snake, obviously angry, has no sympathy for the frog's freedom. It too recognizes who has robbed it of its meal; after a frantic search through the patch of grass, it crawls right over in a plain display of agitated defiance. It seems to sense that the frog is in hiding near the intruder who has so unjustly interfered. It crawls around quite close, with angry rapid movements that show its avowed intention to recover its meal. A motion with the foot to chase it away doesn't frighten it in the least—it returns with increased determination. Meanwhile the frog sits quietly by, safely perched out of sight on top of the log, not anxious to go anywhere.

More sticks are tossed and poked at the snake, which persists even after it is hit a number of times. For a while, it becomes even more agitated and determined, but gradually it moves away a little. It is only after more sticks strike it, that it finally gives up and crawls away. The frog sits quietly still for quite a few minutes more. It finally senses that all is clear, hopping off in the opposite direction.

Even the reptiles and amphibians have a capacity to rapidly assess their situations and respond according to their needs, despite the fact that a creature so strange to them as a human being is involved. There is a common basis to perception assessment and response that spans the entire vertebrate series. Anchored in a common pattern of reflux through

the autonomic nervous system into cerebral reflection, it provides a basis for intuitive communication.

The invertebrates are more remote from us. We share the sensitive energies with them, which doesn't extend to a common organization of perception, assessment and response. Many variations of organization are explored by the invertebrates, each projecting a different pattern of sensitivity that we can intuitively perceive. We have little appreciation for creatures with compound eyes, a multitude of legs, and mandibles, yet we pick up their projected energies of patterned sensitivity. Just to see a millipede is enough to make the skin of many people crawl.

We have an affinity for plants that we don't experience with the invertebrates. The vitality we derive from the air we breathe and the food we eat we owe to plants, but we also share their vital character in the energies they project. Every human who wanders into an orchard dripping in cherry blossoms senses more in the spring air than fragrance. The air is alive with a vitality that invigorates the human spirit.

Plants have transformed the biosphere, the air, the soil and sea. In the course of their own evolution they have had a major influence on the evolution of the planet. They have drastically altered the chemistry of the atmosphere, with a regulatory effect on such things as cloud cover, precipitation, solar radiation, mean temperature, polar ice caps, ocean levels, and the plate tectonics of continental formation. Whatever the complexities of planetary evolution, plants have exerted a major influence for nearly four billion years.

What is the planet then? Is it another living tier in nature's energy refinery? Is it a structured hierarchy of interrelated energies engaged in a self-regulating activity? Is it an intelligent being functioning on a scale with which we are unfamiliar? Or is it just a big, round mud cake that somehow happened to collect itself together near a kitchen stove? Sherlock has something to say on the matter, you may be sure.

For the last few days the kitchen stove has been warming things up beautifully following another cold, wet spell. Today is a lazy, sultry day caressed by a soft, intermittent breeze, like a lover's warm sweet breath casually stirring a quiet excitement deep within. The whiskey jacks have come and gone, the hummingbird has made its hasty inspection, and there has been a visit from a spruce partridge. This morning six loons came through the channel, stopping to give a brief serenade. A red squirrel is rummaging through the cupboard, looking for something to eat. The cupboard may be waterproof, but it is not squirrel proof—the pan-

cake flour and oatmeal must be kept in the tent. Living alone in the wilderness involves an active social life once the neighborhood accepts you.

Across the channel, tree trunks are reflecting in the surface like long snakes trying lazily to slowly work their way to shore, never quite succeeding. The dimpled surface is slicing off the images of tree tops, as if preparing vegetables for an imaginary stew. The kitchen stove, soaring overhead, is warming up the water—a swim just finished felt more like a dip in a simmering pot than a plunge in the waters of a northern lake.

It is the kind of day that stirs a desire to fish, whether the fish are biting or not. The gasoline budget can afford some trolling. This is an excellent way to learn a lake, to find the weed beds, and to get a feel for the contours and quality of the bottom. The nature of the shoreline and the shape of the lake provide many clues as to the nature of the bottom as well. Knowing the general habits of the species, one can then begin to appreciate the feeding patterns in a lake. The experience gained by trolling is therefore never wasted, whether fish are caught or not. It all adds to a sensorium of lake experience, a spontaneous feel for the many subtleties of its character.

Today trolling is begun right from camp, through the channel toward the south. The spare fishing pole is better for trolling, as it is a bit shorter with slightly stiffer action. A regular trolling rod is not necessary for this kind of trolling which is very slow, and close to shore. A popular minnow-shaped lure is being used. It has a quivering sort of action that is very effective for pickerel. A wire leader is used in case of a big northern, and a good-sized rubber-core sinker is placed four or five feet up the line from the lure. To find the pickerel, it is necessary to stay close to the bottom. The lure is a floater and will tend to ride higher than the sinker, which helps to avoid snags along the bottom. Toward the south the water gets a little deeper, and a little more line is fed out. The boat is turned east a bit, past the first point. There are some rocks in the water beyond, with half a dozen seagulls standing in a row as if they were waiting on a bus. Past another small point, the boat is turned south again, heading across the mouth of a quite a large bay that extends about a mile to the east. The boat is kept off the edge of a rocky shoal that extends across the mouth. Then it is turned out around a large point.

Around the point, the granite slides into the water in a solid sheet, with hardly a crack in its weathered facade. With clean-flowing lines, it slips gracefully beneath the surface to seek shelter for its naked form within the depths below. Above the waterline, the lichen clings for life as it has done for centuries, while further up the slope more developed

mosslike forms of lichen grow. These give way to moss, then to low bushes that provide scant covering for the otherwise naked skull of rock. At the fringe of the bush, there are some small pines with a thick stand of moderately sized red and white pines beyond.

A broad outline of the evolution of plants is written on the rock near the waterline, from the algae growing below the surface, through the lichens and mosses, to the higher plants. But what about the rock itself? What about the evolution of the planet?

The eminent Mr. Holmes has been busy on this case as well, certain of a link to the mystery of the organic cell. For one thing, he is convinced that there isn't any motive in either case, that everything just happened according to fortuitous accident. Second, he is convinced that the *modus operandi* is the same. Everything is just a big thermodynamic bakeshop that most probably began with an unthinkable explosion over ten billion years ago. As the universe expanded and cooled, it condensed into clusters of matter that eventually formed the galaxies, stars and planets. There are several variations as to how this could have happened, and there are even some alternate ideas, but essential to them all is the notion of the bakeshop. Third, he is convinced that there is a common *corpus delicti*. He believes that there is only a mindless body, a corpse of molecules, particles, and radiation that is shared alike by cells, people, planets, suns, and galaxies.

The ingenious Mr. Holmes has done some admirable detective work in exposing many pieces of the puzzle; still, he is firmly entrenched in his methods of interpretation. He has regained his composure from his earlier disenchantment with his good friend Watson, and they are on speaking terms again.

"You see, my dear Watson, the evidence from dating the most ancient rocks in the Precambrian shields in different parts of the world, and also from dating moon rocks, indicates that the planet had a birth about four and a half billion years ago. Now all of the major planets revolve around the sun in very nearly the same plane, and in nearly circular orbits, in the same counterclockwise direction. With the exception of Venus and Uranus, all of the planets and most of the moons also rotate on their own axis in the same direction. This suggests that the solar system evolved from a swirling disc of gas and dust around a central concentration of gas and dust in a large protosun. At this point, however, the sun was not yet luminous. The cookstove hadn't been ignited yet."

“Interesting,” replies Watson, “but I have become more skeptical of your ideas. You mean that the solar system evolved from a big cloud of gas and dust, assuming a shape like a huge spinning flying saucer? This turbulent cloud then condensed into a central sun and the nine major planets with their moons. I suppose gravity, turbulence, and electromagnetic forces can account for all of this, can they?”

“Despite your unruly imagination, you really are quite a clever chap, Watson. Yes, that is essentially how it happened. It is all quite elementary. The sun became compressed into a nuclear cookstove, and the planets condensed into big buns whirling around on a rotisserie in a solar oven. There are some problems yet to be worked out, but, given more time and more evidence from space probes and so on, all these things will fall into place. You see, the five outer planets are separated by an asteroid belt from the four inner planets, and except for Pluto they are much larger and less dense. It is two very different kinds of planetary worlds, but this can be explained by the factors involved as the planets condensed. The four inner planets are very close to the sun compared with the outer planets. For instance, Earth is the third planet from the sun, and it is thirty times closer than the eighth planet Neptune.”

“It all sounds plausible enough on the surface,” comments Watson. “I suppose that ever since the planets were formed, they have been held in orbit by a balance of centrifugal and gravitational force, whatever these are, but how about all the other problematic evidence you have collected? If more than ninety-nine percent of the mass of the solar system is concentrated in the sun, then why is more than ninety-eight percent of angular momentum in the planets and satellites? How about the clockwise rotation of Venus on its axis. Why is the spin axis of Uranus nearly in the solar plane instead of approximately perpendicular as in the other planets? Why is Pluto so small compared with the other outer planets, and why is its orbital plane inclined? Why do a few of the outer moons of Jupiter and Saturn orbit in a clockwise direction? Why is there an asteroid belt containing material of all sizes up to minor planets instead of a regular planet? Is it just an accident that a planet didn’t condense in an orbit where one might have been expected? How about some of the minor planets, Hidalgo for instance, with an elongated orbit astride that of Jupiter, but inclined forty degrees? Also, the space probes and powerful new telescopes seem to be turning up more new questions than answers to old ones.”

“Of course there are some disturbing questions yet to be resolved,” replies Holmes between puffs, while lighting his pipe. “Nevertheless

great progress is being made, and there is no reason to suspect a different *modus operandi*. Furthermore, there are many contingency factors that could explain some of these anomalies—collisions, near collisions, comets, and so forth. Also, since we are just beginning to gather evidence from space probes, orbiting telescopes, and ground based observation arrays, many of these questions must be deferred.”

“Can you explain more about the planet Earth, then Holmes? Space probes aren’t as essential here. I really do have a great respect for all the work that you have done on the case.”

“Be glad to, my dear fellow. As you know, gravity was a primary factor in the physical consolidation of the planet, although turbulence and electromagnetic factors came into play. In this way, the orbit of the planet and its angular momentum became established. A geothermal consolidation followed, in which the main cookstove was the heat produced through radioactive decay processes going on within the earth. Earth became organized with a molten metallic core with solid center, surrounded by an essentially solid, but somewhat pliable, mantle, and overlain with a primary crust. Electromagnetic consolidation then occurred, related to internal convection currents in the predominantly iron fluid core, magnetic poles forming in an approximate alignment with the axis of the earth’s rotation. The earth’s magnetic field in turn no doubt exerts a regulatory effect on internal convection, crust formation and atmosphere. A magnetosphere came to surround the planet in a vast envelope that interacts with a solar wind of charged particles—electrons and protons—ejected from the sun. This magnetosphere was important to an atmospheric consolidation that followed.”

“It all sounds so organized,” remarks Watson. “From what you say, there have been four successive stages to the development of the planet: a gravitational consolidation, a geothermal consolidation, an electromagnetic consolidation, and an atmospheric consolidation. Why, it is as if each of these has been worked out in successive stages of delegation, almost like a manager delegates work in a hierarchy of levels as a business enterprise grows.”

Holmes pauses for a moment, making an effort to control himself, then he takes a puff on his pipe and says sternly, “It is all perfectly straightforward, I tell you. There is no need for these inane ideas you keep coming out with.”

“I’m sorry, Holmes.” Watson is genuinely apologetic. “The thought just happened to come to me. Can explain more about the magnetosphere, atmosphere, and solar wind? This sounds quite mysterious.”

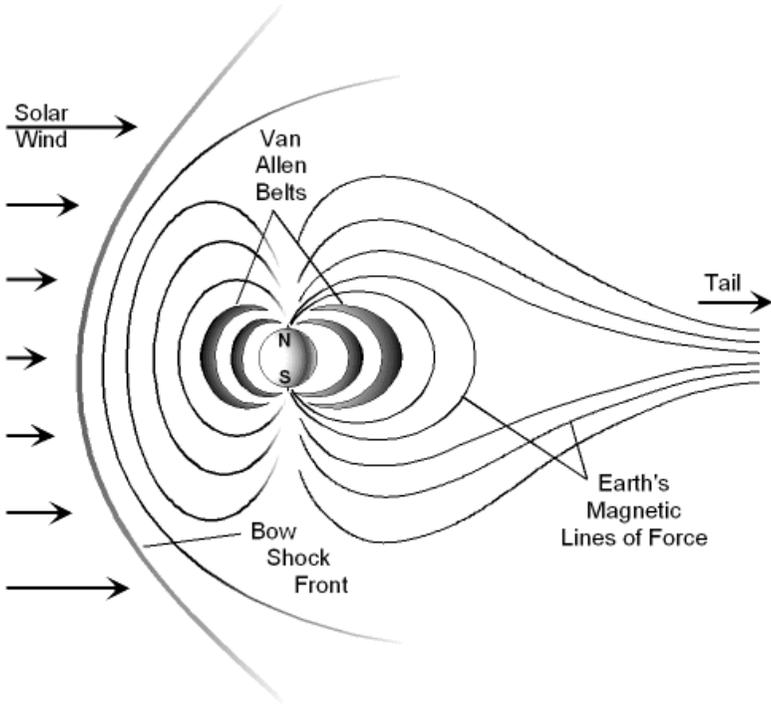


Figure 20

“It’s very elementary, Watson. The solar wind is related to sun spot and solar flare activity that propels high-energy radiation, electrons and protons, toward earth. This has a major effect on the magnetosphere. For instance, electrons and protons become trapped in what are called Van Allen belts within the magnetosphere. Two belts, one with electrons and one with protons, surround the girth of the planet like the shells of two doughnuts, one inside the other. The proton belt is closer to earth—less intense than the electron belt—but both are far above the atmosphere at the equator. Within each belt the electrons and protons spiral rapidly around the magnetic lines of force, traveling back and forth from one polar region to the other. The two belts also drift in opposite directions around the girth of the planet. Their intensity varies greatly, depending on solar activity. In addition, the shape of the whole magnetosphere is distorted by the solar wind. Some of earth’s magnetic lines of force are unable to close in the direction away from the sun. They are swept into a long tail that trails out indefinitely into the planetary disc for at least

several million miles. A simple diagram will help to clarify all this.” (See Figure 20.)

“Fascinating!” exclaims Watson. “Why the tail is like an electromagnetic hand on a solar clock that sweeps around the planetary disc as the earth revolves around the sun. Do other planets have tails as well?”

“Don’t get carried away again, Watson,” snaps Holmes curtly. “This is only of incidental interest to the case. The important thing is that once a magnetic field had become well established, organic life could begin to evolve on the planet. The magnetosphere and atmosphere filter, and select specific radiation from the sun—this is essential to the development of life in the biosphere, since much radiation is very harmful. The upper atmosphere is particularly structured in this regard. As you know, at the low altitudes we are normally exposed to, the atmosphere is a mixture of nitrogen and oxygen, with only small concentrations of carbon dioxide and other gases, together with various amounts of water vapor, depending on the weather.

“For about the first fifty kilometers above earth, the gases are all mixed up because of the turmoil of wind and weather. For this reason it can be called the homosphere. Above fifty kilometers, the atmosphere becomes sufficiently thin for the various gases to separate into layers, one above the other according to density, though they are still somewhat mixed up. This heterosphere extends up for several hundred kilometers. Nitrogen predominates near the bottom, in the layer on top of the homosphere, then oxygen, then helium, then hydrogen dwindles out on top.

“Now when high-energy radiation comes soaring into the atmosphere, it encounters these layers, especially the more dense oxygen and nitrogen layers. This high-energy radiation bombards the molecules, ionizing them by knocking electrons free from their outer orbits. Positively charged ions become separated from some of their negatively charged electron partners. These charged particles interact with the magnetosphere. This forms what is called the ionosphere. It too is organized in four layers, each characterized by its ability to reflect different frequencies of electromagnetic wave propagation. This is very important for long-distance radio transmission.”

“Very interesting,” interrupts Watson. “The way you describe it, the earth is like two different kinds of concentric onions, both inside a doughnut. There is the material onion, with layers of core, mantle, crust, and then atmosphere, which in turn has layer of homosphere and heterosphere. The onion of the ionosphere is constituted of electronic layers

within the heterosphere. This is all enclosed by the doughnut-shaped magnetosphere with its long tail reaching out towards Mars.”

“Hmmm, an onion doughnut. I’d wager that would taste quite good,” muses Holmes thoughtfully to himself.

“Please tell me more about the ionosphere, Holmes. If it is caused by radiation, does it change from night to day, or from season to season? Do tidal influences of the sun and the moon on the atmosphere affect it? Do fluctuations in the ionosphere cause changes in the strength of the magnetosphere? Does this in turn affect electrical currents and convection currents in the center of the earth? Is the ionosphere related to weather? So many questions come to mind when one starts thinking about electric currents wandering about in the upper atmosphere.”

“It is rather complicated,” agrees Holmes. “Yes there are air movements in the ionosphere that generate electrical currents. At low levels in the ionosphere, there is even turbulence. In general, however, air movements in the ionosphere tend to conform to patterns of gravity waves and tidal influences. Temperatures over polar regions are similar to those over equatorial regions, which also indicates a polar movement of air. Relationships between the ionosphere and weather systems at lower levels in the atmosphere are hard to assess, but the strength of the ionosphere has a certain influence on the magnetosphere. This undoubtedly has some effect on internal events in the core and mantle of Earth. Changes in the strength of the ionosphere are dominated by the sun—both by solar activity and by the rotation of Earth in relation to the sun. In the daytime, there is an equatorial bulge in the ionosphere toward the sun, while at night the layers fade. Some tend to disappear altogether.”

“It sounds as if most of the layers wake up and go to sleep with the rest of us through the daily cycle,” remarks Watson jokingly. “Is it not correct that the ionosphere has evolved with changes in the chemistry of the atmosphere, brought about by the evolution of life in the biosphere?”

“An astute observation, Watson,” compliments the sleuth, thinking he has regained the confidence of his long-standing companion. “Yes, the oxygen in the atmosphere is primarily the product of photosynthesis in plants, although it is possible that the disintegration of water vapor into hydrogen and oxygen by cosmic radiation may have contributed. The presence of oxygen is definitely a key factor in making the ionosphere what it is.”

“That is remarkable!” exclaims Watson enthusiastically. “The character of the ionosphere is indebted to plants. The ionosphere in turn selects radiation which enhances organic life, while preventing harmful

levels of radiation from penetrating the biosphere. If I understand you correctly, the ionosphere also regulates the magnetosphere to a certain extent, therefore also influencing electrical and convection currents in the mantle and fluid core. It seems that this could even have an effect on events in the crust of the earth. Who would have thought that microscopic algae and their gentle descendants could wield such immense power on such a massive scale? Why it is as if the ionosphere and its relative, Van Allen belts, sustain mentation processes that reflect the needs of the biosphere and have a complementary effect on the behavior of Earth as well. Could the planet be a living being?"

"Holmes begins to puff furiously on his pipe, then blurts out angrily. There goes your unruly imagination again! It's all a big bakeshop, I tell you, and the planet is just a big bun going round on a rotisserie!"

"I'm terribly sorry, Holmes," pleads Watson, "I just can't help it! These seditious thoughts keep coming, and before I know it I've spoken them. It's as if I'm possessed by the devil himself."

Holmes glares at him for a moment or two, puffing compulsively on his pipe. Then he turns abruptly and walks away.

Science is extremely reluctant to entertain thoughts of an intelligent motive or modus operandi. It regards that perspective as filled with superstitions, yet its own view has itself become a superstition, with an unreasonable belief in an accidental corpse as the only reality. There seems to be a feeling that to admit that intelligence is at work in the universe is to abandon the possibility of understanding the natural order, as if order and intelligence were mutually opposed. There is no doubt that the fishing hole of science has produced a few nice catches, but there is a whole lake left unexplored.

The outboard motor sounds out incessant muffled chugs with monotonous regularity. The turns of the propeller are synchronized with nature's movie, smoothly sliding the scenery along in a script that has been evolving through eternity. Even early chapters of the story, long since told, linger to maintain a dialogue in mute words of sculptured granite along the naked shore. The gallery of hills rises in irregular variations, forested with throngs of spectators that keep returning to the show.

A broad flat point has been shattered into pieces that rest intact, a little weatherworn, yet still assembled like a jigsaw puzzle. Around the point, the granite has been scraped into grooves by a great claw of glacial ice. Approaching up ahead is a small marshy bay rimmed with yellow

water lilies. The bay harbors a grove of poplars, tall and lean, wiggling a smattering of leaves as a standard salutation to every passerby.

Beyond the bay the granite becomes marbled with skinny veins of white and orange running in complicated road map designs. The nude stone shoreline keeps modulating the tone and texture of its complexion. In places there are outcrops of feldspar and quartz, or regions of metamorphic rock, full of seams, twisting and weaving in various directions as a reminder of pained contortions in the awkward plastic stages of its youth. The acid water has patiently eaten out some of the softer veins into ragged ruts that meander with the convolutions of the grain.

Beyond another marshy spot, the rock resumes a regularity of appearance. It has cracked in parallel divisions that angle upward to the left, assuming an even reddish hue. The rock has sheared away between some of these divisions to expose vertical faces up to twenty feet in height, rising cleanly from narrow angling ledges. The slope of the land begins to rise sharply from the waterline into a very large hill, with faces growing to greater heights on angles up the incline.

The narrow ledges between the faces descend steeply in a sloping shelf and steplike pattern. Pine trees are growing on them out of solid rock. One tree has lost its hold and fallen outward, but then taken root again. Other pines have adapted to their meager sustenance with a stunted, dwarfed appearance. A few have outgrown their food supply and died. Still others are quite large, thriving from cracks in solid granite.

The hill has now become a series of cliffs in tiers, with ledges running up on inclines. It rises nearly vertically from the water the first couple of hundred feet, then continues to rise steeply another couple of hundred feet before it rounds off into a large knob, elongated parallel with the shore. The hill plunges into three hundred feet of water.

Momentous happenings on a grand scale must have resulted in this rugged terrain that has survived for hundreds of millions of years. The trials these tortured hills have endured are unrecountable. Erosion, quakes, and crumbling through the ages have tumbled lofty peaks, mutilating stately forms. Then great walls of ice came crunching through, pulverizing pieces, scouring away debris, and spreading it in granulated layers hundreds of miles to the south. Again and again the ice receded, only to come crushing down once more, a mile or two deep, with great teeth munching off the tattered tops and raking out the valleys. Robbed of noble stature and regal bearing, these tormented hills huddle in the memory of the grandeur of their youth.

The ice has all receded now. In repentance it has melted into valleys, like a myriad of tear drops that trickle in never ending murmurs to the sea. Oppressive giant walls of ice have capitulated in remorse, to wash and soothe inflicted wounds and mend pained memories. This water wonderland is born from the sorrow of what these martyred hills have suffered long ago.

In compassion, great forests have sprouted forth from barren cracks and meager beds of bankrupt soil. They offer consolation to these hunched monuments to the past, clothing their disfigured forms beneath a cloak of cover, that they might rest in slumber. What a tale these hills could tell! Only fragments of the story can be pieced together from anguished words written in scattered glimpses of their faces. Stuttered sentences of broken language cry out at the heinous improprieties of their misfortune. But even here, colonies of lichen grow in soft, gray-muted tones of pale greens and blues to veil the starkness of distress from exposure to the world. Only at the surface of the water do windswept tears continue to erode at wretched memories of the past. Here the words are read the clearest, yet sometimes still, these hills can rouse to utter audibly a word or two. They have not spoken harshly now for many years, but when they do, all creatures shudder as they listen, such is the awesome tremor in their voice.

These persecuted craggy knobs and ridges are elder members of an honored family of pioneers. Their origins reach back to the early days of continents, when the planet's primal crust was busy making stages in order to enact an animated drama. Precambrian shields are from a family of protocontinents, with members scattered with their offspring now, in continents throughout the world. But what about the building of the modern continents? Has there been a method and an order to it, or have they just happened along in a random chain of events?

Watson's curiosity has been peaked as well; he has chased after his good friend Holmes with profuse apologies.

"Please forgive my irritating remarks, Holmes. You simply must believe that I have profound interest in the case, and the highest admiration for the fine detective work that you have done. What you have to say is of great relevance to the case. There are many questions that I wish you would clarify for me."

Holmes continues walking for a few moments, reflecting on their long association—on the support and assistance that Watson has given on so many cases over the years. Then he stops. Turning to look directly

at Watson, he says politely, "Very well, my good fellow, what is it that's on your mind?"

"It's all this business about the continents. I've heard rumors about strange tectonic movements—continents floating around like rubber rafts—but it hardly sounds credible to me."

"I found it rather difficult to get accustomed to the ideas also, Watson, but the evidence is very convincing. From the earliest geological record—the Precambrian shields in various parts of the world—the most ancient rocks have been dated at nearly four billion years old. In contrast, the oldest rocks in the ocean floor are about two hundred million years old. This strongly suggests that the earth's crust under the oceans is continually being consumed and renewed from the mantle beneath."

"You mean that the solid crust supporting the oceans is continually being spewed up and formed from the mantle in places, and devoured back into the mantle in other places? How can such a thing occur?"

"Be patient, Watson, I'm coming to that. These activities occur at junctions known as tectonic boundaries, that often coincide with major earthquake and volcanic activity. They divide the earth's crust into a number of major areas known as plates. Since the continental plates are less dense and much thicker than the crust under the oceans, they tend to ride above an ocean plate when the two are thrust together. The ocean plate is turned back into the mantle of the earth, where it tends to melt under enormous pressure, producing volcanic activity. New ocean crust is pushed up at ridges that run through the oceans of the world, like spines of parallel mountain ranges with a trough between them. For instance, there is a spine ridge that runs through the center of the Atlantic ocean, from the Arctic to the Antarctic, where it shifts around the southern end of Africa. At these ridges, magma is forced up from the mantle of the earth beneath, and drawn out into new crust as the ocean floor spreads. Although these movements are very slow, at most only a few inches a year, they have been sufficient to replace the entire oceanic crust in about two hundred million years. In contrast, the continents have drifted and changed through a variety of processes."

"But if the mantle is solid, how are such movements possible?" puzzles Watson.

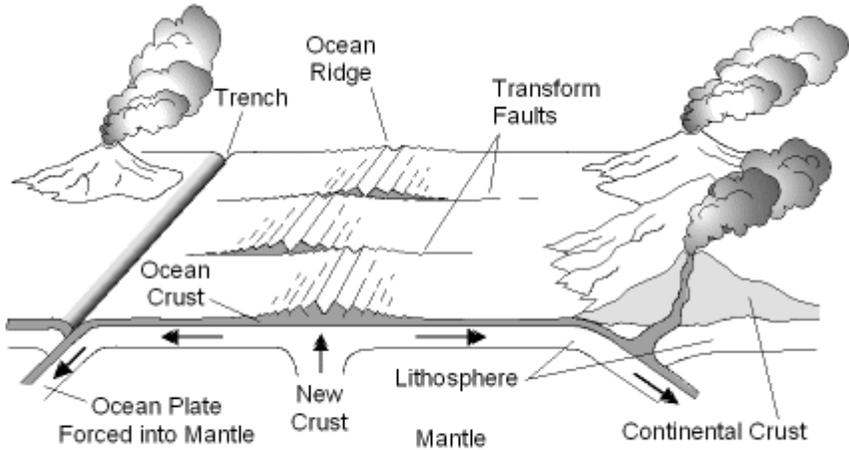


Figure 21

“Well, it seems that the top layer of the mantle, known as the lithosphere, is quite solid. It supports the crust and moves with it. Beneath the lithosphere, however, the mantle can assume a plastic constituency owing to high temperature and pressure. It can permit these very slow, massive types of movement. There are probably even patterns of thermal convection through it, accounting for the forces that move the plates in relation to one another. Where the ocean crust is forced under a continental plate, generally there is a trench, such as the one that extends in an arch from the Aleutian Islands in Alaska down the west side of the Pacific Ocean to Indonesia. More complex processes at tectonic boundaries, such as mobile belts, have resulted in the mountain building along the west side of the Americas. The Himalaya Mountains and the Tibetan plateau are the result of a collision between the continental plates of India and Asia.”

“But how do the movements of the ocean crust adjust to the complex shape and movements of the continents?” interrupts Watson. “Surely the ocean floor is not made of rubber.”

Holmes is not amused, but he continues. “Indeed not, my dear fellow. Movements of the continents are accommodated through what are called transform faults. The crust of the ocean floor shears past itself in lines that radiate laterally out from the spine ridges. A simplified diagram will help to clarify the general pattern.” (See Figure 21.)

“Fascinating, Holmes! Your analysis is beginning to sound quite plausible,” commends Watson. “The crust is like a system of conveyor

belts that shift the continents around from place to place over very long periods of time. Explain more about the movements of the continents.”

Holmes pauses for a couple of minutes to refill his pipe. Then he continues. “The geological record indicates that the early protocontinents got started about four billion years ago, the first beginnings of organic life coming along shortly thereafter. Conditions were very different then; volcanic activity expelled huge amounts of carbon dioxide and water vapor into the atmosphere. In fact much of the water in the oceans could be of volcanic origin. Things must have been in quite a dreadful state, with asteroid impacts still common, even though the accretion process was essentially complete. As the earth’s crust cooled, organic life got a foothold and a more orderly pattern began to consolidate. Tectonic activity became established—associated with the protocontinents—but a very different configuration of activity existed than the one we find today. Unfortunately, the primary crust of the ocean floor has long since been gobbled up and replaced, so we are left with only meager evidence of early events in the Precambrian shields of the world.”

“That is unfortunate,” agrees Watson. “I guess it means that you aren’t able to tell much about the early movement of the continents.”

“Not at all, Watson. There is strong evidence that as the protocontinents evolved and grew, they moved together into a confluence with one another. They all came together into one massive supercontinent called Pangea, a little over two hundred million years ago. By this time organic life had also matured enormously. The bony fishes and amphibians had been around for quite some time. Reptiles were coming into their heyday, many early ones having mammal-like features. The earliest mammals had made a modest appearance, destined to be confined to small rodent-like creatures that didn’t evolve significantly throughout the reptilian period. About two hundred million years ago new tectonic boundaries formed; Pangea began to break up, dispersing into the continental pattern that we find today. Australia broke away from Antarctica only sixty-five million years ago.”

“You make it sound as though the continents have grown and bounced together, only to move apart again as organic life trotted along into ever more evolved forms. One supercontinent would also provide a distribution of species over all parts of the world, a sort of even mix, from which evolution could branch out again as the modern continents separated. In heaven’s name, Holmes, how have you been able to deduce all of these earth shaking events?”

“It is all quite elementary, my dear Watson. You see, it is possible to date the formation of the earth’s crust through trace radioactive elements. It is also possible to determine the initial orientation of the crust at a given location, in relation to the earth’s magnetic field, because trace magnetic minerals become permanently magnetized in a north-south direction at the time the crust solidifies. With knowledge of age and orientation gathered from points all over the world, together with other evidence, it is possible to gradually piece the story together. For instance, portions of the continental crust from Africa and America can be accurately matched, indicating they were once together in the supercontinent Pangea. Transform faults also give many direct clues about movements since Pangea. Furthermore, the earth reverses its magnetic polarity from time to time. This has helped a great deal to assimilate the evidence.”

“I’m flabbergasted,” gasps Watson. “You mean the earth can just reverse its magnetic polarity? Change the North Pole to the South Pole, and vice versa? Why, that must be a cataclysmic event!”

“No need to get excited, Watson. It’s no big deal. It has happened hundreds of times throughout geological history, although I admit that it is difficult to understand *why* it happens. As a matter of fact the sun reverses magnetic polarity about every eleven years.”

“You mean that massive giant, the sun, does it too? And so quickly? That must have some profound significance!”

“You really are a very excitable chap, Watson, and you keep getting carried away. You must learn to get hold of yourself,” says Holmes, puffing a little more rapidly than usual on his pipe.

“I suppose you are right. I’ll try to be a little more objective. Perhaps you could expound some on the development of the continents. Continental growth seems to have had a relationship to the evolution of organic life. Is that so, Holmes?”

“In a manner of speaking, I guess you could say that. You see the huge amount of carbon dioxide in the early atmosphere has been disposed of by two main processes. About three-quarters of it has been dissolved in sea water and deposited as calcium carbonate in the extensive limestone and dolomite formations of the earth—a process assisted by life in the sea. Today nearly all calcium carbonate is precipitated in the tiny invertebrate skeletons of ocean plankton. The remaining quarter of the atmospheric carbon dioxide has been transformed by plants and animals into sedimentary deposits in the coal beds, oil-bearing structures, shale formations, and soil. Nowadays, concentrations of carbon dioxide

are very small. Plants and invertebrate animals have played a major role in effecting this transformation.”

“Then plants and the invertebrates have participated directly in the building of continents. Is that correct, Holmes?”

“In a manner of speaking, I suppose so, Watson, but other factors—crustal movements, erosion, ocean levels, and so on, come into play. For instance, carbon dioxide levels can affect the average temperature—only a few degrees change can alter the size of polar caps substantially, which can change ocean levels dramatically, thus altering the pressure distribution on the earth’s crust, which affects plate movements.”

“But aren’t carbon dioxide levels regulated by organic life?”

“Yes, but also by volcanic activity, although organic life has gained the upper hand. For example, man’s enormous use of fossil fuels is increasing carbon dioxide levels.”

“Then are you answering my question in the affirmative?” persists Watson.

“Well, I suppose so, in a manner of speaking, but there are other things—for instance patterns of thermal convection in the mantle influence crustal movements.”

“But aren’t these in turn influenced by the magnetosphere, which is influenced by the ionosphere, which is the result of changes in the chemistry of the atmosphere brought about mainly by plants?”

“In a manner of speaking, I suppose so, but solar radiation is involved as well,” replies Holmes with a forced air of confidence, while puffing much more quickly on his pipe.

“But hasn’t organic life been an essential instrument behind the regulation of solar radiation as well?” insists Watson, excitement mounting in his voice.

“In a manner of speaking, yes. But so what? You are going in circles and beginning to make me feel like a prime suspect in the case,” retorts Holmes, with his annoyance beginning to show again.

“Perhaps we are all prime suspects in the case,” replies Watson, with a wild and fiendish glint in his eyes as the words begin to spill out rapidly. “At every turn since its first appearance on the planet, organic life has been busy working out a balance between cosmic energies and the behavior of the planet. There are not just two onions to the planet, but three. The third onion is a biospheric onion with layers of organic life from plants and invertebrates to vertebrates and man. The biospheric onion works out a balance with the material and electromagnetic onions, and it...”

Watson is fired up and about to continue, but Holmes cuts him off.

"I know what you're thinking, but don't say it!" he bellows.

The two men stand looking at each other sullenly for what seems an eternity. A new perspective to the case has gripped Watson's mind. He wants desperately to explore it. At the same time, he has a great respect for his longtime companion and is repulsed by the thought of jeopardizing their friendship. Finally, discretion prevails; he perks up with a cheerful suggestion.

"Would you fancy a pint of bitter at the local pub, Holmes?"

Holmes is a bit startled by the sudden change of mood, but after a moments reflection, he is taken by the idea. "Yes, I believe I would, Watson. That sounds like a brilliant proposal."

The two men agree on a familiar haunt. As they walk down the street, the conversation changes to the dismal weather.

Science after all has been zealously pursuing its mode of inquiry for more than three centuries. It isn't likely to drastically alter its attitudes on the spur of the moment. We have all acquired a tremendous vested interest in science and its technological implications. We depend on science every time we brush our teeth or read a newspaper, yet we cannot escape the need for a more meaningful interpretation of the evidence. We are more than an accidental corpse of molecules in a cosmic bakeshop. Like the earth, we are onion beings with three different kinds of layers that seek a mutual balance. Moreover, we have begun to manage the animated spirit of our planet—this dear earth is as much our home as our individual bodies are; we can't forever treat it as a mindless accident of good fortune and expect impunity. (See Figure 10 and Appendix 2-3.)

When fishing for a new perspective, thoughts often come in schools, some with little ones, some with large. They are seldom found in old familiar fishing holes—we must change our tactics and do some trolling. The waters of our understanding must be explored with different tackle and new techniques.

The boat is turned out around a jagged point as the shoreline strays outward from the steep rise of the hill. Another series of low cliffs follows, cracked and eroded deeply, some cantilevered over the surface of the water, with big chunks missing from their faces. These also begin to rise into another hill, but the contour of the land takes them inland from the shore. Next, an avalanche of gravel and large boulders gives way to a sandy beach, where the shoreline curves out to a point at the big narrows.

If you have a good arm you can throw a stone across the big narrows. There is usually very good fishing here—always a current from the flow of water southward, which keeps the channel clear. The water is about forty feet deep in the center. Schools of fish moving up or down the lake must pass through the narrows; it is worth some special attention. The motor is shut off, the trolling line reeled in. There is already a jig on the other pole. Casting is begun as the boat is carried along with the current toward the channel. There is time for ten or fifteen casts as the boat drifts slowly through the narrows, but there isn't any action. Even the best of fishing holes is disappointing at times.

A couple miles south, the lake widens into a maze of islands, with arms at the south end reaching out east and west for two or three miles in each direction. The prospects for pickerel are better there. The boat is headed down toward a narrow channel on the east side of the lake.

The sky is almost cloudless. The spendthrift sun is squandering its energy, with indifference for its reserves. Light leaps in all directions into boundless sky, toying here and there with distant relatives of form, spanning space and time. Our lumbering planet scavenges through the radiating wealth discarded like small change by an eccentric billionaire. It circles and filters through the emanating streams, transforming some, selecting some, rejecting some, according to its needs. An electromagnetic apparatus has been fashioned to exercise discretion. Huge haloed layers of energy enshroud the earth in a meditating womb, reflecting a maternal vigilance for a biospheric fetus. Deep within her bowels, our Mother Earth is churning with concern. Turbulent fluid spirits are disciplined by a brain of interacting ions gyrating through the sky. Seething, restless currents are shaping her behavior to ensure a place and opportunity for her child.

Shifting breasts have heaved and spread to nurture a suckling infant that has been weaned in stages toward maturity. Vital, sensitive, conscious, and creative spirits are entertained in a resonating biospheric song. Each intermingling elemental mind refluxes energies, dancing through the void to seek harmonic balance with the whole. Discordances are introduced as the drama of exploring experience in tiers unfolds, but gradually they are singled out and tailored to the master orchestration. Gradually, the maturing adolescent learns its part and place. The lessons come through resonating regulations ringing through a planetary bosom.

Our whirling lady is a living being dancing round a living solar cell. She has a brain, a body, and a spirit that have mutually evolved, yet she had a primal spirit before the biosphere was born. In her youth she was a

wild unruly wench, lost in constant stormy moods. Lacking a refinement of discretion, she was given to volcanic eruptions of behavior and flashing lightning thoughts, as if she knew it all. Impetuous and impressionable, she was easily influenced by the tide, reveling with her dancing partners, a satellite and sun. Rhythm was her regularity. Maternal instincts came with pregnant seas, then life took root on land while her atmosphere and moods were tamed, steadily transforming into a womanly concern. Our gracious lady has blossomed into beauty. She still dances to a tidal rhythm, but she has learned to sing a melody of life.

She dances through a solar wind, part of her magnetic mental apparatus blowing out like skirts into the breeze. The outer layers of petticoats perceptually transpose on every revolution, opening to trail off into the wonders of the planetary disc. She relates to her environment to keep from getting dizzy. Her twirling tilted head and her magnetic personality maintain an equilibrium. Her axis wobbles through the epochs to modulate her moods and the currents in her core, while magnetic polar transpositions occasionally record the ages of developments. Her whole molecular bulk is itself a syncopated clock pulsating with the galaxy as it tiptoes to and fro into eternal emptiness.

The timing of the complex melding of music into mind spans vast extremes. Our seasoned space ship earth has memories with referents recorded in her crust, reaching back four billion years. Within the grasp of recall she has wandered with her beaming escort around the galaxy twenty times or so, yet spanning space and time on such a scale is not the greatest of her achievements. Along the way she has reared an offspring that has been fathered at intervals by a Universal Being.

Recall from the void is effected through discretion delegated in many tiers—from planets and plants, to bugs and men. Each has a capacity for recall according to concerns of circumstance, but each major stage of delegation requires a gathering from throughout the void by a supremely intelligent being that transcends all limitations of space and time. Our Cosmic Father is such a being. The roots of his mentation remain unborn in a center that spans the vast extremities of his energy rainbow. We share the roots of his mentation with the most distant suns and galaxies—the span of all lifetimes is determined by the complements of his extremes. He gathers his spirit from the void of all experience as he wishes, for his discretionary access knows no limitations. Then he recommits his spirit as he deems appropriate. He is endlessly regenerated through a living spiritual commitment enacted through the world of form, spanning all space and time through tiers of delegation.

In the evolution of the biosphere, each major stage of delegation has been entrusted like a newborn child to the care of Mother Earth. She has nurtured it, modifying its nature through her biospheric song, teaching it to sing in harmony. Again and again the energies of the void have been gathered and recommitted to her care. She has suffered, as every parent suffers, learning through experience to adjust to her family's needs.

Most recently, however, she has reared a problem child with a strange perceptual handicap: the ability to speak. His name is man. Two halves of man's brain have been delegated special functions. The half that organizes speech is naturally concerned with social endeavors; through cultural developments, man has learned to provide quite well for his material needs. The other half, concerned with intuitive comprehension, sometimes catches glimpses of his cosmic spiritual nature, and his vagrant cosmic father. As if two sides to his brain were not enough, man's autonomic nervous system, which refluxes emotive energies into his mentation, is anchored to his evolutionary origins in the biosphere. Mother Earth had great hopes that man would one day help her manage her affairs, but through the use of words, man has learned to reflect on experience in abstraction. He sees in his death the transience of life; at the same time he is taunted by a timeless cosmic intuition. The creative gift of language has thus presented man with a spiritual dilemma, bringing much consternation and disruption to the drama.

Man's cosmic father is something of a philanderer, but though he entertains many wives in his massive harem he is responsible and faithful to them all. He keeps a watchful eye; when help is needed, he intervenes to assist in family matters. Man's education has been of prime concern—long ago both parents agreed upon a curriculum. The two hemispheres to man's mentation have developed in mutual polar distinction from his emotional development in Africa. They have each received independent attention through the divergent streams of East and West, as man has explored the extremities of the world and learned his limitations. All the while, our Mother Earth has tried to complement the divergence of attention through biospheric resonance, while our cosmic father has interjected considerable direction.

The lessons have frequently been misconstrued and very painful, being compounded by a twist to the dilemma that has ripened with the play. The language of technology is flatly inconsistent with the dialects of spiritual concerns. The divergent lessons appear to be in conflict, yet man cannot ignore them, and cannot shake loose his ancestral emotional

roots. Resonance requires a reconciliation, as the divergent streams of education move full circle to converge on one another.

Learning is not confined to individual concerns. It embraces the evolutionary destiny of the human species—our “wholly” spirit. We don’t create the master plot or write the master script in such a drama, but we are obliged to be performers in the play. Obligated to interpret and contribute, we find a part and place according to how we fish for understanding. Expansive pressures, confined by global limitations, move us inexorably toward a climax, yet we cannot appreciate the details of the drama until they are enacted. We are blind puppets of ossified traditions that are discordant with the master orchestration. We thrash aimlessly in currents of our own creation toward a cataclysm.

The channel on the east side of the lake is only a few yards wide in places. The motor is slowed down to navigate carefully through the shallow water that continues for some distance. Once out beyond a couple of small islands the water deepens again toward a long jagged point at the entrance to the arm of the lake that reaches eastward.

The north shoreline of the arm looks best for trolling. As the boat slows down, the lure is fed out about seventy or eighty feet. Taking into account the speed of the boat, the weight of the sinker, and the drag of the line through the water, this gets the lure down about twenty feet deep. The depth of the water is then judged by the slope of the land as it enters the water. The distance from shore is then adjusted accordingly.

There is a smooth rock ledge a few feet high at the water’s edge. It supports a thick grove of cedars with boughs reaching out over the ledge, in a effort to conceal it. This is a characteristic trait of cedars—both sociable and secretive. They often cluster into groups, their foliage growing together into a solid mat that conceals their trunks and limbs from view. Their tops stick up like pointed heads protruding from a common body. It is an attractive style they have, both reserved and friendly.

Approaching ahead is a skinny island, about a hundred yards from shore. The boat is angled out to make a pass along its northern side. The water is not quite as deep between the island and shore—fifteen or twenty feet of line is reeled in. The island is an extension of a low ridge from a point a couple of hundred feet beyond. Off the far end of the island the bottom is visible; there is only ten or twelve feet of water. As the submerged portion of the ridge is crossed, the motor is speeded up a notch to avoid getting snagged. As the lure follows across the ledge there is a heavy strike. The motor is shifted into neutral—the fish is taking line. It

is fighting like a pickerel, a nice one. After a few minutes it is close enough to net. Several other nice ones can be seen following behind. A school is feeding along the underwater ridge.

The pickerel, a couple of feet long, about five pounds, is unhooked and released. The boat is positioned on the outside edge of the ridge, a little over a hundred feet from the end of the island. The anchor is lowered and snubbed in place near the front of the boat with only a few feet of slack rope. There is not enough breeze to drag it, and the position of the boat will not be inclined to shift. Poles are changed, and the jig is cast over the ridge toward the point of the island. The water is even shallower in that direction. Another nice strike brings another nice pickerel about as large. The next cast brings another and the next another.

There is a pickerel for almost every cast for a while, then a very heavy strike. This one takes a long run before it stops, fighting hard. It runs again, heading for the deeper water off the ridge, then swings from one direction to the other. It is too soon to work one this size close to the boat, but it is coming in anyway, conserving energy. It is dragging in slowly like a northern, but hugging the bottom. It's a big pickerel. When it sees the boat it dives under it like a torpedo. The tip of the pole is quickly plunged into the water—about three feet—in order to swing the line under the motor at the rear end of the boat, playing the fish on the other side. Almost lost it on that maneuver! It swims forty or fifty feet away again, circling around the point of the boat. A few steps are taken down to the front of the boat as the big pickerel moves back into deeper water, fighting hard. It keeps slanting back and forth, trying desperately to tear loose. As it begins to tire, the tension adjustment is eased up a bit to keep it away from the boat. It continues to make sporadic runs, staying deep. Gradually, its strength is waning. On the way back to the rear of the boat the net is placed nearby to have it ready. Now it is coming up, very weak. It is approaching the boat from the rear. The tension is tightened up again—the direction is ideal for a net attempt. It's in the net on the first try—a big one. It measures a little over thirty-one inches, about ten pounds. It is well hooked but not injured; soon it is back in the water and on its way again.

Casting is continued. The fish are still hitting hard and fast. In a couple of hours, a couple dozen pickerel are caught, most of them five or six pounds. Fortunately, a couple are smaller—one about eighteen inches long is kept for supper.

Trolling paid off well today, although only a small one is needed for a meal. The rest are like ideas clearly grasped then released again to

range through the waters of our understanding. We can never catch or keep them all, yet our discretionary access matures with each experience.

Although the fish are still biting it is ten miles back to camp. Time to get started. It has been a rare delight to find a school of large ones feeding in shallow water on a sunny summer afternoon. One may try this spot again a hundred times and have very little luck.

# Chapter 13

## An Indian Dance

The morning is quiet, not serene, just an earthy sort of quiet. The wind will get up after a while—often the breeze doesn't feel like doing much until the afternoon. Across the channel, the vein of white quartz is reflecting in the water, as if an unsteady hand is trying to duplicate its image in the surface, patiently erasing unsuccessful tries.

Six loons glide silently into view around the point from the north, moving with an easiness that's magic. There is no working movement to their bodies to reveal the paddling of their feet. The power of their unaided will appears sufficient to propel them through the water. There is an aura about them, as if they were visitors from another planet.

Loons chose one mate for life, never congregating into flocks, although they sometimes get together with their neighbors. They like to go for occasional strolls together; a cruise through the channel is often on their route. They know that a human being is living here and entertain a passing curiosity. They are very discreet about their observations, as they are an exceptionally refined and independent bird. They don't like intruders and wouldn't think of intruding themselves. You won't find these birds crowding into parks in cities, as ducks and geese so often do. They won't accept a human diet and would never abandon their migratory habits. They migrate to the oceans, but their love is the lakes throughout the wilderness of the shield. They never overcrowd them—small lakes may only have a lonely pair. They stay until freeze-up in the fall, returning again as soon as spring break-up lets them land. Each year they raise a brood of only one or two.

Through time, these birds have learned to accept and trust the stranger living on the island. They swim by only fifty feet away, volunteering a couple of quiet hoots of acknowledgment as they pass. Now six more loons come cruising around the point from the south. More soft hoots are exchanged as the two groups slowly coast together. As they are about to merge, a wild vibrato call is uttered, shattering the silence in a shock that spreads for miles. Another loon joins in, then all revel in a chorus of

fervid celebration, rejoicing in reunion through their ritual of song. Two more loons pop up from nowhere to spark another giddy round of greeting. Once in the mood, they can't seem to stop the music. It gushes unrestrained in waves of runs and trills that keep climbing to climax after climax. As they mingle into a single group their vocal volleys are paced and timed to proliferate a modulated medley. They pause in turn for breath to join again in chorus, while as a group they slowly turn gliding back toward the campsite. There is no leader, no loon that strives to distinguish itself apart. Responding in spontaneity as they sing, they seem to sense the awe-inspired admirer sitting on the island. What better thing to do than perform a special show that I might better know the music of their spirit?

They approach like a group of carolers dressed up in Sunday best, with freshly laundered shirts and collars and ornamented coats. About fifty feet in front, they stop. All turn to face their honored audience of one. Beaks are quivering with the vibrato of their voices immersed in ecstasy of song that hastens on and on in a command performance as for a privileged king. Verse after verse ensues, with every loon attentive and enthused, rejoicing at the marvels of rejoicing. The infatuation of the theme is transfiguring the scene into a mystic medium of enraptured song. Calls chasing after calls careen up through the chorus into crescendos that follow with crescendos. Enchantment swells into exhilaration to saturate the senses with enthralling wonder at the virtuoso spirit flooding through a mind transformed to music. Ancestral echoes are answering these birds from deep within this human being's breast.

These charismatic creatures have an uncanny sense of showmanship. Very casually they turn together to add some magic movements to the music. They circle slowly out toward the center of the channel, moving as a single bird but with a dozen voices. Very graciously they execute some turns and loops, in a flawless flow, as if they had rehearsed it all a thousand times before. Their fluid movements sweep round in a circle to return the lyrical melisma for a curtain call in front. More vibrant verses of the opera are offered before they turn again to once more wend their way through a glide of magic grace back to the center of the channel.

Suddenly the music stops, and so do they. As the echoes fade, a deafening quiet rebounds to fill the vacuum. The silence is suspenseful. They sense it too. Still in a close-knit group a couple yards across, they begin to mull around, as if crowded in the lobby at intermission time. Then all at once, without anything to trigger the event, they burst away from the center of the group like maniacs. The water churns to a froth as

they all fan out like fragments of shrapnel from an exploding shell. They slam their wings ferociously into the water as they swim and shriek out calls, as if something terrible has gone wrong. Most of them don't go far, about twenty feet. Then they stop quickly and poke their heads under the water to look around. They all seem to have gone crazy at once. They bring their heads up at random, look around, let out a giddy laugh, then stick their heads back under to look around again.

One especially affected loon doesn't stop with the others after the initial burst, but keeps on swimming like a mad fool trying to kill the water with its wings. It swims away from the group a hundred feet or more before it stops and pokes its head under the water like the others. The next instant it turns and flails the water back through the center of the group again, then stops again to hide its head look up and laugh. It makes another long, feverish rush back and forth, then rejoins the group in their idiotic game of look-and-tell. They look around underwater, then look around on top, then make a mockery of the difference between the two with their giddy calls.

Gradually they close the circle once more, regrouping as they cruise toward the north. Continuing with the game, they start to take turns diving. They just go under and pop up at random within the group as the others play look-and-tell. The whole group goes down, then comes up again together and continues with the game. They keep up these antics like a group of clowning kids until finally they disappear from view around the point.

A group of loons has often paused before to serenade in passing, yet this has been an unusual performance, spontaneously conceived, sustained and varied. They delight in teasing with their common spirit, each creatively exploring its relationship to all, in song and dance and play. Despite their talent for social harmony, these majestic birds are not caught up in flock behavior. They don't perpetuate their gatherings into closed and automated social patterns. They exercise discretion with an eye and feel for what is fitting to the circumstance. They each regulate their responses in perspective, translating the moods of nature into music. The majority of their time is shared quietly with their mates.

The sun is playing peek-a-boo with cotton clouds. Shadow phantoms are creeping in scattered patches across the landscape. Denied a surface of their own, they grope and feel their way over every hill and treetop in their path, each shadow phantom exploring a lane in a procession directed by the breeze. Sometimes the lanes overlap, and if we

watch the parade for long enough we may find that the surface of the landscape has been thoroughly explored.

Unlike the language of the loon, our words and signs and symbols are shadow phantoms—they must borrow surfaces from the landscape of experience. They are more than social servants; we use them to explore. But should we succeed in mapping out the whole terrain, what will we accomplish? Can we understand it from a borrowed externalized perspective? What about the idea clouds that shape the shadows? What about the discretionary breeze that aligns them with specific patches of the landscape? What about the cosmic sun that casts all the shadows? What about the complexities of the landscape itself that underlie its surface? We may be familiar with the phantom mapping of the whole terrain yet not appreciate the projection of a single shadow, or the splendor of a cloudless day.

It is time to do some fishing. The embers in the campfire are doused with a pail of water, the tent is closed up, and the gear is taken down to the canoe. A trolling lure is dragged along behind as the canoe is paddled slowly north across the bay, then northeast along the granite shore. The rock slopes steeply into the gaping mouth of water, the parched weathered lips quenched by lapping wavelets. The canoe slides silently along toward the narrow inlet at the end of the bay.

The trolling line is reeled in as shallow water approaches. A pike lure is selected for the casting rod. The inlet is about fifty feet wide with a slight current. The character of the bays beyond is quite different. They are ringed with dense beds of lily pads that extend out fifteen or twenty feet from shore, teeming with minnows and small fish. Northern pike often scout around the edges of bays like these. The canoe is kept a moderate casting distance from the edge of the weeds, and paddled along at intervals. A stretch of weed bed is cast thoroughly from one position, then the canoe is paddled along to the next stretch, and so on along the shore.

A shadow phantom passes as the sun peeks out from behind a fluffy cloud. The trailing edge of shadow fingers through the trees, counting off their numbers as it manipulates its way along the shoreline. The added warmth is welcome, since the shade is cool today. The sun and planets have still not been thoroughly investigated by science, much less understood. This of course doesn't dismay the undaunted Sherlock Holmes. He has supreme confidence in his methodology and theories about how all the evidence fits together. Watson remains

quite inquisitive, especially since the evidence also pertains to the intermittent insights that he gets into a new perspective. The other evening at the pub, the two men solidly reconfirmed their friendship. Watson got a little tipsy, and Holmes trounced him consistently at darts. Bolstered by his fine performance, Holmes is again responding to Watson's queries, expounding his theories about the mystery of the solar system.

"You see, my dear Watson, the four inner planets, Mercury, Venus, Earth, and Mars, are called terrestrial planets because they are similar in their basic structure to Earth. Not only are they similar in size and density, but they all have a distinctive rocky crust with comparatively little atmosphere. In contrast, the four outer planets—Jupiter, Saturn, Uranus, and Neptune—are very much larger but less dense, with extremely thick atmospheres. They are called Jovian planets because they are similar to Jupiter in their basic structure. Pluto is a maverick, since it is smaller than a terrestrial planet, yet has a density similar to the Jovian planets."

"Strange that there should be such a sharp distinction between two different types of planets. They are even separated by an asteroid belt, a continuous circle of debris like a stone fence between them."

"You can scarcely think of it as a stone fence, Watson. The asteroid belt is a broad band of widely scattered planetisimals and smaller boulders and bodies down to the size of dust. Ceres is the largest with a diameter of about a thousand kilometers, there being more than a thousand asteroids more than thirty kilometers in diameter. Smaller ones are increasingly numerous, yet they have presented no serious obstacle to space probes passing through the belt. A number of factors, such as the disturbing effect of Jupiter, have probably prevented the asteroids from condensing into a planet. The balance of factors involved can also account for the sharp transition between the terrestrial planets and the Jovian planets. After all the innermost Jovian planet Jupiter, is nearly three times as far from the sun as the outermost terrestrial planet Mars."

"Whatever the apparent reasons for the belt, it is still an outstanding structural feature," remarks Watson. "But of course, the planets within each group are not identical. Can you describe some of the prominent differences between the terrestrial planets?"

Holmes pauses to reflect for a moment before continuing. "We have learned quite a lot from the space probes and the major contrasts can be summed up briefly. Mercury, as you know, is closest to the sun, and it has no moon. In fact, the planet resembles our own moon in many of its surface features. The plane of its quite elliptical orbit is inclined seven degrees to the ecliptic plane, which is about the same as the inclination of

the sun's equator. We used to think that tidal influences kept the same face of both Mercury and Venus toward the sun, just as our moon does toward the earth, but for some reason it doesn't work that way. Mercury rotates once on its axis in almost exactly two-thirds of a Mercury year. This means that every year the planet exposes opposite faces toward the sun. A year is precisely half a day on Mercury. Since the planet's axis of rotation is perpendicular to its orbital plane, there are no seasonal variations apart from very hot days and very cold nights. Mercury has only a slight trace of atmosphere, with a magnetic field sufficiently strong to produce a shock front with the solar wind, and a magnetosphere. The general pattern of the magnetosphere is similar to that of Earth, but it is not strong enough to produce Van Allen belts."

"It sounds as if Mercury is half way between a sun satellite and an independent planet. Is Venus similar to the moon as well?"

"In only one respect, Watson. It has little or no general magnetic field. In the case of our moon, the particles of the solar wind impact directly on the moon's surface, and there is a long cone shaped plasma void on the downwind side of the moon. Venus, on the other hand, is perpetually enshrouded in dense clouds of carbon dioxide, to such an extent that its atmospheric pressure is about ninety times that of Earth. The solar wind is prevented from reaching the planet, through interaction with an electrically conductive ionosphere four hundred kilometers above the planet's surface. This induces magnetic eddy currents, and a well-developed bow shock front is produced; thus the electromagnetic environment of Venus is intermediate between those of the moon and Earth. There is a wind on Venus that always blows in the direction of the planet's rotation, encircling the entire globe like a dog chasing its tail. At the cloud tops it reaches velocities of more than two hundred miles per hour. The slow rotation of Venus is retrograde. The sun rises in the west and sets in the east every one hundred and seventeen earth days. An interesting feature is that Venus exposes the same face to Earth at every inferior conjunction, when it is directly between Earth and the sun. Venus is nearly as large as Earth. The surface topography shows curious anomalies and the planet may still be geologically active. Only about one percent of the sun's radiation can penetrate the dense clouds, but they retain the heat. The surface is even hotter than Mercury in daytime. Lead would melt on the surface of Venus. There are also continual intense discharges of lightning on the planet. It is a regular planetary hell."

"I sure don't want to visit Venus," says Watson with a shudder. "Is Mars any better?"

“A little, perhaps. However, it is very cold. As on Venus, the atmosphere is mostly carbon dioxide, but unlike Venus, it is very thin. Atmospheric pressure on Mars is only about 1/150 of what it is on Earth, but it is sufficient to create dust storms that sometimes engulf the entire planet. Mars has some unusually prominent surface features. The densely cratered southern hemisphere stands up to three kilometers higher than the sparsely cratered northern hemisphere. A major ridge amid the lowlands is eight thousand kilometers wide, rising ten kilometers above the surrounding terrain. Called the Tharsis region, it contains four enormous volcanoes. The largest one is twenty-five kilometers high, about twice as high as Mount Everest. A huge equatorial canyon system, extending radially away from Tharsis for four thousand kilometers, is up to four times the depth of the Grand Canyon. These features indicate an active volcanic and tectonic history, displaying a vertical character as compared with the horizontal variety on Earth. There is widespread evidence of water erosion in the past, particularly in the channels that indicate flows from the southern highlands to the northern plains. There is no longer liquid water on the planet but there is a permanent polar ice-cap. Both poles also become topped with dry-ice\* caps that come and go with the seasons. Mars is larger than Mercury but much smaller than Venus. It has two tiny moons, roughly twelve and twenty-two kilometers in diameter. As with Venus, the solar wind interacts directly with the ionosphere, producing a weak shock front that trails off down wind. A Martian day is similar to an Earth day, but the year is nearly twice as long. It is a strange land with magnetic iron soil, peach-colored skies, and purple sunsets.”

“It sounds like an exotic place to visit, but I wouldn’t want to live there. Our Earth is certainly the most fortunate of the lot,” proclaims Watson like a typical tourist. Then he ponders, assuming a very professional tone of voice as he begins to comment on Holmes’s brief account. “The terrestrial planets exhibit definite relationships that seem to be of fundamental significance to the ordered behavior of them all. Mercury, for instance, exposes opposite faces to the sun on each revolution, which provides a precise datum for the relationship of night to day. Of related significance is the retrograde rotation of Venus. Every time it is directly between Earth and the sun, it exposes the same face toward Earth, even though exactly five Venus days have elapsed between such conjunctions. The length of a Venus day coincides with two axial rotations of Mercury.

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\*Carbon dioxide freezes at  $-123^{\circ}\text{C}$  ( $-190^{\circ}\text{F}$ ) and sublimates to vapor at warmer temperatures, without a liquid phase between.

A Mercury day, however, is two complete orbital revolutions of the sun, which is three axial rotations of Mercury. Meanwhile the axial rotation period of Venus is two-thirds of an Earth year. The same ratio of two-thirds keeps recurring between rotation periods and revolution periods. There is a triadic character to the behavior of the terrestrial planets that is reminiscent of the triadic relationships of particle physics.”

You are stretching the point more than a little, Watson. Where does Mars fit into your tidy scheme?”

“Just give me a moment to recapitulate.” Watson pulls out his pocket calculator, scanning a tabulation of data on the solar system and scratching his head. “The rotation period of Mercury (58.65 days) is two thirds (0.6667) of its revolution period (87.97 days). One Venus day (117 days) is two thirds (0.665) of a Mercury day (175.94 days). The rotation period of Venus (243.17 days) is two thirds (0.666) of an Earth year (365.25 days). Now a Mars solar day is 24.6587 hours. That means that there are 666.8 Mars days in a Mars year. The ratio of a Mars day to a Mars year is therefore also two-thirds, except that there is a factor of one thousand involved.”

“Then how about the rotation period of Earth? An Earth day is about forty minutes shorter than a Mars day and doesn’t exhibit any special ratio to revolution periods.”

“But an Earth day is nevertheless close to a Mars day. Both Earth and Mars have seasons distinct from days, whereas Mercury and Venus do not,” retorts Watson. “Perhaps Earth is allowed some flexibility due to the influence of organic life. Earth is also the only terrestrial planet to have a major moon—tidal influences have played an important role in the evolution of the biosphere and tides advance about 40 minutes a day. Is it just an accident that the rotation period of the moon is the same as the average rotation period of the sun? With the single exception of the Earth’s rotational period, all terrestrial rotational and orbital periods display a resonance that cannot be explained by laws of mechanics. Only Earth displays some degree of freedom in its rotational period.”

Now it is Holmes turn to scratch his head as he takes off his hat and walks slowly in a circle. Then he stops, replaces his hat, looks up at the dreary sky, and says in a condescending tone, “What are you suggesting, Watson? Are you implying that the laws of mechanics aren’t valid? Are you saying that gravity and momentum don’t work according to the time-tested laws of physics?”

“Not exactly, Holmes. I am merely pointing out some remarkable coincidences that indicate a more comprehensive system of order to

things. Since electromagnetic energies are involved as well, perhaps our understanding of physical laws is incomplete on a cosmic scale. It could be that nature doesn't work in exactly the way that we think it does. The formulation of so-called physical laws is built on empirical observations close to home. There is no proof for them, especially if we attempt to extrapolate them to cosmic proportions."

"Nonsense, Watson! All this talk sounds more like astrology than science. You mustn't try to make so much of a few coincidences. None of the Jovian planets show any kind of resonance between rotation and revolution periods. They all have rotation periods of nine to eighteen hours."

Watson doesn't pursue the question. More interested in other evidence that Holmes has collected on the Jovian planets, he continues with his inquiry. "The Jovian planets explore a different theme, displaying global winds, complex satellite systems, and rings. Can you tell me more about this and about their magnetic properties?" Watson is especially curious about electromagnetism.

"Very well, Watson. The space probes have told us quite a lot about Jupiter and Saturn, the two largest of the Jovian planets. Jupiter alone is seventy percent of the total mass of the solar system—excluding the sun—while Saturn is about twenty percent. Both planets radiate more than twice as much energy as they receive from the sun; both have numerous moons resembling miniature solar systems in themselves. Both planets have dense atmospheres and turbulent winds that encircle them like huge hula hoops in banded patterns. On Jupiter, the winds reach speeds of several hundred kilometers per hour at the cloud tops, alternating their direction from band to band relative to the planet's interior. Giant hurricanes like the red spot on Jupiter can last for hundreds of years. Saturn's upper atmosphere is dominated by a broad equatorial jet stream that covers more than forty degrees of latitude, reaching velocities of eighteen hundred kilometers per hour, four times the maximum wind velocity on Jupiter."

"I thought Venus was windy, but Jupiter and Saturn are even worse," spouts Watson. "Are their interiors so turbulent as well?"

"Unfortunately we don't have much direct evidence about the interiors of the Jovian planets apart from speculations and one shallow probe to Jupiter. Jupiter is enclosed in a vast envelope of hydrogen and helium gas about one thousand kilometers thick, gradually transforming to liquid molecular hydrogen. Internal pressures become so great that the liquid hydrogen becomes stripped of its electrons to produce a sharp interface

where it transforms to liquid metallic hydrogen—an electrically conducting fluid closely associated with Jupiter's magnetic field. At the very center of the planet, there is probably a rocky core. Saturn is similar, except that internal pressures are not quite so great. The atmosphere should be thicker, with a smaller metallic hydrogen interior."

"Interesting," replies Watson pensively. "A similar pattern exists as with our Earth. There is a layered structure with a fluid metallic interior associated with a magnetic field. In this case, however, there is a fluid layer of molecular hydrogen instead of a crust and mantle separating the metallic core from the atmosphere. This must lead to interactions between convection patterns in different layers, with interesting electromagnetic effects. Do Jupiter and Saturn have strong magnetic fields?"

"Yes indeed! Jupiter has a huge magnetosphere about 1200 times larger than Earth's, and the magnetic moment of the field is 19,000 times stronger. The magnetosphere flares out in a distended disc shape, like a doughnut that has been flattened outward around its edges. This is due to the influence of a plasma or ionized gas—within the magnetosphere—which co-rotates with the planet, and so is thrust centrifugally outward. The tail of the magnetosphere probably extends well out beyond Saturn. The size of Saturn's magnetosphere is intermediate between those of Earth and Jupiter. While our moon passes through the tail of Earth's magnetosphere for only a couple of days every month, the major satellites of both Jupiter and Saturn revolve within their respective magnetospheres, creating some interesting effects."

"That sounds very intriguing. Moons are more completely under the umbrella of planetary influence. Please continue." Watson is anxious for more information. "How many moons does Jupiter have?"

"At last count there were sixteen, Watson. Galileo first discovered four of Jupiter's moons in the year 1610, using a primitive telescope. These Galilean moons are as large or larger than our moon. Closer to the planet are four much smaller moons and a faint ring. The eight closest moons are in the equatorial plane, revolving within the magnetosphere. Much farther away from the planet are eight more moons most of which are only a few kilometers across. Four of them are about 11,000,000 kilometers from the planet, with orbits inclined about twenty eight degrees to the equatorial plane. The remaining four are about 22,000,000 kilometers away, with orbits inclined about a hundred and fifty degrees. The outer four revolve in retrograde direction."

“That number four does keep cropping up, doesn’t it, Holmes? Sixteen moons arranged in four groups of four. That is remarkable. Do they display any special resonant effects?”

“Don’t get started up again, Watson. The outer moons are held very tenuously in their orbits and are probably captured asteroids. The Galilean moons are of greatest interest because of certain similarities to terrestrial planets. The inner two have a rocky structure, while the larger outer two have an icy crust and probably water or water-ice mantles. There are some interesting geological phenomena. The innermost Galilean moon, called Io, has active volcanoes which spew sulfurous material into Jupiter’s magnetosphere, resulting in some powerful electromagnetic effects. Io seems to be the primary source of the plasma within Jupiter’s magnetosphere. Interestingly enough, the inner three Galilean moons do display a simple type of orbital resonance. Their orbital periods double from moon to moon, moving outward. Of course, nearly all of the moons of both planets are in synchronous rotation, just as our moon is. Tidal influences always keep the same face toward the planet.”\*

“The electromagnetic effects of Io sound fascinating. Are there similar effects with any of the moons of Saturn?”

“Not in the same way, Watson,” says Holmes, lighting his pipe again. “Saturn has eighteen known moons, many of them of intermediate size between 300 and 1,500 kilometers in diameter, most of them having a large water-ice component. The largest moon, Titan, is larger than Mercury. It is the only satellite in the solar system with a dense atmosphere, more dense than that on Earth in fact and over ninety percent nitrogen, the remainder being mostly methane gas. Orbiting through the outer fringe of Saturn’s magnetosphere, it produces substantial plasma and magnetic effects. All but the two outermost moons, Iapetus and Phoebe, orbit in Saturn’s equatorial plane, Phoebe having a retrograde orbit. The equatorial plane of the planet is also the equatorial plane of the magnetosphere. Saturn’s magnetic axis very nearly coincides with its spin axis, whereas Jupiter’s magnetic axis is inclined ten degrees. The magnetic poles of both planets are also reversed in relation to the Earth’s present magnetic polarity.”

“It is unusual that the magnetic axis and the spin axis of Saturn should coincide,” Watson observes, casually moving upwind from Holmes’s pipe. “Does this have any relationship to the rings of Saturn?”

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\* Tidal bulges form on opposite sides of a moon as it consolidates, so gravitational torque keeps it in co-rotation. Our moon is slightly egg-shaped.

“It is difficult to say precisely in what way electromagnetic energy affects ring formation, Watson. The rings of Saturn are very complex, consisting of thousands of intricate ringlets. Water ice is the main constituent. Particle sizes average up to ten meters in some rings, down to the size of dust particles in other rings. Some rings display precise proportions of different particle sizes, even though particle populations vary from place to place in the rings. One kinky ringlet consists of braided strands. The rings are also very thin, less than four hundred meters thick, with very sharp edges. There are various resonant effects between both rings and gaps in the rings, with different moons. Electromagnetic influences may predominate on very small ring particles, but there are other curious electromagnetic effects with both moons and rings.”

“Tell me about the resonant effects with moons first,” requests Watson, showing a special interest.

“There is no great mystique about them. It is all very elementary. Gravitational resonances occur between orbits whose periods happen to exhibit ratios of simple whole numbers or simple fractions. It has to do with regularly recurring patterns of gravitational perturbation.” Holmes pauses to rub pipe smoke from his eye, while Watson skeptically compares this explanation to the extraordinary terrestrial planet resonances.

“This type of resonance is very common,” Holmes continues, his left eye still watering. “Material either tends to collect in such orbits or be absent from them. For instance, the three inner Galilean moons of Jupiter have orbital periods that double from moon to moon, probably because of gravitational interaction during the accretion process. Saturn’s moon Tethys has an orbital period exactly double that of Mimas, which is closer to the planet. But Enceladus is sandwiched between them, with an orbital period half that of Dione, which is further out, with Tethys sandwiched between them. On the other hand, there are gaps in the asteroid belt, known as the Kirkwood gaps where asteroids are absent. These gaps occur at distances from the sun where orbital periods are simple fractions of Jupiter’s orbital period. The reverse situation also exists, as in the case of the Hilda asteroids, which have orbital periods two-thirds that of Jupiter’s period. A major gap in Saturn’s rings, known as the Cassini division, has diffuse ringlets with an orbital period one-half that of the satellite Mimas. There are a variety of other resonances and near resonances between rings and satellites.”

“It all sounds like a fascinating dance of rings and satellites, performed to resonating musical rhythms—like a big phonograph record driven by a planetary turntable. The rings meter out the music in grooves

according to resonating patterns. Are there any clues as to how electromagnetic energies might participate?"

"A few, Watson. There are sporadic radio emissions associated with the rotation of the magnetosphere—perhaps also modulated by Dione. Apart from this, there is an unusual pattern to the absorption of inward-diffusing electrons and protons of the magnetosphere's plasma. At the orbit of each of the larger inner satellites, electrons moving at the same rate as each satellite diffuse freely across the orbit, whereas non-synchronous electrons have a probability of absorption by the satellite. This alters the energy spectrum of the electrons similar to the way that light is altered passing through successive color filters. A selection takes place at each satellite, until the surviving electron population at Mimas has a nearly mono-energetic spectrum. This effect doesn't occur with Jupiter, nor with protons, which are strongly absorbed. Electron density drops off at the outer edge of the rings, so that the region closer to Saturn is nearly free of energetic particles."

"That is quite peculiar," asserts Watson. "The result is a succession of different energy levels between the satellites, thus monitoring their orbital behavior. It is as if the planet is able to keep track of them. Are similar patterns apparent in the outer planets Uranus and Neptune?"

"These planets are considerably smaller than Jupiter or Saturn, though still much larger than Earth. They are likely similar to one another in structure, with a rocky core within a mantle of water, methane and ammonia. Both are enveloped in atmospheres of hydrogen and helium, plus ammonia and methane. Uranus has eighteen known moons, most of intermediate size, and eleven slender rings with many tiny ringlets. Its rotation axis is tilted  $98^\circ$ , almost into its orbital plane, so that its poles point toward the sun each revolution. It has the most inclined magnetic field in the solar system. Neptune also has a slender ring system and eight known moons, of which Triton is very large and cold. It is in retrograde rotation with a highly inclined orbit. Both Uranus and Neptune possess extensive magnetospheres that interact with the solar wind."

"The solar wind certainly has an extensive and varied pattern of interaction with the planets. Does it continue out indefinitely into interstellar space?"

"It extends out well beyond Pluto. It is remarkably constant in velocity, but it diminishes in intensity. At some point several times the distance of Pluto from the sun, the solar wind should encounter an interstellar wind and lose its identity. This limit is called the heliopause."

Watson, who finds Holmes's account intriguing, continues to question him on many details. The master sleuth patiently obliges him, responding on different aspects of the evidence in the case. He elaborates on the character of Jupiter's ring, on the shepherding moons of Saturn, as well as on the twin co-orbital satellites, which share the same orbit by less than the sum of their diameters, changing places by jostling past one another every four years. He expounds on the high refractive index in the dense atmosphere of Venus that bends light around the planet, such that one might see the back of one's own head. He fills out the picture in many other aspects, from Kepler's laws of orbital mechanics to proposed space missions. Watson absorbs it all attentively.

Through it all, Watson finds a basic intuition more and more confirmed. He sees a pervading relationship between gravity, electromagnetism, and cyclic patterns of angular momentum, all brought to a mutual balance through successive tiers of consolidation in the solar system. He sees the balance achieved through a master sensorium of some sort that is able to translate the quantum reflux of dissynchronous energy in harmonious ways. He sees in this the analogue for behavioral form, mentation, and an animating spirit that have mutually evolved in stages over great periods of time. He sees an intelligent relationship, a triad of mind dancing at many levels to a cosmic tune, but out of deference to his colleague, he strives to keep his silence. Time is on his side. However much Holmes may try to confine his attention to shadow phantoms, the evidence will require him to do some trolling. Holmes will have to diverge from his old familiar fishing holes and begin to explore the lake.

The canoe has been worked in a circuit around the first bay, through a narrows into a second. Three or four northernns have been caught, but none of trophy class. Down the bay a moose is feeding in a marshy area. Casting is continued along the weed beds. The round green pads congregate in close formation like thin cookies floating on a fluid grill to synthesize their sugars. A few white and yellow water lilies turn pretty faces upward to flirt with passing insects. Low bushes crouch along a shoreline scrimmage, leaning against the water's edge. Behind them, a black spruce army stands with long, lean spines crowded in congested ranks.

The dense weeds end abruptly to demarcate the verge of deeper water. Each cast is placed at intervals just at their edge, as the canoe is moved along in stages. Up ahead a patch of weeds is clustered farther out from shore. A cast is taken along one side. As the lure approaches the canoe, a monstrous northern hits it in a vicious swirl. The line snaps on impact. The fish is gone!

The line is reeled in, tested with a couple of tugs, then another leader and lure are attached. Sometimes a northern will stay in the vicinity and strike a second or third time. The area is thoroughly cast again but no luck. This northern has learned its lesson.

The moose finally looks up with a vacant stare, then ambles slowly into the thick bush out of sight. The sun is moving westward—time to think about a fish for supper. The fishing hole beside the island is still a dependable spot; the canoe is turned and headed back.

After supper the campfire is kept going. A final cup of tea is sipped while shadows lengthen out across the channel. The sun is sinking in the west. The clouds have nearly disappeared.

The sun is naturally of concern to the mystery of the solar system. Holmes and Watson have continued their review of the evidence in the case, Watson having exhausted his questions on the planets and their satellites. He turns his attention now toward the sun.

“As I understand it, the sun, like other stars, derives its energy from the nuclear fusion of hydrogen atoms into helium, the same process that releases the terrifying energies of the hydrogen bomb. Is that correct, Holmes?”

“Yes, that’s correct. The sun is a nuclear cookstove, a huge sphere of burning gas, nearly all hydrogen and helium, with only small amounts of heavier elements. Only in the central core of the sun are temperatures and pressures sufficient to sustain the nuclear conversion of hydrogen into helium. Surrounding this is a huge radiative zone where energy radiates slowly outward to a convective zone. Here, the outward flow of energy becomes turbulent, creating bubbling streams of rising gas, detectable as fluctuating patterns of granulation in the photosphere. The photosphere is the visible surface of the sun from which the great majority of its energy is released as light. The more diffuse chromosphere above it is normally invisible because of the brilliance of the photosphere. Extending for about 19,000 kilometers above the photosphere, it can be photographed when the photosphere is masked, such as at times of solar eclipse, to display a pattern of supergranulation. Needlelike spicules of rising gas jet upwards in complex configurations dominated by magnetic forces. Above the chromosphere is the corona, which is influenced by sunspots and related phenomena known as plages, solar prominences, solar transients and solar flares. The corona radiates outward in the solar wind, bathing the planets in a stream of particles.

“Fascinating indeed!” exclaims Watson. “The sun is also organized in layers. There is a central core of nuclear energy generation, a radiative zone that disperses energy outward, a convective zone that takes over out to the photosphere, a chromosphere of magnetically dominated activity, then a corona that radiates particles out to the planets. Some of the solar activity associated with sunspots and so forth sound frightfully awesome. Can you fill out the picture a little more?”

“Happy to, my dear fellow. Sunspots are often heralded by plages, which are bright spots due to magnetic concentrations in the chromosphere. Beneath the bright spot a dark sunspot may appear in the photosphere. Sunspots are areas of lower temperature that tend to appear in pairs of positive and negative magnetic polarity. Solar prominences most often form along the boundary between regions of opposite magnetic polarity associated with sunspots, some types extending more than 500,000 kilometers into the solar atmosphere. Others take on the shape of a huge arch or loop which indicates the presence of a strong magnetic field. Solar flares likewise tend to occur along the boundary between positive and negative sunspots, sometimes causing radio blackouts and intense aurora activity through their effect on Earth’s ionosphere.”

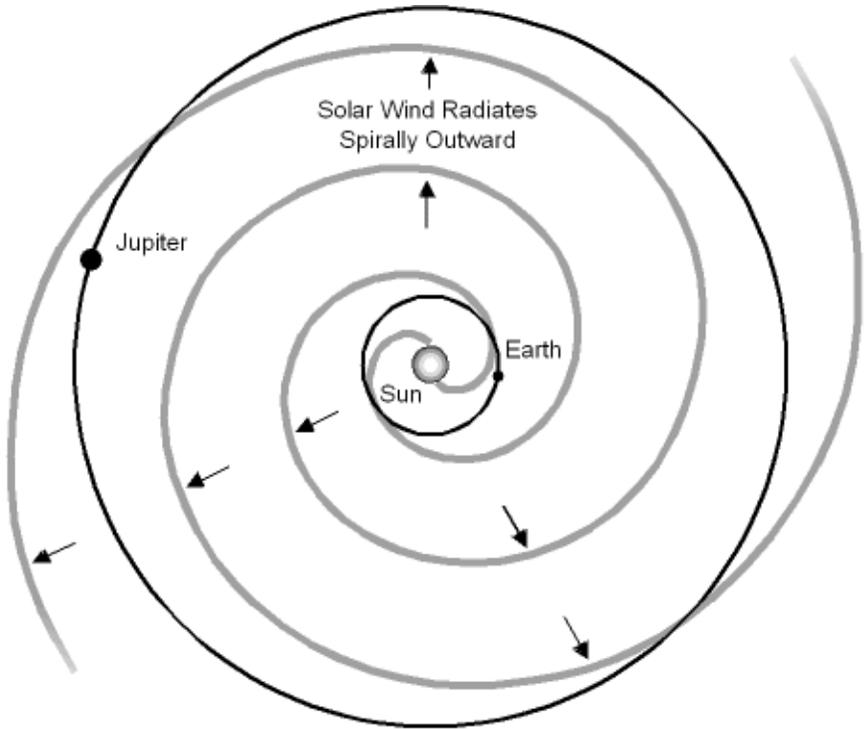
“These truly awesome phenomena all seem to be associated with sunspots and magnetic fields. Do you as yet know how all the evidence fits together?”

“The more we learn, the more things are gradually falling into place, Watson. A remarkable feature of the sun is that it displays differential rotation. The equator rotates in twenty-five days, while the poles take thirty-three days. Since the sun is an ionized gas, the magnetic lines of force become linked to the differential rotation, spirally wrapping around the girth of the sun many times. The spiral pattern converges from both poles toward the equator, the lines of force popping out in loops when solar activity occurs. X-ray photographs of the sun reveal that the lower corona is dominated by loops laced between regions of opposite magnetic polarity. High above these, the sun’s outer corona radiates in long tailed streamers shooting outward from the arched bulbous bases. The corona consists of very hot but widely separated atomic particles, mainly electrons and protons, whose high energy carries them away from the gravitational pull of the sun. As they strive to escape into the solar wind, many are bound by the magnetic arches of the lower corona. Where there are no loops, the solar wind seems to flow more freely into space along open magnetic field lines.”

“I see,” says Watson. “The solar wind begins as a sort of tug of war between high-energy particles and solar gravity. Magnetic lines of force reach up in loops to regulate a balance between the recapture and escape of particles. The solar wind streams outward to the planets from the balance of factors, taking with it a portion of the sun’s magnetic field along open magnetic field lines.”

“That’s the general picture. At the same time, the great majority of solar radiation is in the form of a nearly constant stream of light.”

“Then the fluctuations of the solar wind are related to special features of solar activity, which display recurring patterns in conjunction with the eleven year cycle of magnetic pole reversals. This certainly suggest a high level of internal order to the sun. Can you tell me more?”



*Figure 22*

“The sleuth strokes his chin pensively, then takes a puff on his pipe and continues. “Surface observations of the sun tell us quite a lot, Wat-

son. For instance sunspot activity always begins at middle latitudes, near the start of each eleven year cycle; the activity migrates toward the equator as the cycle progresses. Close observations of surface velocities on the sun also reveal traveling torsional waves that begin at both poles, converging toward the equator about twenty-two years later. Around both hemispheres there are two slightly faster and two slightly slower zones, symmetrically superimposed on rotational movements. A new set begins the twenty-two year migration toward the equator every eleven years. Sunspots appear to occur along the poleward shear lines between fast and slow zones, joining the migration at middle latitudes.”

“Then there is a direct correlation between the fluctuating patterns of the solar wind and the internal organization of the sun?”

“Yes. The evidence points to this, Watson. During quiet periods, the solar wind radiates outward at about 400 kilometers per second, but its speed and intensity can vary drastically, depending on solar activity. As fast streams overtake slow streams, there are a variety of harmonics, all taking the form of an Archimedes spiral because of the rotation of the sun. This is illustrated more clearly by a diagram.” (See Figure 22.)

“It is extraordinary that patterns of activity in the sun should be translated into an electromagnetic sphere of influence outward to the heliopause, where it succumbs to an interstellar wind whispering through the galactic community of stars.” Watson stops for a moment and struggles to contain the words, but they come out anyway.

“It is like an enormously complex mentation system that both influences and monitors the behavior of a planetary family and has done so from the beginning. The resonances of the solar system are but one expression of an underlying cosmic order that seeks harmonic balance between an integrating idea and particular form through an animating spirit. These three factors are invariably focused through electromagnetic phenomena, gravitational mass, and routine patterns of angular momentum associated with cyclic motions. *Idea* is balanced with *form* through *routine*.” The words have tumbled out almost against his will, and Watson himself is a bit shocked.

Holmes takes a couple of quick puffs on his pipe. Then in an effort to be casual, he removes his hat again to scratch his head. “Very well Watson, then *you tell me!*” he says disdainfully. “What is this mysterious system of order that you imply masterminds the behavior of the solar system?”

It is Watson's turn to scratch his head. "Well, Holmes, it just seems to me that it is not only intelligible, but implicitly intelligent. The solar system is in communication with itself, gravitationally linked up as one, and electromagnetically monitoring every movement, while keeping in synchronous step with the galaxy. The relationships exist within the solar system for it to know of its own behavior, and even to compensate according to its needs within discretionary limits worked out through its history. As the sun and planets consolidated, they didn't just gather into dead lumps at random. The accretion process occurred through gravitational forces that were accompanied at every step along the way by cyclic motions, as well as by electromagnetic energies. The solar system can't be understood by considering these factors in isolation, for they have always been inseparably related. Furthermore, they don't bear a linear causal relationship to one another, but rather seek a mutual balance through cyclic patterns."\*

Holmes is becoming more disgruntled and assumes a stern demeanor. "You speak of the motions of planets and satellites as if the motions were something independent. Of course they exhibit dynamic patterns, but to consider this an animating spirit is quite preposterous!"

"Why is it preposterous?" insists Watson. "The kinetic energies of moving bodies are something quite distinct from their gravitational bulk, or from electromagnetic energies. This is not to say that they aren't related, but rather that there is a distinctive cyclic pattern (*routine*) of kinetic energies that has evolved through their mutual relationship. Furthermore, it is a routine replete with resonances of many kinds, as harmonic balances have been worked out on a time scale that strains the imagina-

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\*The position taken here is that cyclic motions introduce dissynchronicity into the primary projection of matter on a cosmic scale (See System 3). This invites a hitherto unidentified family of quantum forces to adjust cyclic motions in order to maintain synchronicity with the universe at large. The forces become implemented through the quantum mode and derive from the reflux of momentum via the skipping of space frames at the center with respect to the periphery of cyclic motions. The universe is in communication with itself through this tensional coupling associated with the sensorium or void. That such quantum forces must arise is a necessary consequence of Plank's quantum of action, which clearly indicates that the universe is a discontinuous projection of particulate matter that defines the nature of space and time, not the other way around, as general relativity theory would have it. Quite apart from galactic evidence, there is abundant solar system evidence to indicate this is so, from orbital resonances, to the differential rotation of the sun.

tion. The solar system is a veritable symphony of movement playing through the unique orbital coincidences of the terrestrial planets, the many resonances of moons, the extraordinary intricacies of Saturn's rings, and who-knows-what beyond. The global winds of Venus and the Jovian planets reflect resonances of another kind, not to mention the performance going on within the sun. One can only speculate on the dynamic patterns boiling within the bowels of sun and planets, or on the related significance to magnetic fields. To think that motion can be understood in terms of causal forces through a mystical belief in time and space as absolute realities is what seems to be preposterous. Where do we find time and space without reference to our solar system? We determine time by regularities of its movements and space by measurements of its form. Our solar system itself offers the basis of our verbal definitions. How can we hope to understand its causal origin in terms of concepts that are dependent on its nature?"

"Then the alternative you suggest is that it is all intelligent," retorts Holmes, raising his voice and getting a little red in the face as he makes a grand sweeping motion with his arm. "You're proposing that the massive bodies of the solar system are animated by a spirit, reflecting an evolutionary balance with electromagnetic energies. Where on earth do you get the notion that electromagnetic energy is intelligent, or that it engenders mental processes?"

"In heaven's name, why not?" blurts out Watson in rebuttal. "Aren't our own mental processes hosted by electromagnetic energies? Don't we employ the electronic potentials of microscopic nerve cells in our brains to formulate our thoughts and integrate our experience? Through an evolved hierarchy of organization, don't these same insignificant energies mobilize the bulk of our bodies according to fostered patterns of performance worked out over time that enable us to walk and run, drive cars, or send rockets to the moon and Mars? By comparison, the mentation possibilities in an electromagnetic body like the sun are staggering. It is highly organized in tiers of turbulent cells, with overriding cyclic patterns associated with magnetic pole reversals. Its sphere of influence extends beyond the planets. Each of the planets in turn displays a personality of its own—a unique magnetic character—effecting a balance with the organization of its form through its dynamics. Massive though it may be, given that the solar system has had five billion years to get its house in order, why shouldn't we consider it intelligent? Don't you see, Holmes? The case takes on a whole new complexion. We are not just

accidents of chance striving for blind mastery over a celestial corpse. We are intelligent participants in a living world.”\*

Watson has glimpsed beyond the shadow phantoms confined to borrowed forms. He has glimpsed the clouds that formulate the shadows projected by a universal sun, while Holmes stands firmly on his record, asserting himself with overbearing confidence.

“Whether you like it or not, Watson, we must provide for all our needs through knowledge gained directly from the evidence. The laws of physics work to meet our material requirements.”

“They may work within limits to meet practical needs, but we try to extend them far beyond those limits. For every question answered there are many left unanswered or unasked. We suffer from an ignorance of our ignorance.”

This time Watson will not be put down. He goes on. “What is space or time? What is gravity, momentum, mass, or light? Why are orbits or spins or magnetic fields inclined to one another with inconsistent variations? Why do some resonances occur and others not? Why do magnetic poles reverse? What are they anyway? Why do we seek to understand it all beyond our immediate needs? I don’t mean that all your patient efforts have been a waste of time. I’m not suggesting that rampant superstition replace a disciplined pursuit. I’m suggesting that the language of our scientific laws is piecemeal and deficient. There is a more fundamental system of order to it all that we should try to understand.”

“Very well. Then where do we begin?” asks Holmes snidely.

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\* According to System 3, electromagnetic force fields derive from the separation of electron from proton in the primary projection of the neutral atom, such that light cannot bridge the distance between them in a primary interval of time, as defined by a single space frame. Light must span any number of space frames in order to link them up, since they continue to be unified via the eternal quantum frame, even to the ends of space and time. It is this linking of electron to proton via photonic energy spanning space and time that constitutes the electromagnetic force field. In the process space and time are spanned, implicitly integrating history in an ongoing present. This requires the reflux and recommitment of experience in order to maintain synchronicity with the universe at large. This must be so if the universe is to have coherent integrity of any kind. This means that electromagnetic energies are implicitly intelligent, communicatively linking particulate matter over vast reaches of space and time in patterns of unlimited complexity. At the solar system or cosmic levels this is a phenomenon far removed from a simple magnet or electric motor.

Don't you see, Holmes? The triad offers an alternative approach to that of cause and effect in a space-time continuum. It embraces our current knowledge in a broader, more fundamental context that delineates the nature of space and time. I can't single handedly reformulate all the language of science in a few minutes. You can hardly expect me too. You have had the resources of the whole department working on the case for four hundred years. The point is simply that the present course is riddled with deficiencies. We will never explore the rudiments of intelligent order unless we make an earnest beginning."

Holmes is fatigued and exasperated by Watson's persistence. He is hardly in a position to get angry, since he has invited Watson's comments. He stares blankly into space for a few moments, then, turning to his colleague, smiles and says, "I believe it is my turn to suggest a pint of bitter."

Watson smiles back and answers, "A brilliant suggestion, Holmes!" A drizzle has started. Both men put up umbrellas.

"Next thing you'll be trying to drag me off to church," growls the detective.

"Oh, I'd never go that far. May the heavens forbid!"

"I wish the sun would shine sometimes," grumbles Holmes, as they turn the corner and walk up the lane toward the pub.

The self-similar triadic nature of the primary projection of the universe by System 3 is illustrated in Figure 23.

The campfire is stoked up with two sticks of white birch. Another pail of water is put on for tea. It is almost dusk. The sun has set but there is still enough light to see clearly. The fire eats hungrily into the fresh birch wood. The bark curls and fries into tar as flames lick up around the pail. The water is already beginning to hiss. The bed of red hot embers sporadically erupts, sending sparks skipping out of the edge of the fire. A small toad approaches in volleys of short hops. It positions itself near the stones where it can get some warmth, but not too much.

The sound of a motorboat becomes audible in the distance to the south. As the noise gets a little louder it is easily identified. There is only one outboard motor that sounds like an automatic weapon. It must be Adam and Agnes. The exhaust housing on their motor has been broken off for years.

*The Primary Projection of the Cosmic Movie*

<b>GALAXY - Idea</b>	<b>Idea</b>	The integrating idea of a galaxy must retain synchronicity with the universal projection of hydrogen. This is done via black holes in their centers. This singular condition common to all galaxies links them by quantum forces. Integration regulates relative angular and linear motions.
	<b>Routine</b>	Routine cyclic motions in galaxies cause dissynchronicity with the primary projection of hydrogen. This space-time contraction in galactic interiors is partly offset by spatial contraction of hydrogen into heavy atoms by nuclear fusion in centers of stars. Space frame skipping leaves a central black hole.
	<b>Form</b>	Galactic integration, via angular momentum, winds up nuclear fusion in stars, as gravitational unit forms synchronous with the whole. Stars contract in clouds ejected from galactic centers, move out, then recycle back to the center, drawn by spatial contraction through maturing into heavy atoms.
<b>SUN - Routine</b>	<b>Idea</b>	The integrating idea of stars retains synchronicity with the universal projection of hydrogen by contracting space into heavier elements. This partly offsets the skipping of space frames due to galactic rotation. Solar system momentum is likewise directed by quantum forces through reflux.
	<b>Routine</b>	Routines altering momentum in stars and planets adjust for spatial gaps due to atomic fusion in suns, radioactive decay in planets, & galactic motions. This maintains synchronous integrity in solar systems, always monitored by electromagnetic factors linked direct to the primary projection of hydrogen.
	<b>Form</b>	The patterned form of cyclic motions and electromagnetic order in suns and planets introduces less pronounced contractions in space & time. The cascading focus shifts to exploring many synchronous forms of molecular chemistry in widely varied planets and moons. Atoms marry up.
<b>PLANET - Form</b>	<b>Idea</b>	The electromagnetic and gravitational form of the sun relates via cyclic routines to events in planets and moons, all linked to galactic order. This directs the chemical integration of planets as synchronous ideas consistent with the primary projection of hydrogen in the cosmic movie.
	<b>Routine</b>	Planets are bathed in solar electromagnetic energy, modulated in patterns by cyclic routines of rotation & lunar and solar revolutions. Cyclic routines, electromagnetic fields, core currents, and plate tectonics, are adjusted by reflux on a planetary scale to maintain synchronicity via quantum forces.
	<b>Form</b>	The diverse chemical integration of planets, via galactic, solar & planet routines, fosters biospheric evolution of life if possible. It is probably seeded by spores from an interstellar gene pool, eternally linked to the galaxy. Life evolves to transcending awareness of the eternal cosmic order.

**Note:** See Appendix 3 for more information. The primary projection of the cosmic movie, and the quantum relativity involved, is developed in *Science and Cosmic Order: A New Prospectus*.

*Figure 23*

The water is boiling vigorously—the pail is set to one side on the stones. Another large stick is added to the fire, and a couple of tea bags are dropped in the pail. Daylight is fading quickly now.

As the outboard motor enters the channel from the south, the racket is amplified into a full scale invasion. When they come into view past the point, Agnes throws up an arm and shouts out a whoop. I wave back and go down the ramp to meet them. Adam steers in carefully, and I catch the point of the boat, holding it while Agnes scrambles out. She is quite nimble for her size and age. The boat, a very old cedar skiff that has been nursed along for years, is loaded with camping gear, a chain saw, and heaps of birch bark sheets about two feet square. I pull the boat up on the rock as Agnes ties it. The Adam climbs out over the load.

“Where have you been?” I shake hands with Adam and give Agnes a big hug.

“Camping trip down the lake,” answers Agnes. “We camped on Sandy Island.”

Camping trip! Every day is a camping trip for you folks.”

“We went to cut some wood and do some work at a cabin down the lake,” explains Adam as we walk up to camp. “A man from the city owns the cabin, but he only comes for a few days in the spring and fall. He wanted me to cut wood last fall, but I told him, ‘Sap not up. Wood not burn right. No good now.’ This spring he asked me again but I forgot what I told him last fall, and I said, ‘Sap up now. Wood too wet. Not burn right. No good now.’ I didn’t want to cut wood in black fly season. I should have cut it last fall when it was cool and no flies, but we wanted to go and visit family. I tried to fool him, but only fooled myself. I had to agree to cut it in summer. ‘Sap just right in summer,’ I told him.”

“I see that you stripped and saved the birch bark. What are you going to use it for?”

“We’ll use birch bark to finish new cabin,” says Agnes, as we sit down beside the campfire. “We’ll chink logs with moss and line cabin with birch bark. Make nice and warm for grandchildren.”

There is some fresh tea. I’ll get some cups.”

“We’ll have Irish tea,” says Adam as he produces a whiskey bottle.. “Man from the city not so bad. He left part of a bottle of whiskey behind for us.”

“Sounds like good medicine for a cool evening.” I use a stump for a coffee table to pour out the tea. Adam adds a little whiskey to each.

“Saw a bear down at the narrows,” says Adam as we settle back to sip tea and look at the fire.

“Which side was he on? Maybe he’s headed this way.”

“The other side, but he might cross there where it’s easy.”

“Have you been bothered much by bears at your camp?” I ask.

“Not too much,” replies Adam. “They know us pretty good and don’t bother us too much. Usually when I chase them they stay away. I have only had to shoot two or three in twenty years.”

“One broke into camp two years ago,” Agnes points out with a trace of annoyance at the memory.

Adam laughs. “Yes, when we were away on a trip to town. He broke into everything. It took us a week to straighten up the mess and fix things up. He punctured and emptied every can of outboard-motor oil. He must have drank it all, because there was none spilled on the ground.”

“He would have a good laxative.”

“That’s maybe why he never came back,” says Adam.

I add some more wood to the fire as Adam pours out some more Irish tea. It is dark now; the moon should be coming up shortly. Adam returns to the subject of bears.

“We came across a bear hibernating one year in March. Agnes and I were working the trap line near a small lake west of our camp.”

“Yes, after a thaw,” confirms Agnes. “Adam tried to wake him up.”

“He had dug himself in under an overturned tree root, and his head was laying out on the snow. I got right up close and shouted in his ear, but couldn’t wake him up.”

“It’s a lucky thing for you he didn’t wake up. Have you ever tried to climb a tree on snowshoes?”

We laugh, then sit watching the fire, sipping tea and exchanging a few more bear stories. After a while the subject of the stories changes to moose. Then suddenly Agnes jumps up and begins to sing and dance around the fire.

Adam begins to chant along, stopping a moment to explain. “It’s an old Indian song about a hunter who kills a moose.”

Agnes treads lightly on her toes in time to the rhythm, gyrating around in traditional Indian fashion as she slowly circles the fire. The flames lick up in pulses to augment the rhythm with a flickering shadow-giant, mimicking the performance along the ground and through the branches of the overhanging tree. The setting is hypnotically transported to another time, to bygone days of campfire dances after a successful hunt. The atmosphere is suddenly psychic, infused with ancestral presences returning to enjoy the song. Their energies can be felt. They are

almost visible sitting cross-legged in an outer circle, their interest focused intently upon the dance.

Adam interrupts his chant occasionally to describe the song: "The young hunter has killed a moose and is making many trips to carry it back to the village."

He joins again in a refrain between verses.

"There is a big hill on the way back to the village. The refrain is about the hunter struggling up the hill with a heavy load. It's a funny song."

At every refrain Agnes adds some body movements to the dance to dramatize the struggle up the hill, while Adam tells parts of the story in between. The hunter is very proud to have killed such a big moose, and he wants everyone to see it. He is not satisfied to carry home just the meat. He comes back for the head, to show it off. Then he returns for the hide, and then the hoofs, to show them off as well. Finally he tries to carry home the guts. He ties them all up in raw hide, with a tumpline over his forehead, but as he struggles up the hill, they keep slipping out and sliding down his rear end.

Agnes finishes at last, sitting down out of breath, while Adam chants another chorus.

"Do you dance too?" I ask Adam.

"Only do sun dance," he jokes. "Like to keep the rain away, but this summer not too much power in my dance. Rain spirits sometimes very strong."

We continue telling stories and sipping tea. After we finish up the whiskey and some fish left over from supper, they decide it is time to leave. It's quite late—the moon is well up in the sky. I take the lantern to show the way as we head down to the boat.

"How long do you plan to stay?" inquires Adam.

"Another few weeks. Until it gets too cold."

Adam scrambles in over the load and I lift the boat off the rock before Agnes climbs in front.

Skillfully turning the boat around with a paddle, she giggles and turns to Adam. "Let's hurry home. Not sure, but think I feel sexy."

"Adam laughs as he wraps the starting rope around the flywheel and gives it a pull. The motor coughs and spits a few times, deciding whether to explode or run. Then it catches. We all wave as they head off in a cloud of blue smoke up the lake.

The lantern is taken back to camp and another stick put on the fire. It doesn't feel like bedtime yet. The night is still and clear. The moon shows ample light to walk around the shoreline to the northern point.

The racket of the outboard motor is already fading into the distance. For some reason, the noise doesn't seem out of place. There is a quality to Adam and Agnes that compensates. They are saturated with the spirit of the land. As with their ancestors for generations before them, their spirits are attuned to the earth spirit and her moods. You sense this in their presence. You rarely sense it in a whiteman's presence, for in his culture, the earth has no spirit. It is something to be used. The Plains Indian summed up the problem many years ago: "The whiteman doesn't know where the center of the earth is." He doesn't sense it in his being.

The moon looks like an aperture seen from inside a cosmic camera. Images stand out as phantasmagorical forms projected on celestial film. Everything is smeared with the mystic pallor of the moon. The sky is adorned with a silken veil that mutes the messages of stars, reminding them the moon is mistress here tonight. The influence of the moon on the earth spirit is profound, eternal—like a heart beat and breathing both. Similar influences pervade the solar system, like a celestial Indian dance around a campfire—a tradition that recalls ancestral patterns to the resonant performance.

There is another resonance which Holmes neglected to elucidate. It was discovered by a man named Jean Foucault in 1852. Suspending a weighted pendulum from the Pantheon in Paris, he carefully observed it swing. He found that the arc of its swings gradually rotated such that its motions back and forth were independent of the rotation of the earth. If the pantheon were situated at the North Pole, the direction of the swings would go through a complete circle every twenty four hours. It was reasoned that only gravity acted on the pendulum—that it was independent of the rotation of the earth. In other words the angular momentum of the earth is something quite distinct from its gravitational mass. This was taken as proof that the earth rotates. The fact remains that the direction of motion of Foucault's pendulum is governed not by its proximity to earth, but by the fixed stars scattered through the firmament thousands of light years distant.

This is obviously not the result of local causal factors operative in a space-time continuum. It is direct evidence of the social mystery of each and all. The synchronous dance between form and emptiness is orchestrated for all matter in the universe, everywhere at once. The alternations

of all atomic matter back and forth between the particulate and quantized modes are regulated by the action of a common universal set. Gravity is a manifestation of this implicit unity. The resonating dance of the solar system is superimposed upon an eternal atomic jig throughout a living cosmos. The cyclic patterns of momentum operate independently from the gravitational mass.

It is quiet now. Even the loons are silent, listening to the moon. It whispers hush across the land. Faded stars are winking in the water. The hills have lost their features, themselves becoming like shadow phantoms. Everything is filled with a common emptiness. The great mystery is transparent.

Thoughts of the experience return. The world of form vanished in the void. There was an immediacy to it, as there is tonight. The whole of history is now. Patterns of the past work to shape the future through the void, but not in linear, causally determined ways. The future is not a runaway expression of the past. The two must ever find a balance in a never ending present. The one must be evaluated against the other. It is a work of mind.

Memories of the fear come back, and all the questions in the years that followed. A proper resolution seemed impossible. The unruly concerns seem remote and irrelevant now. There is only gratitude for an incredible learning experience. In revealing the cosmic order the experience transcended the whole of creation, all of time and space. It was not grounded in organic experience. The realization of the universal center is eternal in a way the void is not.

The granite point has donned a faint fluorescent glow. The pallor of the moon paints its cracks and folds as lines and wrinkles in an aging skin. Deep cracks with weathered edges are mapped in bold relief, while gnats and bugs creep unseen through the dark lanes and narrow alleys. They find it risky to be too conspicuous. Some cautious crickets are the only muted voices, their squeaking squelched by cracks.

Spruce trees are poised like rockets on a launch pad. There is a tautness to the hollow night. The trek back to camp is like a space walk across a prehistoric monster's hide. In places rocks have flaked like flecks of dandruff from the scalp. The monster's face is hard and cold, unflinching, yet tensed toward the moon to hold it captive in a tidal staring match. There is no rest for the watchman over regularities of life.

# Chapter 14

## Black Bandits

It has been raining steadily for several days. Everything is damp and miserable. For a couple of days there were strong north winds with whiptops rolling on the lake. Now the winds are light, but a solid mass of sullen gray cloud keeps moving in from the north. Sometimes the rain lets up for a brief respite; then it starts again. Temperatures in the early morning have dropped near freezing. The only reprieve from the bitter cold is in the sleeping bag at night.

The fish have stopped biting. The little cove beside the island hasn't been providing supper. Fortunately, a few strays are still biting across at jam-bag rock and down at the big narrows, but it takes time to work for them. All the clothes are damp. They will not dry on the small clothesline strung up inside the tent. This morning the drizzle is fine, yet it keeps peppering down without a sign of quitting.

Much of the time has been spent reflecting on the system. System 4 is a little more complex than System 3. Since the general pattern can be conveyed in a simplified way, it is worth some patient attention. System 4 has already been introduced in the geometric form of the enneagram; we have seen how it applies to the three polar dimensions of a business organization. The nine terms of the enneagram are generated from five sets of four energy interfaces. Before discussing the individual terms, we will explore how the active centers are divided into universal and particular sets, and how they transform from term to term in a specific way.

You may recall that there is a six-pointed figure and a universal triad to the enneagram. The six pointed figure is generated by three sets of particular centers following one another in succession, one step apart, through the six pointed sequence. The mediating triangle consists of two sets of universal centers, each set with a sequence of transformation of its own. A total of five sets of centers thus participate in three sequences of transformations. This creative matrix will be called the primary creative process, to distinguish it from the primary activity of System 3.

Let's take a brief look at the sequence of transformations in the six pointed figure first. The three sets of particular centers each transform through each of the six terms in succession. Since they follow one another at every other position in the sequence, only three terms occur at once. The pattern can be illustrated by a series of diagrams in which the three sets of centers are designated as S1, S2, and S3. (See Figure 24.)

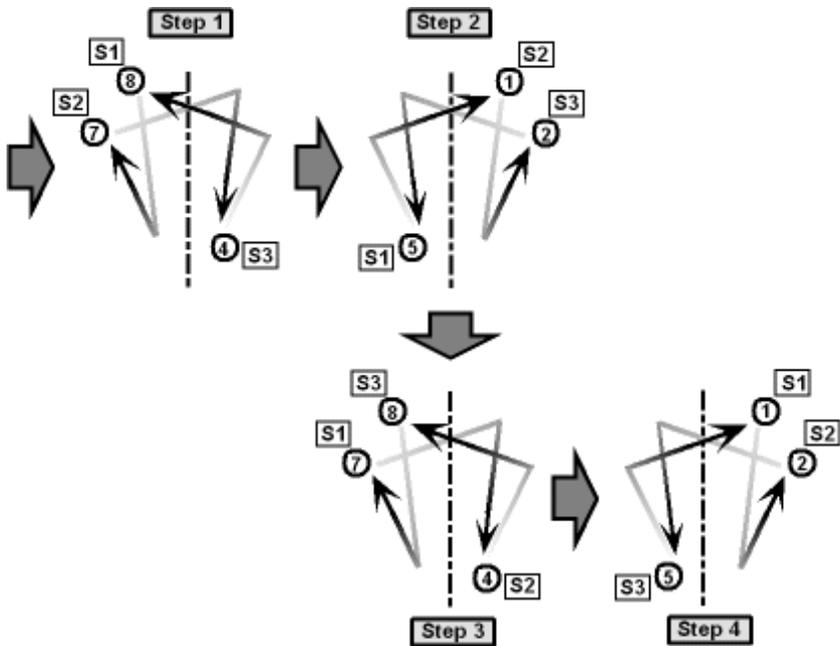


Figure 24

The sequence of transformations from term to term is shown by the arrows and by the six term position numbers: 1, 4, 2, 8, 5, 7. The three sets of centers are shown at four successive steps through the sequence.

Two points can be noted. First, terms alternate between positions 8, 7, 4, and positions 1, 2, 5 indefinitely. Second, at every four steps, the three sets of centers are in mirror image positions across the vertical axis. Compare Step 1 with Step 4.

To turn now to the mediating triangle, two sets of universal centers are operative. They each go through a separate cycle of transformation that repeats with every four steps outlined above. This can be illustrated

by another series of diagrams in which one set of universal centers is designated by “U1” and the other set by “U2.” (See Figure 25.)

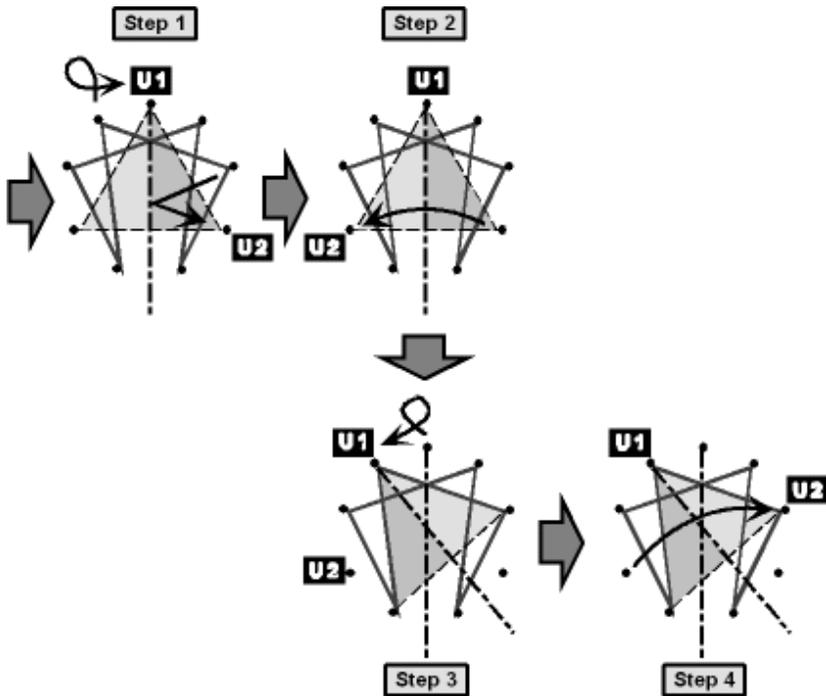


Figure 25

The perceptual axis of the mediating activity has been shown in each stage. Like a master mirror for the matrix of activities, it is associated with the U1 set.

It can be seen that the U1 set remains unchanged for two steps, while the U2 set transforms; the U2 set then remains unchanged for two steps while the U1 set transforms. This provides a continuity of reference in each cycle by mutually bridging transformations.

The transformation of the U1 set inverts the perceptual axis in Step 3, as if to flip the whole triangle over into an alignment with positions 8, 2, 5. We shall see that this is associated with a change in emphasis from an expressive mode to a regenerative mode. This alignment of the perceptual axis also directs the transformation of the U2 set to Position 2 in Step 4, rather than back to Position 3.

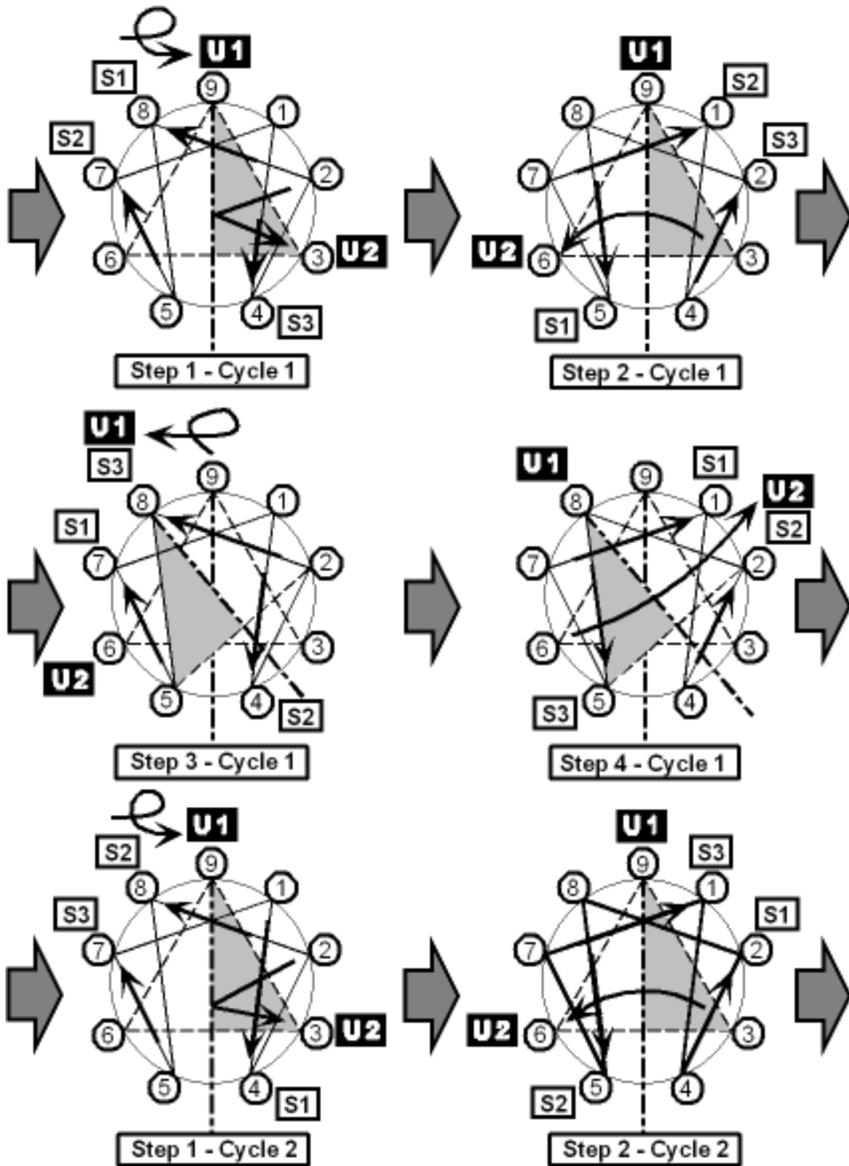


Figure 26

Between Step 4 and Step 5, the triangle flops back again, as both terms simultaneously transform back to their original positions to begin a

new cycle, as in Step 1. Between cycles the mutual bridging between universal sets is lost, since they both transform. This introduces a degree of discontinuity between cycles. It will be called a *shift transformation* to indicate the shift in the perceptual axis back to a median position.

When the two sets of diagrams are put together, an integrated picture is provided of the pattern of transformations. (See Figure 26.) Although this may look a little complicated, it is as simple as learning a little rhyme. There is a rhythmic spirit to the pattern.

*Particular sets take alternate steps  
to see themselves in the mirror.  
Universal sets take double steps  
to flip themselves round with the mirror.*

The creative activity of a business enterprise can again be used to exemplify the pattern. The three particular sets of centers in the six pointed figure are associated with specific cycles of product activity. The universal sets are concerned with the overall policy and infrastructure of a company as it integrates product cycles into a coherent operation.

The three polar dimensions of a business enterprise are mirrored across the medial axis within each cycle, since each product set is in the opposite position across the medial axis every four steps. Another diagram will refresh the memory. (See Figure 27.)

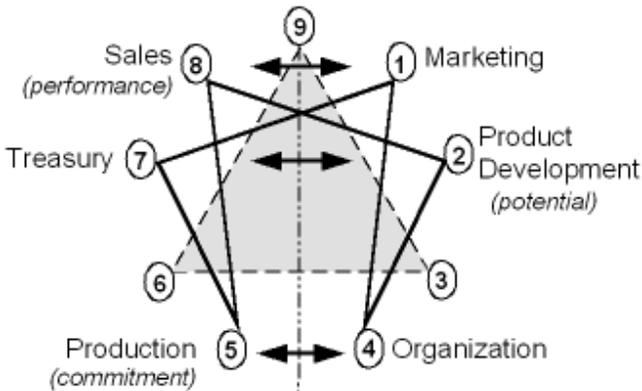


Figure 27

Sales is mirrored in Marketing. Product Development is mirrored in the Treasury. Production is mirrored in the Organization. Each stream of product activity may be assessed on its own merit, according to one of

the polarities within each cycle. The universal company sets of centers commit resources to each product stream on this basis. In practice, this may take the form of periodic reviews which reflect changing conditions in the polar dimensions for various product streams.

There are two other significant factors involved. First, it is obvious that each particular set of energies, associated with each product stream, must take six steps to complete the sequence through the six-pointed figure. Second, energies cannot be endlessly committed to production without replenishing resources. Each particular set of energies must therefore also go through a regenerative sequence, in addition to the expressive sequence associated with production. An expressive mode and a regenerative mode come into play for each term, except that the sales term in the sequence acts as a pivot between expression and regeneration. It always occurs in the expressive mode.\*

From these two factors, it is apparent that twelve steps are required to complete the creative sequence of each particular set of energies. There is an expressive sequence of seven steps, and a regenerative sequence of five steps, since sales is always in the expressive mode. Three cycles are involved. In each successive cycle, each particular set of energies advances from one polar dimension to the next, although all three polarities are represented by all three particular sets within each cycle.

SET	TERM	CYCLE 1				CYCLE 2				CYCLE 3			
U1	Sequence	9	9	8	8	9	9	8	8	9	9	8	8
	Mode	E	E	R	R	E	E	R	R	E	E	R	R
U2	Sequence	3	6	6	2	3	6	6	2	3	6	6	2
	Mode	-	-	-	E	-	-	-	E	-	-	-	E
S1	Sequence	8	5	7	1	4	2	8	5	7	1	4	2
	Mode	E	E	E	E	E	E	E	R	R	R	R	R
S2	Sequence	7	1	4	2	8	5	7	1	4	2	8	5
	Mode	R	R	R	R	E	E	E	E	E	E	E	R
S3	Sequence	4	2	8	5	7	1	4	2	8	5	7	1
	Mode	E	E	E	R	R	R	R	R	E	E	E	E

Figure 28

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\*The universal U1 set fills in for the regenerative mode of sales in Steps 3 and 4 of each cycle.

This pattern can be represented in tabular form, the letters “E” and “R” in the table representing the expressive and regenerative modes of the six particular terms. (See Figure 28.)

Now we can add a couple of lines to the rhyme:

*Particular sets reflect in four steps  
that repeat with three flips of the mirror.*

The three polar dimensions are the referents to the music of a company. They are the rungs in the ladder that spell out a genetic language that is common to all companies. As with the DNA molecule, it is a three word language. It is also a common pattern to all mentation and behavior reflected through an animated spirit. The pattern applies to creative intelligence throughout the universe.

But how are the referents read? To answer this question, we must look toward the universal centers, to how they integrate the particular terms of the six-pointed sequence. We must also take a look at how four centers define the meaning implicit within each of the nine terms. We will return to this task shortly.

The tent flap is opened to step outside and check the weather. The rain has almost stopped, having diminished to a fine sprinkle that peppers the surface of the lake with a barely audible high-pitched tingle. There is no noticeable wind. The lake is smooth. The ground squishes with each step. Leaves and twigs collect the drizzle into larger drops, then oscillate like fumbling fingers, as they let them tumble onto twigs below.

The clouds are winnowed into heavy furrows, slung in dark gray rows that strive to hug together to exclude the sky. The sky is brighter in the north; the furrows are coming with wider spaces in between. One fold betrays a small patch of blue. The signs are reasonably reliable. The sun should be shining in two or three hours.

Time to fetch some water from the lake. On the way back comes an unwelcome surprise. Damn! A black bear. He is coming up the path from behind the tent, standing right beside it. We see each other about the same time, and stop about fifty feet apart. Our eyes meet for a moment, then he turns tail and runs. He bolts back down the path, up through an area of hardwoods to the south. He is agile and fast. Powerful limbs propel his bulk in fluid strides. His body bunches and stretches like water sloshing in a big fur bag. Since he is already on the run it won't hurt to encourage him a little. The water pail is dropped to give chase with lots

of shouting. Already fifty yards ahead, he soon increases the distance and disappears. There's no point in pushing one's luck. The chase is abandoned. We will have to share the island for a while.

Bears have a relentless preoccupation with their stomachs. They will eat almost anything, but apart from fish and insects, they rarely kill. If no one had been in camp, this one would likely have destroyed everything, looking for a change of menu. With luck, he won't come back. There are lots of berries this time of year to satisfy his appetite. Nonetheless, bears are full of mischief—it will be wise to stay close to camp for a day or so.

Some dry kindling and birch bark are collected from the bottom of the cupboard, and a fire is started. The tea pail is used to heat some soup. The warmth of the fire feels mighty good, and with some hot soup in the belly, things start to look a little better. Thoughts return again to the system.

The universal terms and their sequences of transformation will be discussed first, as this will give an overview of how System 4 works. The particular terms will then be discussed to see how they fit the overall pattern.

*Term 9: Universal discretion—U1-T9*

The four centers that relate in various ways to delineate nine terms are most easily identified through Term 9. This is the discretionary hierarchy term, which has already been discussed to some extent earlier. It is also the expressive mode of the “U1” set of universal centers, the set that is most primary of the two universal sets. We may refer to it as the *primary universal set*, while the “U2” set of universal centers may be called the *secondary universal set*.

In exploring System 4, we shall use as an example a system that is intimately related to “the system” and familiar to us all—the human nervous system. We all have one. Even though we haven't yet learned how it works, we use our nervous apparatus to integrate our experience, at least to the extent that we are able to. By examining how it works, it may therefore be helpful to us all.

The universal sets must assimilate the many sensory inputs from throughout the body into a formulated plan for an intelligent response to the flux of circumstance. For the sake of simplicity we will deal mostly with the somatic nervous system, that focuses on sensory input from the environment, and also treat the corresponding motor responses. A self-similar link to autonomic function will become apparent as we progress.

Somatic and autonomic function are integrated at the limbic level by System 5, which is beyond the scope of our present discussion.

The integration of the particular sets, generating as they do such a complex and often chaotic array of experience, is no easy job. This is all the more apparent when it is realized that it is not just the bewildering maze of neural circuitry that is involved, but also the incredibly intricate biochemistry of the cell, orchestrated together with the vital organs, all in accord with four billion years of evolution in the biosphere, and this in step with the stars and the atoms. It's nothing short of miraculous.

The primary universal set is universal in a way that transcends human experience, and yet, in the operation of our nervous system, it is intimately associated with human discretion. Through it our discretionary access may potentially know no boundaries, but as we widen the envelope, commensurate responsibilities appear with each new horizon. These two modes, one expressive through discretionary access, the other a regenerative concern with responsible action, are complementary and alternately omnipresent. We shall see this in the way the primary universal set works in conjunction with the secondary universal set.

The universal hierarchy of Term 9 is illustrated in Figure 29. This is consistent with the general form previously indicated:

*(1)Idea→(2)Knowledge→(3)Routine→(4)Form.*

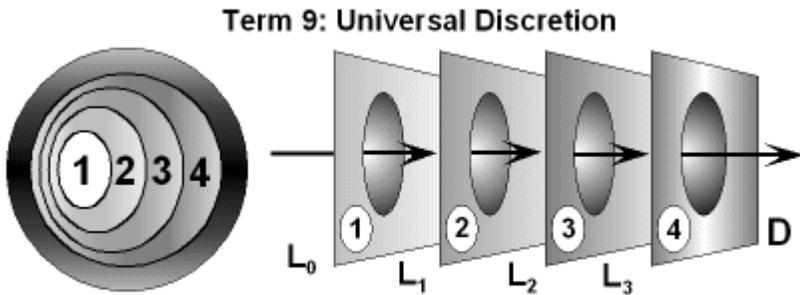


Figure 29

In this case however, it will be necessary to further briefly identify Centers 1, 2, 3, 4, (henceforth designated C1, C2, C3, C4) as they relate to the human body in general. C1 is identified with electronic processes as evidenced by the electronic potential across the membranes of nerve, muscle, and other cells of the body. C2 is identified with the knowledge implicit in the mutual organization of cells to function together coher-

ently. C3 is identified with the patterned commitment of resources to the body's organic routines. C4 is identified with change in the body's explicit form as part of the natural form of the environment.

Let's elaborate a little more about how the four centers might relate to the behavioral direction of the body by the nervous system, but keep in mind that the brief definitions given above are more universal in their application than that described below.

The *idea* center, C1, may be associated with ongoing patterns of electronic activity between all of the various neurons in the central nervous system. This patterned electronic activity is what generates and monitors the expression of ideas in the brain and spinal column. There are an unlimited variety of patterns possible, associated with all possible human ideas. C1 is thus a *managerial level* relating to overall *electronic thought processes*. It is these *ideas* that give direction to the *knowledge* implicit in the body's organization.

The *knowledge* center, C2, is associated with all of the synaptic interconnections between the neurons of the nervous system, including projections to muscles and organs in the body. The synaptic patterns between cells in the central nervous system are quite plastic when we are born, and they become progressively committed to specific interconnections as we learn and make specific commitments through personal experience. The integration of our knowledge thus tends to shape the organization of our central nervous system. This takes place within the self-similar constraints of how the nervous system of the human species has been intelligently ordered by the evolutionary process, to relate to the organs and glands of the body. C2 is thus an *administrative level* relating to the established infrastructure of the body's *cell processes* as they are organized to implicitly direct the body's *routines*.

The *routine* center, C3, is associated with the animation of the body. It employs the linkages of motor nerves with the skeletal muscles, fueled by autonomic energies. It is concerned with the patterned commitment of the body's resources accordingly. It therefore integrates routines of the body's organs as they work together committing resources to specific behavioral patterns or product cycles. Organs in this sense include everything from skin and sweat glands to muscles, heart, bowels and bone. C3 is thus a *supervisory level* relating to the patterned operation of *body processes* as they direct the body's *form*.

The *form* center, C4, concerns the external form that the body takes as part of the external spatial form of the environment. It concerns the shape that the body takes in the course of enacting an animated sequence

of behavior. While the shape of the environment is monitored primarily by the senses of sight and touch, the relative position of the body's segments in relation to one another is monitored by proprioceptive sensory feedback from special sensory organs in the muscles, tendons and joints. C4 is thus a *functional level* relating to changing sequences of the *body's form*, directing itself as an integral part of environmental form.

The above identification of the four centers as they focus on the operation of the human nervous system may be summarized as follows:

- C1- Electronic processes give direction to cell processes.
- C2- Cell processes give direction to body processes.
- C3- Body processes give direction to changes in body form.
- C4- Formation processes of the body direct themselves as integrated changes in environmental form.

It can be seen that there is discretion implicit in the direction of the hierarchy. It is this universal discretion that sifts through the quantized energies of the void to select particular elements of memory that are suitable for recall and integration into each human being's participation in the cosmic movie. The universal centers are open, being unconstrained by spatial or temporal limitations. They may potentially have unlimited access to the energies of the void, as was so vividly demonstrated in the experience. Human discretionary access is accompanied by a sense of wonder. Thoughts come to us according to how we wonder.

There is an autonomic aspect to the hierarchy that should be pointed out here. It relates in a self-similar way to the independent function of each of the soft internal organs of the body, the glands, heart, lungs, liver, kidneys, gut, blood vessels and so on, sometimes referred to collectively as the viscera. They are generally stimulated to function by the electronic patterns active in the autonomic nervous system. They each perform according to the knowledge implicit in the organization of their cells, and they execute cyclic routines of activity that direct the chemical formation of end products, and/or their transmission through the body. So the hierarchy is essentially the same in each organ as it is in the host, but with a more particularized focus.

The hierarchy is likewise self-similar within each cell. It is electronic processes associated with the chemical structure of DNA that directs the knowledge implicit in the many organelles that constitute the infrastructure of the cell. The infrastructure in turn mobilizes the cell's resources to specific routines of physical and chemical activity, that in turn gives explicit form to the cell's various products, including its own

regeneration. It thus becomes apparent that System 4 elaborates on System 3 in resolving the social mystery of each and all between cells, organs, and host, in all multicellular creatures.

*Term 3: Assimilation of Idea into Form—U2-T3*

For the moment let us skip over the regenerative mode of the primary universal set in order to have a look at the goal, Term 3, of the primary creative process, as System 4 is called. The goal is accomplished through the secondary universal set, U2. It concerns the assimilation and translation of idea into form. It assimilates all of the quantized memories of the void, as elements of technique coalesced within ideas, that are identified by discretion as pertinent to each action sequence, for each human being. The secondary universal set is thus subordinate too and more specific than the primary set. It concerns not only the assimilation of those elements of behavior selected by discretion, but also their translation into coherent form as an integrated sequence of specific action.

Before we take a closer look at the term, keep in mind that the assimilation of each somatic action sequence is in response to sensory input from the environment. The body cannot act without sensory direction and feedback.

Let us think of a mosquito buzzing around and about to land on Harry Smith's arm. It's dark in Harry's bedroom, and he's half asleep, but he hears it and wonders when and exactly where it will light, so he can give it a lethal swat with his other hand. Discretion seeks out the appropriate elements of required technique that have been well rehearsed from many bites in the past. Harry has no sympathy for mosquitoes. His nerve cells and muscle cells are organized such that they *know* what to do when all of the elements of the *idea* come together as the mosquito lands on a specific spot. When the right sensory stimulus comes, Harry's resources will be mobilized in a rapid *routine* of action that will change the delicate *form* of a mosquito to a smear on his arm.

It won't happen as an instant reaction, however, even though Harry won't waste a split second. There are three sequences of particular sets following one another through the six particular terms of System 4 at the same time. T4, the organization term in Step 1 of each cycle, picks up sensory input, and it is the last of the three sets in the sequence. It has to transform through three more terms to translate that into action in Step 4 of the same cycle. (See Figure 24.)

The sensory input will influence the two preceding sets, however they must each play out their own sequence of transformations. Let's say that in a preceding cycle Harry heard the mosquito and raised his hand in readiness to strike. He's waiting for the mosquito to touch down, since it has been keeping him awake off and on for hours.

Now let's examine the universal U2 goal term as illustrated in Figure 30. We see that C2 and C3, knowledge and routine, are partially coalesced within the constraints of idea and form, C1 and C4. The partial coalescence is represented by  $R_1$  and  $R_2$ .  $R_6$  represents stimuli from the environment, C4, through the body as partly coalesced with cells,  $C3 \leftrightarrow C2$ , to find an identity in electronic processes, C1.  $R_5$  is a counter-current motor response to the  $R_6$  sensory input. Study Figure 30 to become familiar with the method of representing the basically simple concepts. Once grasped, it's easy.

**Term 3: Assimilation of Idea Into Form**

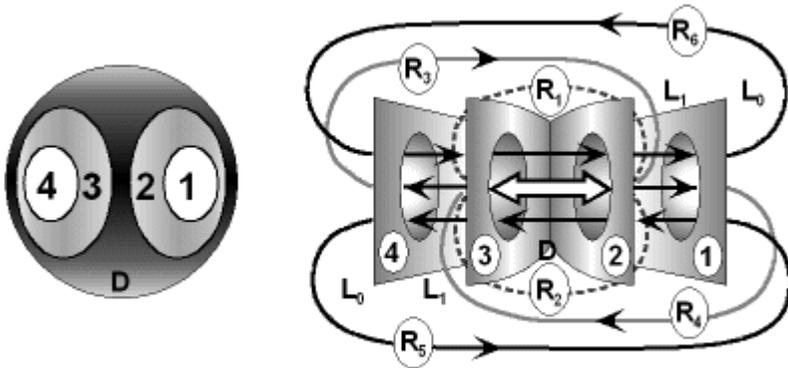


Figure 30

A transference of idea, represented by  $R_3$  and  $R_4$ , takes place within this whole context, via the partial coalescence as it relates in one direction to *idea*,  $R_3$ , and in the other direction to *form*,  $R_4$ . In  $R_3$ , body processes, C3, assimilate idea, C1, via partial coalescence with cell processes, C2. In  $R_4$ , cell processes assimilate an environmental response, C4, via the partial coalescence with the body, C3. In other words, the transference of the idea to the form achieves mutual consistency via the partial coalescence of body and cell processes.

Since the term is universal, so far as Harry's current predicament goes, it concerns all of his cell processes coalesced with all of his body processes, and all electronic processes in a countercurrent relationship

with environmental form. The internal and external aspects of the term are mutually balanced such that the term has an eternal quality. This provides it access to the timeless memories of the quantum sensorium—the void. It can thus relate to manifold elements of memory, as well as to diverse sensory input, in this way facilitating the assimilation of idea consistent with an appropriate form of response. This is how Harry gets the specifics of his act together—how he assimilates idea and translates it into form.

T3 is synchronous with T9. They always occur together in the first step of each cycle, so that T3 is assimilating ideas for transference into form while universal discretion is accessing them.\*

The transference of idea into form must be in accord with universal discretion, T9, which prescribes a time like succession in the translation of *idea*, via *knowledge*, thence via *routine*, into *form*. This dictates that the transference of idea, assimilated by T3, must be implemented in successive steps. This is consistent with the four steps in each cycle. It will take four steps for Harry's hand to move.

Since T9 is also universal in a way that T3 is not, it may access elements of memory which may not otherwise be raised. In this way creative new memories may be implemented to enhance the assimilation of idea and its transference into an appropriate form of response. Harry

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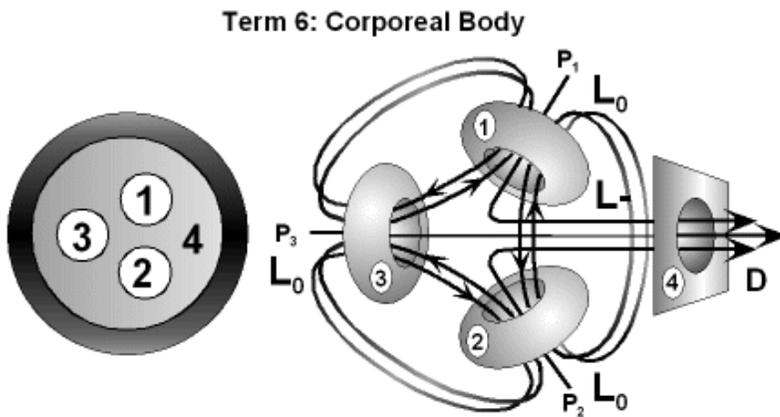
\*T3 is also synchronous with T8E, T7R, and T4E. Later we will see that in the memory term, T7, C3↔C4 are coalesced as the perceptual core of memory. We will also see that in the organization term, T4, which receives sensory input, C1↔C2 are coalesced to represent the body with respect to the environment. The two coalescences are reversed and the terms are always tensionally coupled. (For an explanation of tensional coupling see Appendix 1.) In T3, the partial coalescence between C2 and C3 therefore bridges the coalescences in T7 and T4. All pertinent memories may thus be taken together with all relevant sensory input, in assimilating idea into a form of response. Harry does all this without having to work out specific muscle movements. His motor-sensory responses have largely been automated at the spinal level since childhood. He remembers well how to swat mosquitoes.

T8E, is also a member of the synchronous grouping. This term reflects a balance between sensory input and motor output within the context of cell processes. T8E is the sales term, sending motor output to the muscles. The countercurrent motor response to sensory input thus has a relevance to this overall context represented within T3. Harry raised his hand ready to strike in a previous cycle, however, so in Step 1 of the current cycle, when the mosquito touches down, his hand is in a waiting mode, with T8E sending signals to hold it there ready to slap his other arm.

might decide instead to reach for a can of fly tox and forget the age-old swat technique.

*Term 6: Corporeal Body—U2-T6*

In Step 2 of each cycle, T3 transforms into T6, which is the consequence of assimilating idea into form. It is Harry's corporeal body starting to go through an integrated action sequence uniting form with idea. T6 is Harry's living form. The sequence isn't the one planned, however. The mosquito doesn't land on his arm as expected. It lights on his cheek. That sensory stimulus gets translated into a thoughtless reflex idea in Step 2 to slap himself in the face. He doesn't do it yet in Step 2, but he's surely going to. Harry wants to kill that cursed mosquito that won't let him sleep.



*Figure 31*

Let's have a look at T6 as illustrated in Figure 31. It can be seen that C1, C2, and C3, representing electronic, cell, and body processes, are linked by the countercurrent double identities within the context of environmental form C4. The double identities lend a specific form to each of C1, C2, and C3, much as they do in T4 of System 3. In System 4, however, the activity they are mutually engaged in is working behind or within environmental form, shaping it.

Each center also projects independently through environmental form, as designated by P<sub>1</sub>, P<sub>2</sub> and P<sub>3</sub>.

For instance, electronic processes, which express ideation, have a form which is consistent with both cell and body processes. Likewise cell and body processes each have a form which is consistent with each of its two partners. Thus each of the three relates to the other two and can also be independently identified through environmental form. We can identify them as specific ideas, specific knowledge, and specific routines. Together they represent an integrated sequence of action mobilizing Harry's fleshy hand to swat the pesky mosquito.

The explicit form of the centers of the triad is also displayed in the topological representation of Harry's body in his spinal cord, which is further elaborated in his cerebral hemispheres. Here it can be seen that there is an explicit relationship between the spatial organization of cell processes, the specific pattern of electronic stimulation, and the specific areas of the body concerned.

The overall relationship in T6 bears the stamp of the transference of idea into a form of response that was specified as the overall goal by T3. It also continues to be influenced in Step 2 by T9 of U1, requiring that the goal be achieved sequentially in a historically integrated manner.

In Step 2 of each cycle T6 occurs synchronously with the particular terms T5E, T2E, and T1R. T5E is the pattern of muscle activity that mobilizes Harry's hand. It follows from the motor signals initiated in Step 1 by T8E, which is a holding pattern. But T5E is also tensionally coupled with T2E, the idea term which interprets the sensory stimulus in Step 1 when the mosquito touches down on Harry's cheek. The sensory stimulus goes first into the spinal cord, and a reactionary spinal idea is generated before a cerebral one can be. To Harry's surprise, this idea isn't consistent with what was expected. His hand is waiting to swat the other arm, but the mosquito lands on his cheek. His hand is holding for an instant but uncertain.

At the same time there is some marketing going on. T1R has begun an electronic simulation among special proprioceptive motor neurons in the motor areas of the spinal cord, to feel out a better motor response to the market environment. (More on proprioception and muscle spindles later. See Appendix 2-4.) Many things are going on inside Harry that Harry doesn't know a thing about.

The fire is stirred up a bit and more wood is added to stave off the soggy weather. Another cup of soup adds some fuel for further thought.

*Term 8R: Universal Regenerative Feedback—U1-T8R*

In Step 3 of each cycle T6 remains unchanged, while T9 of the U1 set flips the universal triad over and turns it inside out, by transforming into T8R. Now some action can get initiated on Harry's problem. The primary universal set turns to a regenerative concern with Harry's capacity for motor activity in the T8R term. This coincides with the T8E term that has followed in sequence from the initial sensory stimulus of the mosquito landing, thence to the reactionary slap-in-the-face idea inside the spinal cord. Now T8E in turn activates a pattern of motor neurons projecting out to specific muscles. Sleepy Harry is going to slap himself hard in the face. You can bet on it now.

In the meantime, let's have a look at T8R of the U1 set in Figure 32. T8R differs from T8E by a switch in the position of Centers 1 and 2. The expressive and regenerative modes always involve a switch between C1 and C2. In T8R, the U1 set assumes a regenerative concern with Harry's whole corporeal body. It can't be entrusted to particular interests, so the particular sales term always occurs in the expressive mode. It is always called upon to send messages to muscles.

T8R of the primary U1 set involves all of Harry's electronic, cell, body and environment processes taken collectively. The transformation to this term involves an inversion of the objective orientation of T9 to a subjective alignment with the overall condition of Harry. Harry's overall resources must be maintained. He needs his sleep.

In Figure 32,  $R_1$  depicts the overall input from environment processes, C4, through body processes, C3, to cell processes, C2. It is a specific identity associated with the projections  $P_1$  in T8E of all particular sets. It represents environmental input of various kinds, including physical nourishment and rest to sustain the cell processes of Harry's body.

$R_2$  depicts a countercurrent identity of cell processes, C2, as they relate to body processes, C3, reflecting its implicit capacity to respond to environment processes, C4. It represents the state of regeneration of his body's resources in order to meet Harry's ongoing commitments.

The countercurrent balance between  $R_1$  and  $R_2$  is a subjective concern, within the context of the electrochemical processes, C1, that sustain Harry's entire body. It may also resonate to a degree with the historic integration of the culture, the human species, and with all species, since these are implicit to some extent in the evolution of the individual.

As a universal term, T8R does not independently initiate specific motor responses to the muscles, as in T8E of the particular sets, but it does influence the overall motor pattern that emerges. The term integrates the overall capacity of the body to respond appropriately, and it may even inhibit activity. This may present no problem to Harry so far as swatting a mosquito is concerned, but he is very tired and he needs a good night's sleep to be ready for a very important meeting tomorrow.

**Term 8R: Balanced Feedback**

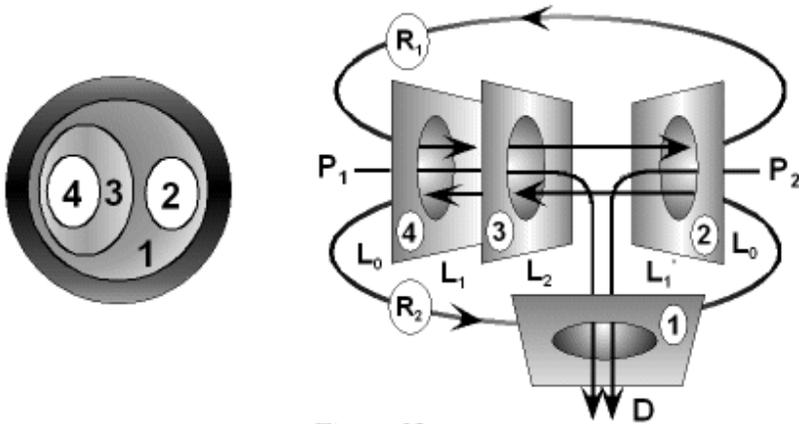


Figure 32

$R_1$  and  $R_2$  are mirrored across the interface of body processes, C3, from a subjective and objective perspective respectively, and the open centers encompass the historical context of related experience. The universal centers of the term embrace history. This mirrored balance of  $R_1$  and  $R_2$  is effected through the *cohesion* of T8R with T6. The two terms *cohere* or interact as one. The countercurrent identities of T8R tunnel through the triad C1, C2, C3 in T6, linking them together in three pairs, this time in clockwise direction, similar to the universal set tunneling through the particular sets in System 3. (Refer back to the space frame in Figure 19.) In doing so it reinforces a subjective to objective identity for each of the closed interfaces of the triad in T6, just as the universal set did for the particular set in System 3.

There are several distinguishing features in this case, however. Each of C1, C2, C3 in the triad of T6 share C4 of U1 as a common center in the cohesion with T8R. C4 is inside them.  $R_1$  and  $R_2$  of T8R thus reflect

the internal maintenance of the body processes of T6 as derived from the environment, and a capacity for response, respectively.

Also, in the clockwise linking in pairs, the respective centers of U1 and U2 are mutually aligned to correspond only across the interval between C2 and C3 in T6. This conforms to the partial coalescence between C2 and C3 in T3 through which idea transference into form is effected.

Furthermore, R<sub>1</sub> and R<sub>2</sub> of T8R are within C1, whereas the triad of T6 is within C4. The mutual cohesion of the two terms thus intimately aligns the context of *idea* in T8R with that of *form* in T6, further integrating the overall transference of idea to form in the light of regenerative needs. Harry has limited resources which must be taken into account. His weary frustration with the mosquito proves that.

Harry would never understand all this as an abstract system relating to his biological organization. It is a bit hard to visualize and deserves some study. But Harry does know that his body needs rest to regenerate his resources from within—his thinking, knowing and action abilities—through feedback from the environment. He had a good meal and went to bed early. He must put on a good performance at that meeting tomorrow and that pesky mosquito could cost him dearly.

There is also an overall balance sheet in T8R that is projected in terms of electrochemical energy and its pattern of distribution in Harry's body. Two independent projections, P<sub>1</sub> and P<sub>2</sub>, constitute an accounting of environmental input and a budgeting for cellular expenditures respectively. P<sub>1</sub> projects from the environment C4, through body processes C3, thence through electronic processes C1, thus reflecting a chemical input. Harry's supper is being digested inside his body and nourishing his cells from within, together with their electrochemical capabilities. P<sub>2</sub> projects from cell processes C2, through electronic processes C1, that determine chemical activity, thus reflecting chemical needs. There is thus a comparison of projected revenues alongside projected expenditures, in effect a balance sheet expressed in terms of electronic processes, the currency of chemical exchange. Harry knows that his energies must be restored though this balance, just as surely as he must present his company's budget at the board meeting tomorrow morning.

In Step 3 of Cycle 1, however, things aren't going so well for Harry. His hand is about to be galvanized into action to slap his own face very hard. Harry's anger with that tiny mosquito has him in an overkill mood.

Synchronous with the shower of motor signals in T8E that will mobilize Harry's hand, T4R is simulating another motor response for a sub-

sequent action sequence. The result will not be a reflex reaction but a preplanned action, like the one that had Harry's hand in a waiting mode in Step 1. In Step 2, the electronic motor simulation by T1R has initiated in Step 3 a motor simulation in the muscles that will move Harry's hand. The simulation isn't carried out by the muscles themselves, but rather by muscle spindles that exist within the muscles throughout Harry's body.

Muscle spindles are proprioceptive sensory organs containing muscle fibers that monitor the body's position, but they also have an independent motor supply. They can be tensioned or relaxed independently of the muscles they monitor. In this way they produce sensory feedback about the proprioception of the body's simulated position. (For more on muscle spindles see Appendices 2-4 and 2-5.) This is how we sense a pattern of action before we do it, how we might rehearse a new dance step in imaginary feeling before trying it out, for instance.

The muscle spindle simulation is tensionally coupled to the previous stream of completed action in memory, T7E. This will influence the simulation, lending it continuity, and conversely influencing yet another pattern of relevant memories being recalled. In this way the simulation will influence a subsequent expressive reactionary sequence as well.

Gradually a picture is taking shape about how System 4 spans and integrates history, in this case the history of Harry's ordeal with a mosquito. Harry's hand will slap his face in a reactionary manner according to how knowledge of his past experience has developed neural connections within his spinal cord to produce an automated response. But this will influence an ongoing simulation of a planned follow up, that anticipates a future course prior to committing the body to act. This in turn influences the recall of a subsequent expressive sequence. So there is a bridging of past and future involved that integrates the history of Harry's actions and lends them continuity step by step, and also coherence, under the direction of the universal sets. The cosmic order is a very ingenious arrangement. One can read down into it layer upon layer upon layer.

*Term 2E: Integrating Idea Creation—U2-T2E*

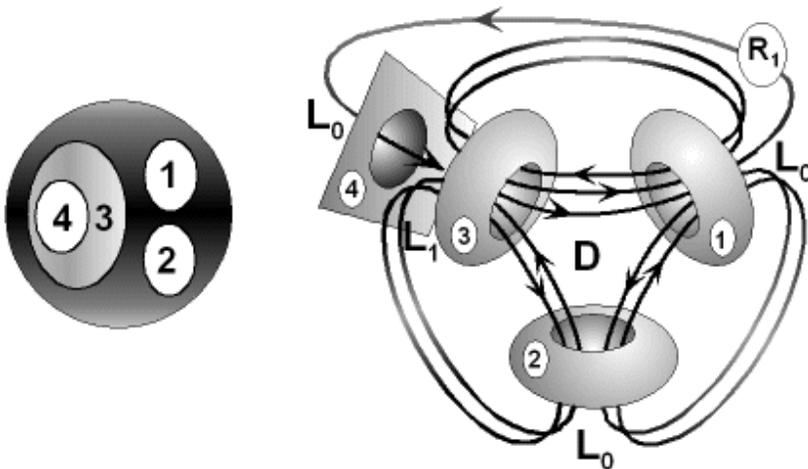
Smack! Ouch! That woke him right up. And he missed besides! The mosquito is still buzzing around in the murk. Harry's really mad now. Poor Harry.

This brings us to Step 4 of Cycle 1. The sensory impulse from the slap hasn't yet reached Harry's central nervous system, but his face will start to sting soon enough, in Step 1 of the next cycle. The slap was the

result of physical work, the T5R term that mobilized Harry's muscles. The four step transference of idea into form initiated in Step 1 of the cycle is completed in Step 4, but there is more in the works in the two other particular sets, all three working together with the universal sets.

In Step 4, the U2 set transforms from T6 to T2E. It turns inside out across the still inverted perceptual axis of the U1 set in T8R. Let's have a look at the universal T2E term that integrates all of Harry's particular ideas into one coherent pattern of idea, identified with the inverted form of Harry's physical body. Harry has an expressive idea of himself as an integrated form within his body. This is illustrated in Figure 33.

**Term 2E: Creation of Idea**



*Figure 33*

In T6 the C1, C2, C3 triad was within C4. In T2E of U2, C4 is within body processes C3, of the triad. The resultant  $R_1$  represents the environmentally integrated form of Harry as a corporeal entity, C4, transmitted through his body processes, C3, to complete an identity as an idea in electronic processes, C1. This identity is superimposed on the triadic relationship as an idea that Harry has of himself in action. It is an idea with a specific coherent pattern of activity in the triad, as inverted from T6.

The superimposed idea of Harry in T2E integrates the simulated ideas of all particular sets up and down his spinal cord, and in related sequences elaborated in his cerebral hemispheres. Once again T8R of U1

*coheres* with T2E of U2, linking the centers of the triad in pairs, and balancing energy input with projected expenditures. This is again effected through the topology of the cord and cerebrum with a shift from a sensory focus toward a motor focus. The interneurons connecting the sensory to the motor areas of the cord and cerebrum carry with them Harry's idea of himself. In this way the finalization of the overall plan as a patterned idea is tailored to suit as required, and refined into its integrated final *form*. It is expressed as a specific and coherent electronic pattern for execution.

The countercurrent identities of T8R link up the centers of the universal T2E triad in pairs, in clockwise rotation as in T6, but this time not within the context of form. The form interface, C4, integrating a specific overall pattern of the triad in T6, has inverted across the body interface to superimpose the integrating pattern as a coherent idea of Harry in T2E. This time the electronic interface, C1 of the universal T8R term, determines the context alone.

The integration of the simulated T2R particular sets, whether up and down the spine or in the cerebrum, is thus effected through the universal electronic pattern determined in T2E of U2. This universal idea term coherently reflects the body's capacity to perform in an electronic context, specified by C1 in T8R of U1. The primary universal set thus continues to monitor and direct the secondary universal set. With the overall pattern of response thus integrated, it is left to Step 1 of the following cycle for T8E of S2 to send the concerted pattern of motor innervation to the muscles of the body to physically enact the sequence.

The particular terms T1E of S1, T2R of S2, and T5R of S3 are synchronous with T8R of U1 and T2E of U2 in Step 4 of Cycle 1. T1E and T5R briefly deserve further mention.

T1E of S1 recalls memories associated with the immediately preceding sequence of action in Set 1, plus additional memories that were tensionally coupled to the simulation in T4R of S2 in Step 3. T1E is further influenced by proprioceptive feedback from the T5R slap in the face of S3. While initiating no simulation itself, T1E thus bridges past sequences with simulated anticipated action in future. In doing so it readies the body's capacity to respond in a pattern that anticipates the market. Despite Harry's angry sleepless state, there is nevertheless integrated continuity to his experience that is quite flexible. Harry is much more than a random collection of stimulus-response mechanisms blindly determined by positive and negative reinforcement over evolutionary history. Harry can intelligently integrate his own history.

T5R of S3 also provides proprioceptive feedback to T2R of S2. The integration of simulated idea that is so important in Step 4 must take into account the slap in the face and proceed from there, compensating as best it can.

### *Cyclic Integration*

Keep in mind that the secondary universal set began the cycle as T3, incorporating a host of sensory input with many elements of memory in the mutual assimilation of idea and response. Only elements of technique that were appropriate to current sensory information could find assimilation. Likewise, only sensory information that was relevant to the formulation of a response was pertinent, and much of it could be disregarded, Harry's inability to see much in the dark for example. In this way a nucleus of relevant sensory input was coalesced with a nexus of memories thus selected for recall in Step 1.

There are three polar dimensions to the transference of idea into form within each cycle, one dimension associated with each of the three particular sets. In Step 1 of Cycle 1, Harry knows the sensory impulse of the mosquito landing through T4E, and this set ends with a slap to his face, T5R in Step 4. The slap relates to the polar sensory context. Insight into this commitment dimension shows that at least the mosquito was prevented from biting, but a more accurate try is needed next time.

T4E is tensionally coupled with the recall of related memories, T7R in Step 1, which becomes translated into a simulated idea, T2R in Step 4, in anticipation of a better result. This potential dimension places the idea in the context of Harry's remembered experience.

The performance dimension in Cycle 1, concerns the motor impulses, T8E, to Harry's hand, which were in a holding pattern waiting for the mosquito to land in Step 1. This motor pattern is seen in the marketing context of the preparedness of the body to act, as given by T1E in Step 4. We thus see that each polar dimension is represented by a different particular set within each cycle. For each particular set, each of the three polar dimensions occur in three successive cycles.

Somatic behavior requires that the three polar dimensions find an appropriate ongoing balance. Considering the complexity of the human body this balance requires some further assistance where there is the conscious involvement of the cerebral hemispheres. We aren't smart enough to consciously work this all out with split second timing, so we have been fitted with a cerebellum to help us out so far as physical ac-

tivity is concerned. The cerebellum is smaller than the cerebrum and rests just below it at the back of the head. It has four distinct layers of neurons in its cortex, as compared to six layers in the cerebral cortex. The human body is represented topologically three times in three distinct homunculi, as they are called. It works with the vestibular system concerned with balance, and with the integration of motor activity, having a role in learning also. For a brief overview see Appendix 2-2.

At the end of Step 4, both universal sets shift transform back to their original term orientations in Step 1, to begin a new cycle.

In Cycle 2, S3 follows the same sequence of transformations that S2 followed in Cycle 1, S1 follows S3, while S2 follows S1, and so on in Cycle 3. This can be seen in Figure 26. One cycle is thus sufficient to portray the pattern, although it is necessary to follow through three cycles to complete the sequence for any one set.

In Step 1 of each cycle, new sensory input in one particular set arouses a tensionally coupled pattern of recall in another set. These particular sets are employed in an overall mutual assimilation of idea and response as a universal goal of the cycle. In subsequent steps through the cycle the assimilation of *idea* is translated through *knowledge* and *routine* to a specific overall *form* of response. Once this is achieved in Step 4, the universal sets shift their focus to a new pattern of sensory input and recall in the next cycle, while the already simulated pattern of response acts itself out. There is thus a self-consistent stream of continuity maintained through a process of discontinuity and change. The whole of history is integrated in a self-similar way.

We will return in the next chapter to have a look at how the meaning implicit in the particular terms is generated, and how they transform synapse by synapse one into another through the nervous system. The nervous system is in fact structured in exact accord.

The rain has stopped completely, and the sky is clearing; there are frequent patches of blue between the furrows overhead. The best news is in the north. The trailing edge of the storm center can be seen approaching as an ashen gray arch over the horizon. Beyond the arch is clear blue sky. A glorious remission is coming after five dreadful days of penance.

A spruce partridge is feeding near the tent. The same hen has stayed in the area most of the summer. She is plucking leaves from blueberry bushes, much as a housewife plucks canned goods from a supermarket shelf. She looks first to one side, then the other. She even has the supermarket walk, but without the buggy. Like most shoppers, she uses slow

deliberate steps as she looks here, then there, cocking her head to read the labels. Each leaf is carefully selected.

The shadow phantoms have returned to bring glad tidings. The sun is streaming down between the furrows, marching from the north in blessed beaming ranks of light. A liberating army has arrived to usher out the crippled captives of a former occupying force. Beaten, war-mongering oppressors are on their way. A feeling of renewal fills the clear bright air, washed clean of heavy moods. Rations of warmth are issued out in waves to vitally rejoicing masses in a victory parade. The air is moved by radiating spirits to murmur sweet nothings softly through the trees. Gentle boughs respond by reaching out to hug the breeze, while little white caps crop up to kiss the rocky shore.

The last limping stragglers of defeated troops mope off in broken file into a sullen southern sky. Their energies are spent, their surrender unconditional. The sky has clothed itself in a spotless uniform of blue. The job of mopping up is already under way.

The tent flaps are tied open to air it out. The sleeping bag is tossed across a clothesline behind the tent, along with articles of damp clothing. Other clothes are taken to the lake to wash. The rest of the afternoon is spent cleaning up and cutting wood.

The fish are biting in the little cove again. During supper the whiskey jacks pay a brief visit. They vary their timetable from day to day, coming even on rainy days, if it isn't pouring down too hard. Two of them have become very tame, but Pushy Number One is still quite timid. Although he snatches food quickly from the fingers at arm's length, he won't venture to perch on the knee or hand.

As the evening wears on, the mood consolidates into a breathless quiet. Though warmer, the air is still quite chill and crystal clear—purged of vague uncertainty. Each leaf, each needle, each stone and pebble stands out distinct. Distant trees and rocks are striking in detail. The vision probes with telescopic depth. Minor sounds ring sharp in tiny detonations. Unnoticed birds chirp short soprano solos in fleeting fragments of disjointed song.

The lanterns are filled and lit as darkness begins to bleed the colors from the sky. The fireplace stones are spread to make room for a large green chunk of wood that will burn for two or three hours. The bear has not returned, but may still be waiting on the island to see what he can steal at night. Two lanterns and a fire should be enough to dissuade the hairy thief from venturing into camp, permitting some time for star gazing from the nearby point.

The benchlike rock on the northern point is shaped like a reclining seat in a planetarium—an ideal spot to watch the stars come out. The last vestiges of light are fading fast. There is a single, slim cloud stretched in black silhouette across the west, like a rip in the vault of the heavens. Gradually it blends into darkness. A trace of northern lights appears over the horizon in the north. For a while they grope like searchlights from beyond the hills, then they disappear.

Watson's interest has also turned toward the stars, but unfortunately the island weather there has been less accommodating than on the island here. He has dragged Holmes off to a special church, a planetarium, where the mock night sky is always clear. The master sleuth is proceeding now to expound on the evidence in the mystery of the stars. He remains convinced that the stars are just a multitude of kitchens in a big bake shop, believing that central to the case is the cooking of the natural elements in thermonuclear ovens. He is busy explaining about our own galaxy, the Milky Way, and about the different kinds of stars, about how they are born from interstellar gas and dust, how they mature, grow old, and die. He is careful, however, to avoid the implication that these are real life cycles, that the stars are living beings. He takes pains to describe how the laws of physics can be invoked to explain events, pointing out the special importance of the laws of thermodynamics, essential to his belief that everything is a bakeshop. These laws are his commandments.

"It is all very elementary, my dear Watson. Everything has happened in a most natural way. Our galaxy has condensed from a gigantic swirling eddy of gas and dust, just as all the galaxies have done. It all most probably began with a big bang about ten to fifteen billion years ago, from which the universe expanded, cooling into the independent galaxies that continue to expand away from one another under the impetus of the initial explosion. There are some possible variations to the theme, but the big bang was the primal act of cooking in the bakeshop."

Watson is skeptical of Holmes's big bang ideas; however he is interested in the evidence. "I understand there are various kinds of galaxies and that ours is of the spiral type. Is that correct Holmes?"

"Yes, our galaxy is a large member of the spiral type, about 100,000 light years across. Our sun is situated in one of the spiral arms about 30,000 light years from the center, where the main disc of stars is about 3,000 light years thick. The center of the galaxy is about six times thicker. Surrounding this swirling spiral disc is a vast, spherical-shaped halo of globular clusters of stars, each containing hundreds of thousands of

stars. About two hundred of these globular clusters are in elliptical orbit about the galactic center. The majority of stars in the clusters and near the center are of an older type than in the spiral arms. There is also an intermediate flattened halo of stars surrounding the disc, which are mostly stars of intermediate age.”

“I see,” says Watson. “There seems to be different regions of organization to the galaxy: the galactic center with older stars, the spiral arms with newer stars, globular clusters with older stars, and an intermediate halo with stars of moderate age. It is amazing that you are able to judge the age of stars. How are you able to surmise such a thing?”

“It has been accomplished through a long process of classifying stars in various ways by observing their nature and behavior. All this is possible because stars emit electromagnetic fingerprints.”

“Fingerprints!” exclaims Watson. “That does sound like a classic bit of detective work. Can you tell me more?”

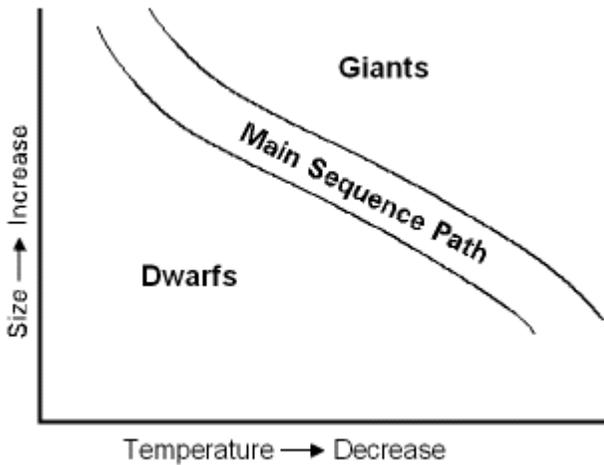
“Of course, my dear fellow. Electromagnetic fingerprints are patterns of lines in the light spectra of stars, like tiny fragments of the rainbow. They reveal the surface temperature of stars, their chemical constituents, and their radial velocity directly toward us or directly away from us. Clusters of stars that move together as a group also permit determination of their of their directional space velocity because they appear to converge toward a point. If we know their space velocity and radial velocity, it is possible to compute their distance from us. Now, as you know, the brightness of stars is an indication of their size. Knowing a stars brightness and distance, we are able to estimate its actual size, according to its fingerprint type.”

“Let me see if I’ve got it straight,” says Watson, a little confused. “You are able to compute the distance of stars from a knowledge of their radial and space velocities. Knowing their distance and their brightness, you are then able to estimate their actual size. Are you then able to determine their age from their size?”

“Not quite that simply, Watson. Fingerprint type indicates their temperature. When stars are plotted on a chart according to their size and temperature, an interesting pattern emerges. Most stars fall within a path diagonally across the diagram—these are called main sequence stars. Stars above the main-sequence path have low temperatures, yet are very luminous because they are so large. These are called the giants and supergiants. Stars below the main-sequence path have high temperatures, yet are rather dim because they are small. These are called white dwarfs. The chart is called an HR diagram. (See Figure 34.)

“Interesting, indeed! Above the main-sequence path is the land of the giants, and below the path is the land of the dwarfs. You have certainly been able to piece together a lot from a few fingerprints,” commends Watson. “I guess that all of our knowledge of the stars depends on electromagnetic energy, but how are you able to translate this information into age?”

“It is a straightforward matter of elementary deduction,” replies the sleuth proudly, getting ready for a lengthy dissertation. “As a cloud of interstellar gas and dust tries to condense into a protostar, the gravitational forces of contraction are resisted by thermal pressure. If conditions are right, gravity wins the struggle, the cloud contracting until very high temperatures and pressures in its core bring about nuclear ignition.



*Figure 34*

A star is born in the land of the giants. This can occur dramatically: a number of protostars are known to have appeared in the skies in the course of just a few years. Following ignition, the star continues to consolidate, contracting in size while increasing in temperature. It moves out of the land of the giants onto the main sequence path, where it stabilizes for more than 90 percent of its life.

“Eventually its primary fuel supply of hydrogen begins to wane. Hydrogen is transformed through nuclear fusion into the next heavier

element, helium, which collects in the core of the star. As hydrogen supplies are used up, the star cools, weakening the internal support of thermal and radiation pressure. The core undergoes further gravitational contraction, releasing more energy as heat, which in turn restimulates hydrogen burning to more vigorous levels than before. The increased energy expands the outer layers of the star, increasing its total brightness even though its surface temperatures are reduced. The star thus moves off the main-sequence path back into the land of the giants. Now a red giant, its core temperature continues to increase owing to further internal contraction. At 100 million degrees Kelvin, helium burning can begin to cook heavier elements such as beryllium, carbon and oxygen.”

“An admirable piece of detective work!” compliments Watson. “A young star begins as a giant that moves onto the main-sequence path for most of its life. Later it expands again, to spend its old age as a red giant while it produces heavier elements in its core. Does it keep doing this until it burns out?”

“Nothing so simple as that, Watson. It depends on the mass of the star. The most massive go through a series of contractions in the core which ignite a series of nuclear reactions that eventually cook the elements up to iron. Elements heavier than iron cannot be fused, because the reactions required do not yield energy. Continued uncontrolled core collapse produces uncontrolled heating that eventually results in a gigantic explosion called a supernova. The supernova event can outshine an entire galaxy, supplying the energy needed to cook the heavier elements all the way up to uranium. This material disperses as interstellar gas and dust, to eventually form again into new stars. This accounts for the difference in chemical composition between younger stars in the spiral arms and older stars in the center of the galaxy.”

Holmes pauses for a moment to point out the location of the Crab nebula in the constellation of the Bull.

“The Crab nebula is the remains of a super nova explosion that was recorded by Chinese astronomers in the year 1054. It was visible in daylight for three weeks. Not all stars experience a super nova in their old age, however. Stars like our sun appear destined to have a nonviolent demise. Their cores continue to shrink in size to the limit that atomic structure will allow. Our sun will one day shrink to the size of the earth—a spoonful of its material will weigh many tons. These white-hot stars shed their red-giant cloaks to become white dwarfs, crossing over the main-sequence path into the land of the dwarfs, where they continue to cool. At the end of its life, our sun will become a dark cold cinder

called a black dwarf. Another HR diagram can be used to illustrate the life cycle of a star." (See Figure 35.)

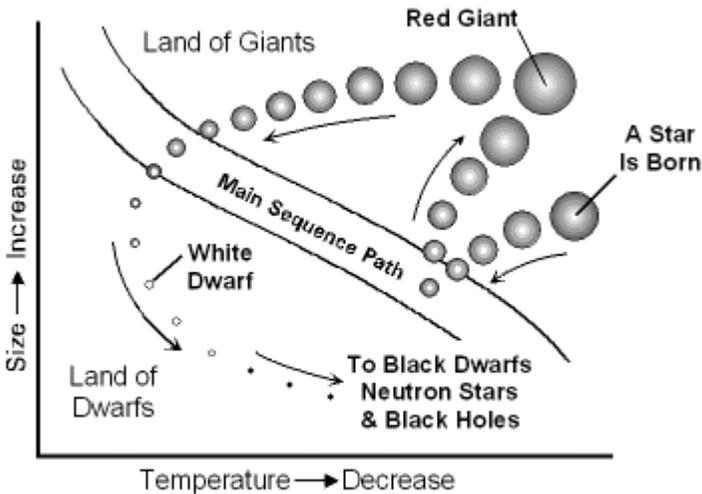


Figure 35

"Why that's extraordinary!" responds Watson as he studies the diagram. "It all seems to fit together beautifully, and you can estimate the age of a star from its position on the diagram. Can you show me some examples?"

"Yes, indeed," says Holmes, pointing out several red giants and white dwarfs. He then goes on to explain about neutron stars. "Some stars more massive than our sun may undergo even further contraction beyond the white dwarf stage, to as little as twenty or thirty kilometers in diameter. Under intense gravitational forces, the electrons and protons within the atom may be forced to combine into neutrons to make such a supershrink possible. Rapidly pulsating radio sources are thought to be such superdense stars. There appears to be one in the center of the Crab nebula, the remnant of a supernova."

"I can't imagine how heavy a spoonful of that material must be." Watson is a little incredulous, adding "I guess we can assume that's the end of the line as far as shrinking goes."

"Perhaps not," replies the detective as if he has private access to a piece of earthshaking truth. "If a star is sufficiently massive, the neutron forces may not be enough to halt core contraction. Gravitational collapse may continue into a condition of infinite density and zero volume, which

is commonly called a black hole. This condition is known in theory as a singularity.”

Watson, a little shaken, stammers to get his question out. “Wh-what on earth is a singularity?”

“No need to get excited, Watson. It is all perfectly natural. Relativity theory merely indicates that there is a certain radius, called the Shwarzschild radius, associated with any given mass, which defines a sphere of critical density. If any mass contracts sufficiently to become enclosed within this critical sphere, then contraction must continue until the mass vanishes in a pinpoint. The laws of science no longer have any meaning. A particle entering the sphere, as seen from within the sphere, can only fall toward extinction in the singularity. To an outside observer, however, this can never be seen to happen—particles can be seen only to approach the sphere without ever quite reaching it. This suggests that a particle entering the sphere splits in two, one part passing into extinction, the other part ejecting again.”

Watson wonders what kind of double talk Holmes has resorted to. He searches his face but can detect no sign that he is joking. “Then you expect me to believe that an entire star, several times larger than our sun can be squeezed to extinction in a pin prick under the force of its own gravity? Okay, I’ll try! Is this Shwarzschild density the same for every mass?”

“Oh, no! It depends on the total mass involved: the smaller the mass, the greater the Shwarzschild density. For instance, if our sun shrank to its Shwarzschild sphere, its density would become 10 billion tons per cubic centimeter, and its diameter would be less than six kilometers. On the other hand, the Shwarzschild radius of the entire universe is about ten billion light-years, and the corresponding density is about  $10^{-29}$  grams per cubic centimeter. Although the observed density of the universe is less than ten percent of the Shwarzschild density it’s possible that there may be a lot of dark matter out there that we can’t detect. The universe may one day again contract into the singularity from which the big bang gave it birth.”

This last example shatters Watson’s efforts to restrain himself. “If I understand you correctly, Holmes, you are asking me to believe in the existence of black holes, which by your own admission do not exist. Seen from inside the Shwarzschild sphere, there is only extinction of mass and energy, and seen from outside the sphere, nothing within it can be seen. If you will excuse me for saying so, Holmes, I have less trouble believing in the bogeyman.”

Holmes, unamused, goes on. "I admit that the detection of black holes presents a problem. They have a closed event horizon. Even light cannot escape the massive pull of infinite gravity. There is nevertheless evidence that such black holes exist. As particles approach black holes they should become accelerated and heated to extremes that result in X-ray radiation. The X-ray emissions associated with the star Cygnus X-1 seem to indicate a black hole. This star behaves as if it is one member of a binary pair that orbit around one another. The unseen partner could very well be a black hole that is drawing material from Cygnus X-1 into a singularity. There are other candidates as well."

"I suppose that if there is one black hole, there are sure to be many scattered through the heavens like the pox, stealing the material substance of the universe from under our very noses. They sound like thieves in the night, black bandits robbing from the heavens to stash their booty who knows where."

Though Watson jokes about black holes, he is also perplexed. He senses an unreconciled dilemma in the two perspectives of a singularity, one from inside the Schwarzschild sphere, one from outside the sphere. This dilemma, concerning the relationship of center to periphery, is implicated in theories of the origin of the universe as well. It is ironic that Holmes's laws cease to have meaning under these conditions. Holmes himself is stuck with this dilemma.

Watson doesn't pursue the question further. He doesn't like the big bang idea, but he hasn't yet glimpsed the *Big Screen* in cosmic movie projection. He hasn't seen the great void, the master quantum repository spanning space and time in the synchronous projection of the universe. Instead he turns to other questions about the great variety of stars, about interstellar gas and dust, and about the galaxy's magnetic field. He becomes perplexed again by news of the strange events observed going on in the center of our galaxy. A very compact radio source, as massive as five million suns, indicates a huge black hole lurking there. Enormous amounts of hydrogen are being ejected radially away from it, like giant smoke rings emitted every few million years. These enormous clouds have hot young star formation within, as the rings expand out into the spiral arms. At the same time the central region contains the highest concentration of stars in the galaxy, and star sized clouds of ionized gas are speeding around the center at high velocities, their velocities increasing

with their proximity to the center. This indicates old stars being torn apart as they are drawn into a super massive black hole.\*

Holmes continues to respond as best he can to Watson's questions, candidly admitting to conflicting evidence that keeps turning up in the face of this vast mystery.

The night sky has become very dark and deep. The Milky Way is strewn across the heavens like a great celestial cocoon breeding suns from mysterious silken folds. It has turned directly overhead to view its own reflection in the water. The Big dipper is sitting flat, as if a huge hand has set it on a table.

Memories of the experience come back again. A galaxy of stars was re-created in the void by the Cosmic Being. They appeared behind a dark interface of energy that swept in a sheet quickly through the void. It radiated from the center of the Cosmic Being, as if he had waved a magic wand to retract a veil. The galaxy was seen from outer space, recalled to form at his discretion.

This wasn't just a picture show without a message. It was followed by the two horrendous hemispheres of energy, incorporating all the particular and universal aspects of being striving for wholeness. Their energies were striving to get together, to become one, striving for balance between self and other, between one and many, between one and two. I was one particular center with respect to the Universal Center beside me.

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\*There is thus direct evidence, from radio and infrared observations, that the galaxy is recycling its stellar population. This is consistent with the primary discontinuous projection of matter, which requires the skipping of space frames in the centers of galaxies with respect to their peripheries, due to their angular velocities with respect to one another. Spatial contraction may therefore be expected near the center, which can be partially offset by the spatial contraction of atoms through nuclear fusion in stars, but also leaving a black hole or singularity associated with the universal projection of matter at the very center. Young stars migrate outward while old stars are drawn back toward the center by their advanced spatial contraction into heavier atoms. A significant number of galaxies are also known to emit strongly in the infrared region, indicating high rates of star formation, in some cases sufficient to recycle their entire stellar population in less than a billion years if the rate was sustained, although it can be expected to be cyclic. There is thus no compelling reason to suggest that the universe ever had a beginning, or will ever have an end. For a summary of these ideas and a more comprehensive interpretation of the evidence, see Appendix 3.

We were each a center of a hemisphere on each other's periphery. We were linked but separate. In our mutual separateness we transcended the whole creative process, seeing the dilemma of creation apart from creation, seeing it objectively, yet experiencing it impartially.

Then the balance between the two hemispheres faltered. The hemispheres began to tremble on the verge of cataclysmic instability. The entire universe was at risk. The alarming realization of personal responsibility for the balance was at the same time utterly beyond the capacity of one particular human being to accomplish. A powerful eruption of energies began in my bowels and came cascading up through my autonomic nervous system, through my evolutionary origins in the biosphere, through the whole of vertebrate evolution, culminating in the bilateral polarization of brain function. The three polar dimensions to the integration of experience were implicitly involved. But the transverse tension in my mind was severe beyond description, prying open my mind to realms far beyond normal human experience.

Just as all seemed utterly lost, the Universal Center intervened. It began to consume the energies of the void in an apparent attempt to restore the balance and stave off the destruction of the universe. But the void *was* the universe. This became the most awesome of spectacles with a dynamism beyond compare in the universe. The whole void became polarized along invisible rays that disseminated in all directions from the Universal Center as it drew the energies of the void unto itself to meet their doom in the incredible dynamism of its being.

As the transverse tension reached unbearable proportions, a black hole opened in the energies of the void within me. It was a bottomless well that tunneled from my eyes straight through my being, opening an access way right through the mist-like energies of the void. It was a bottomless black hole right through me, with the tension in my mind infinitely extreme.

Somehow I managed to turn away from the cataclysmic spectacle which held me, in a last ditch effort to stave off the destruction of the universe. It was a concern for other than self, because this cosmic intervention was consuming the energies of the universe out of a need to restore the balance between the two hemispheres. Without that balance nothing could exist, and without the void nothing could exist. The void was generated by particular commitments to experience, myriads of them structured tier upon tier in every nook and cranny of the universe.

The Cosmic Being had moved up and away as it began consuming the void. It became an Absolute Universal Center in a field of pitch black

emptiness visible beyond the great tongues of the void that were flying into it. It was becoming a manifestation of System 1, transcending and subsuming System 2. It was becoming complete and whole unto itself, dismantling involutory variants of experience. Particular elements of experience were composites with universal aspects, created through the higher systems of the creative process. The Universal Center was gathering itself unto itself, bringing involutory variants to a final end in the consummation of its being. The Cosmic Being has no origin in the void, no birth in space and time, no personal history recorded there, no possibility of ultimate demise. It transcends the void in every respect.

As I turned my back on the Universal Center, another black hole opened down into the void. It was another tunnel projected forward with my vision, opening a bottomless well through the quantized mists of the void. The black holes into the void were now balanced, one opened from the front and one opened from the back, with the center of my perception an axis between them. From behind me the Cosmic Being began to access the energies of the void through me, then recommitted them so I could see how the process worked. Streams of memories were projected out into my visual field, then energies were drawn into me and projected out into the completion of the city.

Black holes provide access to experience, to history. They permit the eternal reflux of ordered energies, their regeneration and their recommitment to experience. Through black holes galaxies are living cells recycling their stellar populations eternally. In a self-similar way people can redeem their involuted energies. We can make a responsible contribution to the cosmic balance in the eternal best interests of all.

The enigma of the singularity is not a mathematical problem confined to black holes in astrophysics or the cosmological origins of the universe. It is an expression of the creative dilemma at the root of mind.

A mood of sleep is cast across the deep. Only crickets resist the paralyzing quiet to sustain the rhythm for a psalm of slumber. Eventually their muted squeaks inspire the musicians of the lake to croon a lullaby. A solitary loon begins, a mile or two to the north. Its call is smooth and mellow as it utters a single note, prolonged and clear, without vibrato. The note begins with a single soft yodel, then it rises only slightly before it falls in harmony with its own resounding echo. The crystalline acoustics of the night replicate the solo into the distant fading chorus of a crowd. As it trails away, another loon captures the mood and melody to perfection. Another round of replicating sound is picked up by another

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loon. Links of replicating tune are passed from loon to loon. Each link is in exquisite taste, each concordant with the others. A fluid chain of sound is woven round and round. The euphony of echoes rings through the hills, but softly, rising only slightly, then trailing off, bidding peace and rest to all creatures of the wild. The water comes alive with the mellow hum of gentle song as the loons croon on and on their lullaby on the lake. It is a rendering reserved for very special nights.

The fire will be burning low; it is time to check the camp. There is only starlight to show the way, but the eyes have become accustomed. The gas lantern on the table, low on air, is pumped up. Some more wood is added to the fire. The bear hasn't returned—perhaps he has left the island. Another hour passes watching the fire and listening to the wood worms munching in the log. The black bandit won't be back. It is time for bed. However, just in case, a couple more large chunks are added to the fire, and the coal oil lantern is left alight.

# Chapter 15

## Ghosts and Ghouls

There is a loud splashing in the small cove right beside the tent. It is very early morning; nothing but fog can be seen out the window. Surely it can't be a moose or a bear. What is it?

The tent flap is opened to have a look outside. It is getting light, but the sun is not up yet. The mainland shore is completely concealed by fog. The small cove is full of mergansers feeding on a school of minnows. There must be thirty of them or more. They are swimming rapidly back and forth, diving all over the little bay. With the school of minnows corralled, they make throaty sounds of glee as they feast like greedy monsters.

It is earlier than usual to be up. Might as well catch a fish for breakfast. It will pass some time while the sun dispels the fog. In late summer and early fall it is common for fog to settle on the lakes at night.

The canoe is paddled slowly around the point toward the west side of the island. The thick fog makes for poor visibility. The world seems to end a few yards from the canoe. There is only a short distance to go, yet it feels like a journey in a time machine through the twilight zone. The mirror surface of the lake vanishes into a misty void as sleek ripples drift out into oblivion. Lost in time, the craft sifts through the vacant vapors, seeking out a destiny suspended as a memory in the past. Gaunt forms begin to loom ahead like apparitions in a crystal ball. Uncertain branches reach out for recognition and guide the intuition. Pale rock creeps down to join with its reflection in a point that gestures into nowhere. The time machine has found its mark: the point beyond the little bay which indicates the fishing hole. Casting begins into the blank white sea of emptiness.

The whole of experience is synchronously recalled from the sea of emptiness, and from that vast cosmic sea, every particular event is given form, even a mosquito landing on Harry Smith's cheek. Systems 3 and higher all have at least one eternal term associated with recall. Let's re-

turn to Harry Smith, to see how his particular sets are generated. Harry won't mind.

Recall that the six terms of System 4 occur in alternating groups of three—one term from each particular set. We may call them an emptiness grouping, and a form grouping. The emptiness grouping, Terms 8, 7, 4, occur in Steps 1 and 3 of each cycle. The form grouping, Terms 1, 2, 5, occurs in Steps 2 and 4 of each cycle. In the emptiness grouping, memories tensionally coupled to sensory input are being aroused while a pattern of motor impulses is on its way to Harry's muscles. Harry is passive in this grouping. He's in a fleeting sort of limbo, like a fog between action sequences, getting his act together, you might say. In the form grouping his muscles are contracting, with proprioceptive feedback telling him the form of his action. His action is also tensionally coupled to idea, and together they relate to his perception of market need. Harry knows what he's doing all right.

Let's keep the alternate groupings in mind, that the terms in each set mutually influence one another, and that they are regulated by the universal sets. Knowing that all this is working in the background, let's follow through the six term sequence, term by term, focusing mostly on one set, but pointing out regenerative modes and important other features as we go. This will familiarize us with how each term generates meaning and how it relates to the structure of Harry's nervous system. If the reader is interested, they can then review the last chapter and clarify points about how all the sets are integrated and work together. We will use Set 3 and begin with T4E in Step 1 of Cycle 1. That's how Harry first feels that monstrous mosquito touch down.

One other thing should be pointed out. The somatic sense of touch for the head employs cranial nerves, as distinct from spinal nerves, but so far as we are concerned here they are organized in a similar way in the brain stem, which is an elaborate extension of the spinal cord. For the sake of simplicity we will therefore refer to the sensory input from Harry's cheek as coming into the sensory area of the spinal cord, rather than get into technical jargon. The sensory areas are at the rear of the cord, and they are connected by interneurons to motor areas at the front of the cord. (See Appendix 2-5.) This is similar to the way the sensory areas of the cerebral hemispheres are to the rear of the central fissure, while the motor areas are in front. The cerebrum is an elaboration of the spinal cord, the central gray of the cord being inverted to the cortex.

Term 4: Sensory Organization—T4

From an examination of T4E in Figure 36, it can be seen that *electronic processes*, are mutually coalesced with *cell processes*,  $C1 \leftrightarrow C2$ , and that together they represent the *body*, C3, as it relates to *environmental form*, C4. The mutually linked relational wholes  $R_2$  and  $R_3$  designate this. In other words Harry's body relates to his physical environment via the electronic processes of his cells. This clearly indicates his sensory apparatus.

Countercurrent to this relationship it can be seen that the environment, C4, can provide input to the body, C3, by completing a relational whole,  $R_1$ , via electronic process, C1, as these are coalesced with cell processes, C2. Accordingly, when the mosquito touches down on Harry's cheek, his sensory neurons for touch transmit an electronic stimulus into the sensory area of the spinal cord. This electronic stimulus is represented by  $R_1$ . This is the expressive mode, T4E.

**Term 4E: Sensory Organization**

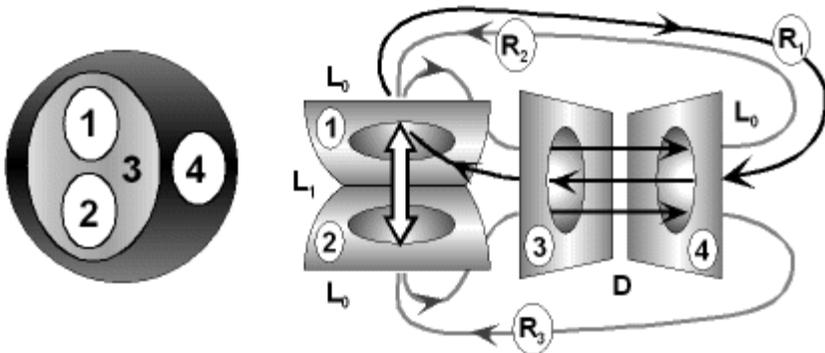


Figure 36

Six steps through the sequence, this set will transform to the regenerative mode, T4R. In the regenerative mode C1 and C2 always change places, so  $R_1$  is completed through C2, instead of C1. It focuses on the selection of cells rather than on electronic stimulation.

T4R follows from T1R, in which the marketing term conducts a motor simulation of a better action plan for Harry. This occurs in special motor cells of his spinal cord which project to muscle spindles. As we shall soon see, the motor simulation in T1R involves a coalescence,

$C1 \leftrightarrow C2$ , between electronic and cell process, according to the topological arrangement of the latter in the cord. The simulation in Harry's cord thus projects motor impulses to the muscle spindles in Harry's muscles. This initiates a similar spindle simulation in the  $C1 \leftrightarrow C2$  coalescence of T4R as it represents his body, C3, with respect to its form, C4. This is represented by  $R_2$  and  $R_3$ . A fleeting little dance is going on inside Harry's arm and hand as he figures out what to do next, after he so viciously slapped himself in the face. (Appendices 2-4 and 2-5 have more on muscle spindles.)

The enactment of this spindle simulation produces proprioceptive sensory feedback,  $R_1$  completed through C2, on the simulated change in the position of Harry's hand. Proprioceptive sensory neurons project very quickly back to the sensory areas of the cord. They also have collateral branches which project directly to the motor areas, thus bridging the interneurons that interconnect sensory to motor areas in the cord. The simulation thus pre-selects an anticipated pattern of motor cells. This selected response has a mutual influence on the other sets. In this way Harry can plan something better than a series of reactionary slaps to his face and body. We don't want Harry bruised for his meeting tomorrow.

Jumping back again six steps now, T4E transforms into T2E, the next term in the sequence, across the synaptic cleft to an interneuron in the central gray of the spinal cord. A collateral branch of the sensory neuron also synapses with a tract neuron transmitting via the thalamus to the sensory area of the cerebral cortex. For our purposes here we will focus on Harry's spinal responses, so it is the interneuron in the cord that interests us.

Note that the transformations from term to term generally occur across synapses, apart from the memory term, which concerns all cells in the sequence. This means that the nervous system must be organized to function in precise accord with the system, synapse by synapse.

### *Term 2: Creation of Idea, Identifying Patterns—T2.*

The transformation of T4E into T2E involves the *perceptual transposition* of the body interface, C3, such that it turns inward to face C1 and C2. Figure 37 illustrates the resulting triadic relationship between the topological representation of the *body*, and the *electronic* and *cell processes* in the gray matter of the cord. Harry doesn't know he has such a triadic condition in his cord, but he surely has.

**Term 2E: Creation of Idea**

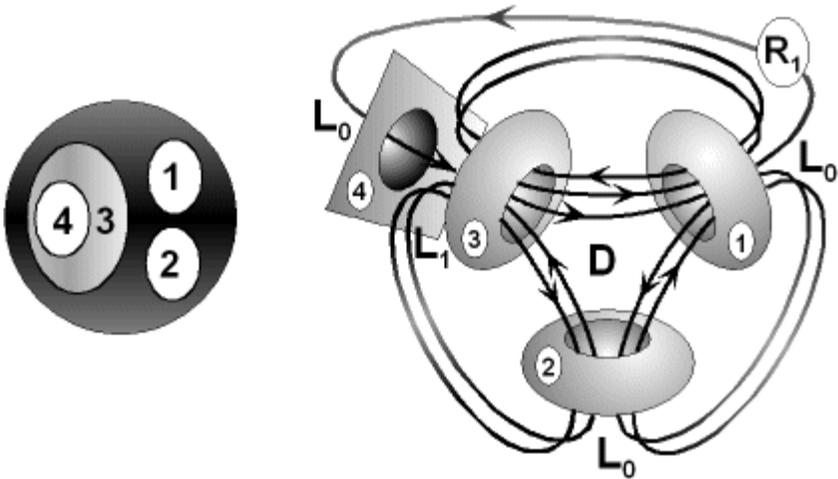


Figure 37

The electronic stimulus from the mosquito landing,  $R_1$  in T4E, that was transmitted through Harry's body by the sensory neuron, is thus relayed to the interneuron in the gray matter of the cord. The firing of the interneuron in T2E is likewise shown having its origins in an environmental stimulus, C4, transferred through the body, C3, into a new electronic identity, C1, indicated again by  $R_1$ . This time  $R_1$  expresses the idea of the mosquito's touch down on Harry's cheek, superimposed on the triadic relationship between body, cell, and electronic processes in his cord. The electronic idea coming through the body is also linked to the third member of the triad, relevant cell processes, organized as they are through experience to select an automatic motor response. This is especially so since Harry is waiting so expectantly to slap himself at the first touch. His spinal responses are primed in anticipation of a slap, through cerebral simulation in conscious thought.

Recall that there are two more synchronous terms in Step 2 that mutually influence one another. The proprioceptive feedback in T5E of S1 can influence the pattern selected in T2E of S3, and both can affect the motor simulation in T1R of S2. The nervous system is thus structured in accord with the system in such a way as to lend continuity to sequential events, thus integrating history by bridging past and future. in a non-causal way.

Let's look ahead six steps to the regenerative mode of the same set, T2R. In this term,  $R_1$  derives from proprioceptive sensory feedback from the simulated muscle spindle response, C4. This feedback from simulated action in the previous step has come through Harry's body, C3, to complete a superimposed identity with cell processes, C2, instead of C1 as in T2E. Again  $R_1$  represents the firing of interneurons superimposed on the triad, but this time as a simulated idea involving a specific pattern of motor cells. Since the proprioceptive sensory feedback from the spindle simulation spanned the interneurons, projecting also to the motor cells of the cord, the interneurons are specifically directed to select the corresponding motor pattern. The firing of interneurons, the superimposed idea, is thus strongly biased to select predesignated motor cells, subject to synchronous influences. The motor cells are thus selected by simulated feedback from an anticipated action.

If you think this through you will see that Harry's ideas are not pre-determined. He is not fully a creation of his past conditioning. He can change his mind. At a conscious level, he can even simulate a whole new plan. He can go and sleep in the spare bedroom and lock the mosquito up alone in this one—starve the cannibal.

Jumping back again six steps, T2E transforms into T8E across the synapse from interneurons to the motor neurons which transmit out to a corresponding pattern of muscles.

*Term 8: Creative Feedback, Balanced Response—T8E*

We have already seen the regenerative mode of this term. It is the regenerative mode of the primary universal set, U1. The particular sets never occur in the regenerative mode of sales. They always project motor impulses to muscles. The expressive mode of this term is nevertheless the pivot between the expressive and regenerative modes of the other terms in the sequence. They switch to the regenerative mode following this term, and they switch back to the expressive mode when they come to this term again.

The transformation to T8E involves the perceptual transposition of cell processes, C2. C2 turns away from external double identities with C1 and C3 in the triad of T2. It can be seen in Figure 38 that C2 contains the other three centers. There are countercurrent identities between C4, C3, C1, within the context of cell processes, C2. This countercurrent balance between  $R_2$  and  $R_1$  is how Harry tries to balance his act in response to sensory input. The countercurrent balance occurs across his

body interface, C3, the sensory input coming from the environment to an identity in C1, the electronic motor response being directed toward the environment, C4. Since the touch down of the mosquito is still represented by R<sub>1</sub>, Harry knows exactly where to slap himself in the face. Harry's motor response, R<sub>2</sub>, is thus directed accordingly. Harry was on target; the mosquito was just too quick.

**Term 8E: Balanced Response**

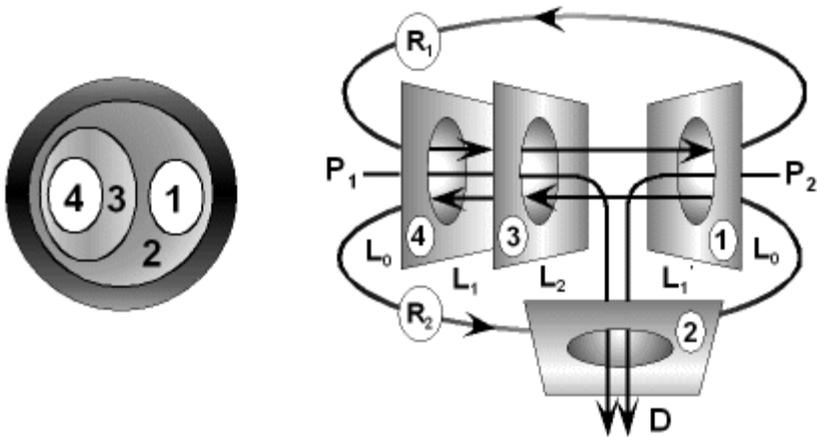


Figure 38

This motor-sensory balance occurs within the context of cell processes, C2, since there is still no actual action. Motor neurons are in the process of projecting to muscles in R<sub>2</sub>. The motor balance to sensory input is essential, given the immense complexity of synaptic junctions in the gray matter of the cord, while only a few are selected as suitable.

The term also exhibits two independent *projections*. P<sub>1</sub> projects through C4→C3→C2→D, and P<sub>2</sub> through C1→C2→D. P<sub>1</sub> projects an environmental input through the body and its cells. It represents feedback from the environment to sustain the body and its cells. Harry must eat. P<sub>2</sub> represents an electronic projection through cells. It thus represents a parallel commitment to the electrochemical renewal of cells involved. Harry's metabolism keeps him going. This is double entry book keeping, with assets and liabilities accounted for every step of the way. Sales can't perform at a loss, requiring costs to be offset by revenues. As the treasurer of his company, Harry knows all about it. So does Harry's boss, the

Managing Director, since he is concerned with the universal regenerative mode of this term as it relates to the whole company.

Motor responses are not causally determined in a rigid manner by synaptic junctions, but rather  $R_1$  and  $R_2$  must mutually balance the value of the response across the body interface, C3. At the same time the expended energy debt must be replenished by independent feedback from the environment in the form of food and rest. At a conscious level Harry knows that tiny mosquito is causing him a very large energy debt. He is red eyed from nervous upset and lack of sleep. He must get the little monster. His cerebral processes project to the motor areas of his spinal cord and amplify his spinal motor response. He over reacts and is going to hit himself very hard.

T8E transforms into T5R across the synaptic junctions to the complement of muscles selected, causing Harry to mobilize his hand. We are already in Step 3 of the cycle, where the primary universal set coheres with Harry's corporeal body in assimilating idea into form. Nothing can reverse the result of the motor pattern already speeding its way to Harry's muscles. The die is cast. We will return to the remaining three terms in the sequence shortly. We can't miss Harry slapping his face. It leaves a stinging memory that brings on a motor simulation. Harry must find a way to compensate.

The fish are biting. Four or five nice ones have been caught. One has been kept and cleaned for breakfast. Although the fog is still heavy, the sun is now penetrating through. The canoe is floating on a dish of fluid satin that fades into a blazing limbo of forgotten forms. Sunlight has exploded in a brilliant sheen. The mist is all aglitter. Light is playing through a fairyland of mirrored dewdrops suspended everywhere. The few vague features that rise as shades to haunt the tinsel sphere become forestalled hallucinations in a vision. The resplendence of the specter conveys a message far too meaningful for words. Everything has been transformed into a world of light, with knowledge only of unending life. The features of the mystery have been curtailed. The puppets in the play have lost their place in the charade of life.

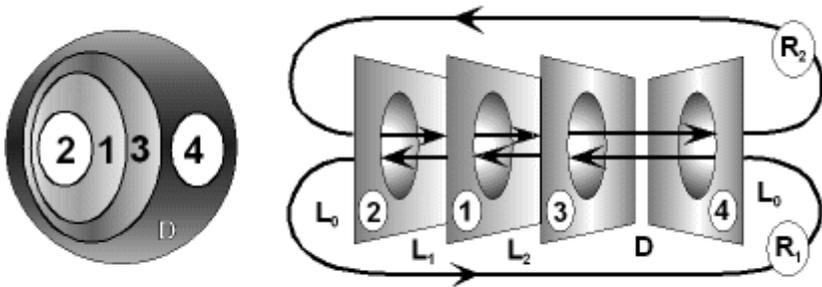
The canoe is paddled in a scintillating bubble through the luminescent spell. The tip of the island soon pokes through to show the turn to camp. Around the point, the light, dancing on the vagrant forms, has charmed them into enchanting beings. Trees and bushes glisten in a spangled luster as light plays host to surrogates of light.

The canoe is pulled up and tied. The fish is taken up to camp. A fire is started, and breakfast is prepared. Diffusing rays are playing now in streamers through the branches of the nearby trees. The channel has become an effulgent globe of light that slowly yields into translucence. Creations of the shoreline are merging out of mist. Forms are taking form from out of emptiness.

*Term 5 - Physical Work, Motor Activity—T5*

Perceptual transpositions from term to term tend to reflect a pairing between C1 with C2 and C3 with C4. The coalescences in T1, T4 and T7 are also paired this way. In this case C2 perceptually transposes from an orientation containing the other three centers in T8E, to an orientation within C1 directed outwards to a spatial identity between C3 and C4 in T5R, as shown in Figure 39.

**Term 5R: Physical Work**



*Figure 39*

In R<sub>2</sub> we have a hierarchy where the initiating impulse proceeds from cell processes, C2. The muscle cells are selected according to the pattern in which they are organized to respond in concert. This organization reflects motor skills that Harry learned during his formative years, within constraints that his early hominid ancestors before him had established during the formative period of humanity. Although there is a reactionary quality to Harry's impulsive action, automated motor responses are learned patterns that reflect immediate regenerative needs. This pattern is reflected in the organization of the neurons in the cord, through which the selection process took place in T2E and T8E of the two previous steps. Then the electronic signals were in the drivers seat, directing

cell processes, not vice versa. Now the cell processes selected are in the driver's seat.

Cell processes thus implicitly reflect the knowledge that directs the electronic processes through which muscles are mobilized to alter the form of Harry's body in the environment. It is action potentials in muscle fibers that transmit the motor signals to the many myofibrils within each fiber that are the basic units of muscle contraction. This hierarchic direction from C2 to C1 to C3, to a new identity with C4, enacts a swift regenerative motion of Harry's hand to kill the mosquito that is dismembering his life.

As Harry's hand moves swiftly up to slap his face, the movement of his arm is proprioceptively monitored by a new sensory stimulus in countercurrent direction to the muscle activity represented by R<sub>2</sub>. This is illustrated by a new R<sub>1</sub> associated with the stimulation of sensory neurons in muscle spindles throughout Harry's arm and hand. This sensory stimulus reflects the changing environmental form of his body, C4, with respect to his body's processes, C3. It feeds this information back via electronic processes, C1, to the interneuron and motor neuron cell processes in the gray matter of his cord, from which the initiating knowledge, C2 in R<sub>2</sub>, proceeded in the first place. This sensory proprioception is very rapid, much more rapid than touch or pain stimuli.

Proprioceptive feedback is thus in a position to influence the synchronous regenerative idea T2R in S2 as it follows through the sequence, especially since T2R and T5R are tensionally coupled. Since proprioceptive feedback also projects to the motor area of the cord, it can directly influence the motor pattern that follows in that set at the beginning of the next cycle. This can be seen by reexamining the table of synchronous sets in Figure 28. This rapid feedback means that Harry won't likely slap his face with his other hand, even if the mosquito does hop to his other cheek quickly.

Let's now jump ahead six steps and have a look at T5E, the expressive mode of physical work. As usual Centers 1 and 2 change places. This time it is electronic processes which direct cell processes, which change the body with respect to environmental form. It's necessary to see that R<sub>2</sub> incorporates the historical sequence of preceding terms that determines how it is directed. T5E derives from an electronic simulation that selected the cell processes in T1R, T4R, and T2R, that preceded the motor pattern to Harry's muscles. The direction implicit in R<sub>2</sub> thus originates from electronic processes, C1, thence to C2, thence to C3 in achieving a formal identity with C4. Two other sets have intervened with

action sequences by this time, so maybe Harry has gotten around to rubbing his stinging cheek, with his lips perhaps poised to utter a first curse. The air will be blue in a few minutes.

As before, Harry's movement is monitored by proprioceptive sensory feedback,  $R_1$ , and can directly influence the synchronous T2E in S2, which is identifying an automated pattern of response for the next motor sequence. As pointed out before, this provides essential continuity by reconciling one action sequence with the next.

Let's hop six steps back again now to T5R

The transformation of T5R to T7R occurs through the agency of chemistry, just as all synapses depend on chemical transmission across a tiny gap between one neuron and another. This time, however, the transformation does not involve a synapse, and it involves every cell in the sequence. T7 is the memory term, memory being the treasure house of the body and its resource capacity to respond. It involves chemical book keeping and budgeting, and the value of its coinage is determined by quantized elements of technique. The core of each memory is a formless abstract idea. Harry might like to forget the slap in the face, but it will be faithfully recorded in his body's ledger, just as every failure in his company must be accounted for alongside every success. The universal sets have been keeping track all along and will see to it, as they shift transform from Step 4 back to the beginning of a new cycle.

#### *Term 7: Memory Resources, Quantum Sensorium—T7*

The perceptual transposition to term T7R preserves the change in the body, with respect to the environment,  $C3 \leftrightarrow C4$ , as a coalesced element of technique that projects through relevant electronic processes, C1, and cell processes, C2. The coalesced element of technique,  $C3 \leftrightarrow C4$ , is the *perceptual core of memory* that projects through the electronics of those cell processes that were involved in formulating and enacting the motor sequence. See Figure 40. Recall that the inverse of 7 generates the six term sequence 1, 4, 2, 8, 5, 7... repeating. The whole six term sequence is implicit in each element of memory.

Before going on it should be pointed out that the word memory is used to mean more than just the conscious remembering of events. (See Appendix 1) In a broader sense, memory also includes all of those techniques that are subject to automatic recall, as in a spinal reflex response. The clinical evidence indicates that there is a chemical link to memory via protein and nucleic acid synthesis in cells. Common sense observa-

tion will confirm this in a general way. For example, although most neurons don't replicate, as other cells of the body do, they tend to elaborate their dendritic branches and synaptic connections with experience and learning, demonstrating a biochemical link to memory. In a more obvious way, physical exercise builds the bulk of muscles, reflecting in a physical sense a learned capacity to respond. In the broadest self-similar sense, the whole human body may be regarded as an evolved, historically integrated product of memory, implicitly reflecting evolutionary learning synchronously integrated and recalled in the cosmic movie.

**Term 7R: Memory Resource**

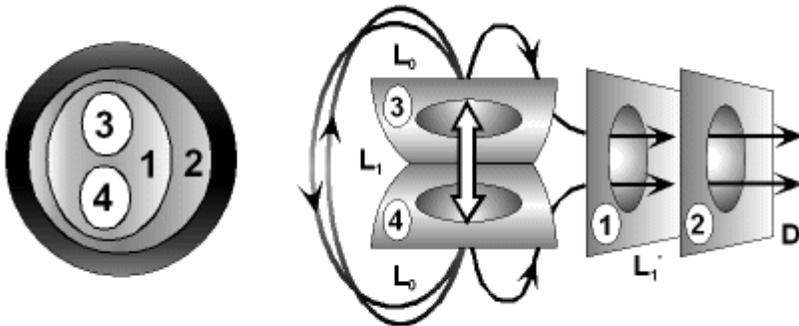


Figure 40

But back to Harry's situation in Cycle 1 again, leading up to T7R at the beginning of Cycle 2. This requires a brief review of the role of the universal sets as they are involved in memory integration. We can anticipate that the expressive and regenerative modes of T7 concern accounting for chemical expenditures after the fact, and budgeting for them in advance. The role of the universal steps will clarify the picture, since memory and recall involves integration of the whole sequence.

In Step 1 of Cycle 1, the primary universal set accessed memories from the void while U2 assimilated them, to translate idea into form. Harry felt the mosquito land and intends to kill it.

In Step 2, Harry's corporeal body was assimilating the idea.

In Step 3, U1 does its big flip and coheres with Harry's corporeal body to balance its energy inputs with expenditures. The sensory idea likewise becomes balanced by an automatic motor response.

In Step 4, U2 does its big flip with U1 still cohering like glue. Harry's corporeal form is now an idea in action, with U1 balancing energy

inputs and outputs, but Harry is busy slapping his face, while a new simulated idea comes together to better suit his market needs.

Then U1 and U2 do their big shift together, to start the next cycle. Harry's memory of the slap is now tensionally coupled to new sensory input about his stinging cheek, with the mosquito buzzing away, while the simulated motor pattern will cause his hand to pause. Harry's a bit stunned that the mosquito got away.

We see then that Harry's regenerative memory term at the beginning of a cycle is two-faced, because of the Janus-faced shift transformation inverting the universal sets back to begin a new cycle. In recording events of the old cycle, one face of T7R is looking back, making energy adjustments to balance expenditures in regenerating the electrochemical reserves of the cells involved in the sequence. C1 projects through C2. This regenerative concern with balancing the budget is integrated by the inverted U1 set in Steps 3 and 4 for all cells involved in Harry's body. But then when the U1 set jumps from coherence with Harry's idea of himself, inverting back to the void, the electrochemical accounts must be balanced within each cell, as the memory of that sequence is put to eternal rest. This is thus accomplished by the face of T7R looking back.

At the same time a new cycle is begun, and U1 accesses memories for it consistent with new sensory input. The other face of T7R must look ahead. The mosquito got away and Harry's cheek is stinging. What is he to do? Harry has a wealth of associated experience in the void and U1 must draw upon it. A new motor simulation will arise from memories recalled, to work out a plan. Those memories must budget for the electrochemical resources that will be needed by each cell in advance. Again C1 projects through C2, to indicate these resource needs directly associated with the coalesced elements of technique,  $C3 \leftrightarrow C4$ , at the perceptual core of the memory term. It knows what these needs are because they have to be funded and balanced whenever each element of memory is put to rest in the other face of the term.

In the face looking back, one set of memories is being put to rest by balancing accounts. In the face looking forward, another set is being aroused and budgeted for.

Let's jump ahead six steps for a glimpse at the expressive mode T7E. C1 and C2 change places, so that cell processes project through their electrochemical processes. This term comes mid cycle, in Step 3, just as U1 does its big flip to cohere with Harry's body. Harry has just enacted a sequence that was simulated in advance and properly budgeted

for. Now the U1 coherence with U2 aligns the environmental form of all of Harry's cell, body and electronic processes to the integrated electronic pattern of Harry. The T7E memory term for all the cells in the sequence thus has its electronic interface aligned with the U1 electronic interface. There is an overall accounting involved that must compensate for contingencies not foreseen in budgeting. The accounting is facilitated through the projections  $P_1$  and  $P_2$  of the universal T8R term of the U1 set.

Mind you all Harry has done is rub his smarting cheek and purse his lips in preparation for a curse. Even he is not yet sure of the string of invective that is certain to issue forth. It will begin as an automatic response that he won't inhibit. Harry is well practiced at swearing.

It should be clear that memory is not an exclusively biochemical function, although it may be keyed to chemical links. There is no memory bank as such in Harry's body. The memory bank is the quantum sensorium—the great void—with savings deposited through the simultaneous perception of the inside and the outside of the cosmic theater. Deposits are eternal. In T7R,  $C3 \leftrightarrow C4$  see inside one another, thence outside through their common periphery, C1, thence through C2 to darkness. This timeless realization of internal and external determines the eternal quality of memory, and it is banked in the sensorium, the treasury of the mind.

Memories contribute to the electronic organization of every cell and organ in the body, thus associating with Harry's body a highly structured energy field. But the recall process draws on the perceptual core of memory, which in essence is not chemical at all. This core may incorporate many inputs, however they are structured in relation to the proprioception of the body's change in position as it relates to its environment. This involves an element of technique of some kind, whether writing a letter or skiing in the Alps. Some memories may carry with them a powerful emotional component derived from a strong autonomic involvement in their conscious formation. Harry may look back years later and laugh at his angry ordeal with that tiny mosquito.

The transformation of T7R to T1R requires the perceptual transposition and coalescence of  $C1 \leftrightarrow C2$  alongside the perceptual core of memory. T7 is always tensionally coupled to T4, and the two synchronous terms are always in opposite modes. Memory recall is thus assured of relevance to the stream of sensory input.

*Term 1: Perception of the Field, Responsive Capacity—T1*

The perceptual transposition to T1R occurs in such a way as to preserve the perceptual core of memory,  $C3 \leftrightarrow C4$ , alongside the coalescence of electronic processes with cell process,  $C1 \leftrightarrow C2$ . The  $C3 \leftrightarrow C4$  coalescence represents a needed pattern of response recalled from the sensorium of experience. Harry must compensate in some way for his stinging cheek. From past experience a sympathetic rub seems in order, but he's angry too and wants to curse that demonic mosquito.

**Term 1R: Simulated Response**

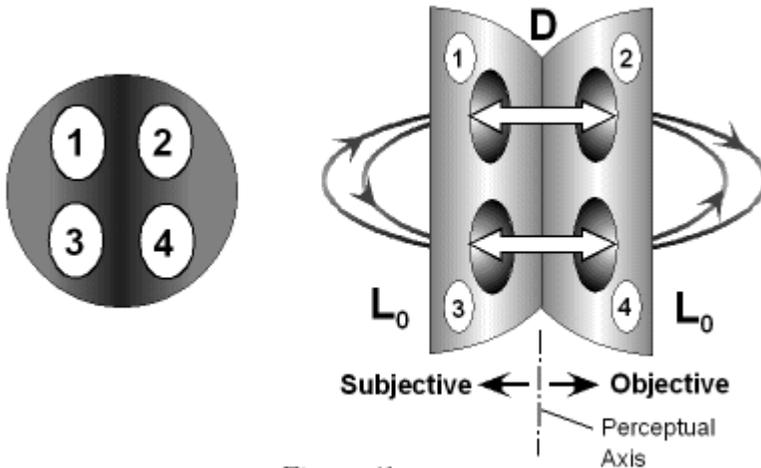


Figure 41

The coalescence  $C1 \leftrightarrow C2$  represents the electronic processes of cells aligned with the recalled pattern of action in  $C3 \leftrightarrow C4$ . Notice in Figure 41 that the term exhibits a subjective to objective *perceptual axis* with respect to the universal axis of the matrix, as specified by U1. Harry is thinking ahead. The electronic pattern C1 is thus aligned subjectively with recalled body processes C3. C1 represents a coalesced electronic simulation in special cells, C2, as they are topologically aligned to reflect the environmental form of Harry's body, C4. Harry is going to simulate rubbing his cheek and cursing, before actually doing it.

The special cells in which the electronic simulation in the spinal cord takes place are classed as gamma motor neurons, and they project directly to muscle spindles throughout Harry's body. About thirty per-

cent of the cells in the ventral motor areas of the spinal cord are of this type. They also receive inputs from the brain, especially the motor cortex of the cerebral hemispheres, including also input from the cerebellum. In the next step, proprioceptive feedback from muscle spindle simulation will likewise have collateral branches projecting back to the cerebellum and the sensory cortex of the cerebrum. (See Appendix 2.)

Harry's premeditated self-pity and slander, simulated in T1R, will be more than a carbon copy of old habits recalled. The synchronous T5E of S2 is enacting a pause in Harry's hand, and proprioceptive feedback from this action may have a moderating effect on the simulation, although Harry is very angry. T2E is also in the process of identifying a motor pattern in the cord, and there will be a mutual influence between all three terms, integrating Harry's history in a flow consistent with his intentions.

Let's again jump ahead six steps to T1E, the expressive mode of marketing.

In T1E, C1 and C2 switch places in Figure 41, as usual. Now electronic processes are aligned with the environmental form of Harry's body, while his cell and body processes are aligned. There is no simulation here. The alignments reflect the readiness of Harry's sensory apparatus for new sensory input from the environment in the next step. This indicates the receptivity of Harry's form in the market environment. It reflects his state of electronic readiness to receive new input. With adrenaline pumping through his body, his every cell is fully aroused and ready for anything. So Harry is more than ready to respond to the market, conditioned somewhat by a simulated idea in progress, together with proprioceptive feedback from his ongoing reaction to the tiny beast. Harry's OK, but he won't get much sleep the rest of the night. It will take hours for his adrenaline levels to subside.

The T1E term transforms to the T4E term, which is where we started with the mosquito landing on Harry's cheek, twelve steps back.

The sun has broken through the sleeping cloud; the trees across the channel have emerged above their fleecy bed. The mist has shriveled to a pit of vapors, confined within the serpentine contortions of the shore. They steam up into a multitude of tufts, endowing weird misshapen faces to a mass of ghostly forms gliding on the water. Their glossy heads are wreathing slowly to a funeral dirge, while the pristine oracle rises to exorcise their clammy spell. The weave in tortuous orbs, legions of them, wailing in remorse, seeking expiation from their imposed demise. Their

futile pleas unheeded, they gradually expire, as throngs wander aimlessly through throngs hovering in a chasm.

The whiskey jacks soar into camp and land in the dead tree. They jostle for position as usual and settle on the same pecking order as usual. A stale pancake is taken out, and Number Three immediately flits down and lands on the knee, chirping softly. It hops up on the finger of one hand to take a piece from the other hand then flies away. Number Two follows suit, while Number One lands on the ground a few feet away and watches. Not willing to be coaxed any closer, it waits to be thrown a piece, then flies off to hide it. A bevy of small ground sparrows ventures from seclusion in the bushes, but they are shy and stay together in a clique about ten feet away. Some pancake is crumbled up and tossed to them. They all rush to pick at crumbs, then the whiskey jacks return and steal the larger pieces. More pieces are doled out as two red squirrels begin to fight over dominion of the cupboard. One of them approaches, taking a piece of pancake from the fingers.

Meanwhile the ghosts have withered to an assemblage of trolls and gnomes. Wizenen figures stir in a malaise, unable to escape the scourge of light. Streams of shimmering lances pike and shred their forms. They become dismembered, frayed, diffused—then lost. As their numbers slowly dwindle, the pace quickens with enlivened spirits, in a cavalcade of little people who come dancing on the scene. Leprechauns and elves begin to twirl around their dying cousins, unconcerned at the fate that they themselves await. They glide—unaided by a breeze—in currents, swirls and eddies, directing movements with a sorcery of their own. New swirls keep forming, changing, twining, mingling in graceful waltzing swarms. Fairies come, then the pixies, some marching time, then joining into streams that swirl behind a marching band. They keep calling smaller cousins with quicker tempos; then, as they tire, each does a final twist and pops up, as it jumps out of sight.

A lone loon is swimming through some transparent wisps of remaining mist in the shadows across the channel. It begins to sing a note, loud and clear, but then its voice breaks into a rasping squawk. It is a bachelor loon that comes back to the same bay every year. It never tries to sing with the other loons. Perhaps it lost its mate long ago and since has lost its will to sing. Whatever the tragic circumstances, this bird is an outcast, required to live out its time in solitude. It makes a circle in the channel, returning to the south, without trying to sing again.

The system isn't always kind; sometimes it is hard to find much justice in the world. The ledger keeping is eternal. The budget and the

balance sheet are worked out on a scope we haven't yet begun to comprehend. All we see is the screening of a movie. We don't appreciate the creative effort that goes into the script, the design of sets and costumes, the endless planning and development of the theme, and the learning and rehearsing of the roles.

System 4 illustrates how the energies of experience are drawn upon to structure the plot and evolve creative themes for screening in a marketplace of movies. The nine terms that delineate the primary creative process in System 4 are illustrated together in Figure 42. The terms are all shown in the expressive mode. Keep in mind that Centers 1, 2, 3, 4 represent *idea*, *knowledge*, *routine*, and *form*, respectively.

The form of the enneagram is an elaboration of the primary activity, but System 3 also subsumes System 4 in a transcendent way. The alternate groupings of the six pointed figure display a recurrent identity between form and emptiness, just as the particular set of the primary activity does. The overall goal of System 4 is the simultaneous realization of idea in form, just as the goal of the primary activity is a simultaneous realization of inside and outside. The overall consequence is an independent corporeal body, a living form, just as the consequence of the primary activity is particular form. The U1 set alternates between discretion and a regenerative feedback that sustains the creative process, just as the universal set of the primary activity alternates between discretion and a double identity that sustains activity. The terms are self-similar. The primary creative process is an elaboration of the primary activity subsumed within a common pattern of meaning.

This completes a general description of System 4. The account has been kept to essentials in an effort to communicate the essence of the system as a whole. Once the essence is grasped, one can explore the endless intricacies of the system for oneself. (See Appendix 1.)

After the fog vanished, the day warmed up quickly. Yet there is a taste of autumn in the air—quiet and mild, but not like a summer's day. It is more like a woman refined by long experience, having acquired the grace to move into the autumn of her years with quiet dignity. There is a hint of color in the trees, like wisps of gray betraying the advancing season.

After some chores and a swim, the afternoon is spent casting in a bay across the lake. Along with some gathered greens and roots, a pickarel from jam bag rock completes the menu for the evening meal. After

**SYSTEM 4**

Terms 9, 3, & 6 are universal.

Terms 1, 2, 4, 5, 7 & 8 are particular and are shown in the expressive mode.

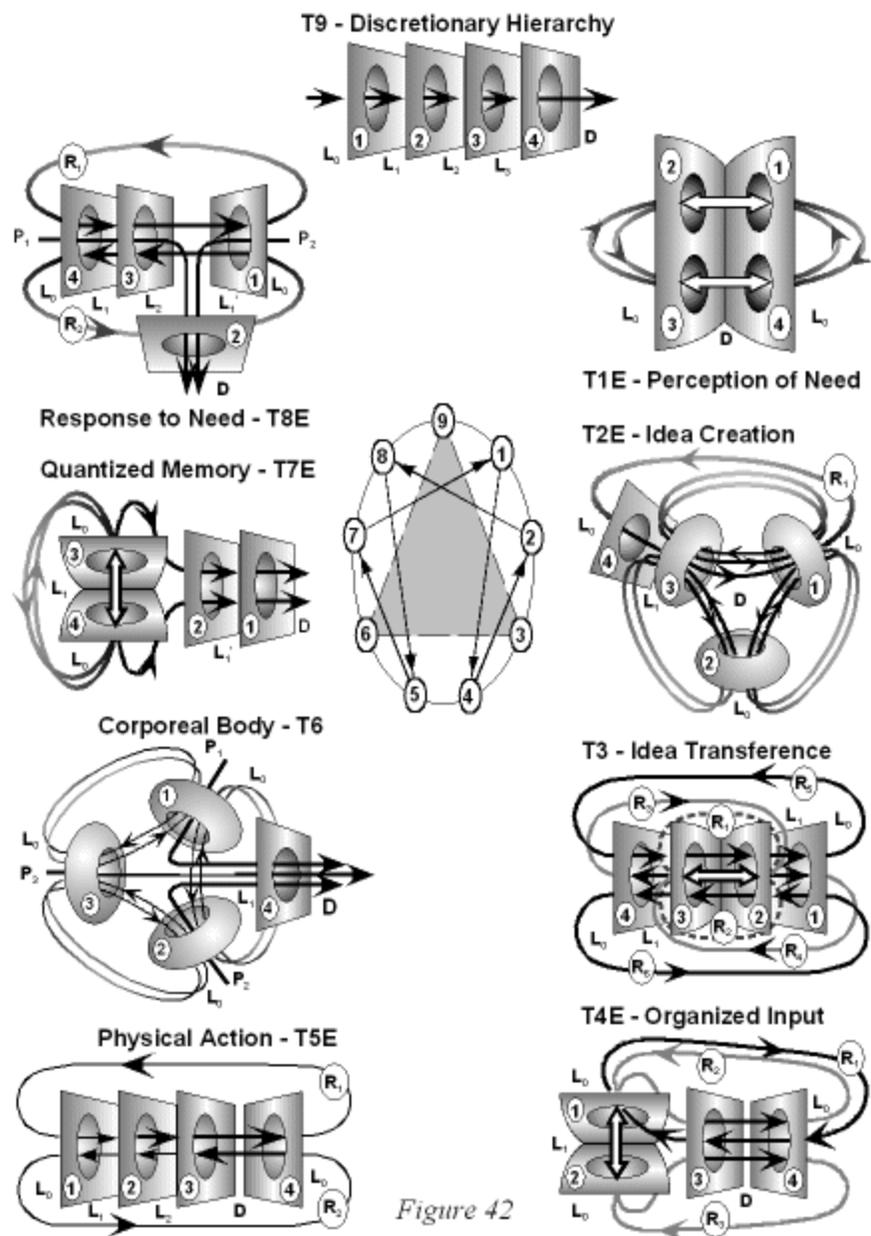


Figure 42

supper the canoe is paddled west of the island, a good place to watch the sun go down.

Each day has a character of its own: today has been very calm, with just enough haze to subdue the glare of the sun. It has been warm but not hot, with a certain tranquility of moderation. Now the messages of the day are digested into subtle evening residues, slowly subsiding into stillness. Many are the moods of the wilderness—never do they speak so clear as when they are most quiet.

The blue sky above is blended into a golden glare across the west. A single thin band of cloud, curling overhead, has transmuted into a floral necklace flung round a neck of sky. The evening colors promenade through the rainbow into violet, then pale into a lingering glow. The cloud of carnations finally wilts into a smudge of gray, cast of in a bunch toward the east.

All day the haze has muted shades of color, softened edges, and blended highlights into shadows. With the advancing night, the haze has concentrated near the water and in the bays, to hide the shoreline in the distance. Horizons have merged into the sky. The stars are twinkling in the water. The canoe has been transported into boundless space, floating in a sphere of stars. An island across the lake, and another to the north, intrude boldly through the haze in two big blobs, hovering like a pair of oblong asteroids growing trees from top and bottom.

Holmes has worked hard devising sophisticated instruments and theories in his effort to crack the ultimate mystery of the cosmos. Now his faithful companion, Watson, has dragged him back to the planetarium with many questions. Holmes is explaining how powerful telescopes reveal that there are distant galaxies more numerous than the stars in our own Milky Way. Dispersed in all directions, they are woven in a great skein with clusters and voids, throughout the firmament.

“As you know, Watson, galaxies come in a wide variety of sizes and types. When the first large telescopes began to reveal great numbers of galaxies beyond our own, they were classified into three main categories: elliptical, spiral, and irregular. Elliptical galaxies are further subdivided according to the eccentricity of their shape, from spherical to elongated. They are generally dust free and dominated by red giants. Spirals are subdivided according to whether their nucleus or spiral arms are their predominant feature. Some have a very bright, large nucleus with tightly wrapped spiral arms. Some, such as our own Milky Way, have a more even distribution of brightness between the nucleus and spiral arms. Oth-

ers have a much smaller nucleus and open predominant arms. These three broad subdivisions also apply to the bar-type spirals, which have an elongated bar shaped nucleus.”

“Strange that galaxies should be so highly organized and yet differ so widely in shape. What are irregulars like?” asks Watson, with his usual curiosity.

“Irregular galaxies seem to have no distinctive shape,” replies the sleuth, with professional detachment. “Some are cloudlike, with young, hot stars and interstellar gas and dust. Others are composed of dim stars, yet have gas and dust as well. Some eject material at high speed. A variety of galaxies exhibit violent, jetlike emissions far into space.. Galaxies in general cover a wide range of size, from dwarfs a few thousand light years across, to giants like our own, and larger.”

“It is hard to even imagine the immensity of the universe,” exclaims Watson. “A couple hundred billion galaxies, each with many billions of stars. The numbers are too immense to mean anything. There must be more stars in the sky than there are grains of sand on all the beaches of the world.”

“Yes indeed, and then some,” agrees Holmes.

“Do galaxies differ other than in their optical appearance?”

“Very much so, Watson. Some galaxies are strong sources of radio emission, although the source is not understood. In some cases the emissions come not from the center, but from two regions many thousands of light-years on either side of the optical galaxy. There is also a class known as the Seyfert galaxies that can be reasonably strong radio emitters; their light output can also vary greatly in a period of only a few months. Among the strangest of objects are the quasars, which are sometimes also radio emitters. Considered the most distant objects from us, some have recessional velocities over ninety percent of the speed of light. If this is correct, the most distant known quasars must ten to fifteen billion light years away. We are seeing them from the distant past, just after the big bang.”

“You mean we are seeing quasars as they were ten billion years ago!” gasps Watson. “All objects in the heavens are like ghosts from the past, but to see one resurrected from ten billion years ago seems fantastic. Such an object must be very large to be visible from so far.”

“That is the strangest part of all, Watson. Quasars appear to be much smaller than the smallest galaxy, yet they emit more energy than a giant galaxy. Their energy output can change drastically over a period of months, weeks—even days. There is yet another class of objects called

BL Lacterae objects—BL Lacs for short—whose distances rank with those of quasars. Their energy emissions are even more violent and variable. The first one to be observed, initially thought to be a variable star in the constellation of Lacterae, was later identified as the nucleus of a normal galaxy that is very faint. More powerful telescopes, like the Hubble, have likewise identified faint optical galaxies associated with quasars. These findings confirm the great distances from us, yet energy emissions come from a nucleus as small as a light-day in diameter, overpowering the whole galaxy. The source of such enormous energies remains a mystery.”\*

“Amazing!” exclaims Watson. “From what you say, thermonuclear processes are not nearly sufficient to account for the energies of quasars and BL Lacs. Have you no ideas on the possible source of such incredible energies?”

“Unfortunately, none that are very satisfying, Watson. Energies of the magnitude emitted by quasars could be produced if a body the size of hundreds of millions of suns were to undergo gravitational collapse within its Schwarzschild sphere. Such an enormous black hole could theoretically release part of the total mass as energy, but there is no way of knowing if such a phenomenon is possible or, if it is, what mechanism accounts for the form in which the energy is observed.”

“It is remarkable that you are able to assess the distances to other galaxies at all. How are you able to do this with any confidence?”

Holmes is a little uncomfortable, and he shifts in his seat. Since he is not allowed to smoke in the planetarium, he is toying with his unlit pipe. “There are a couple of methods that can sometimes be employed, Watson, including Hubble’s red-shift law. This law states that the distance to any galaxy is directly proportional to its velocity of recession. In other words, the faster a galaxy is moving away from us, the farther away it is. The ratio between recessional velocity and distance is known as Hubble’s constant. As you know, galaxies have fingerprints—distinctive lines in their light spectra. The faster a galaxy is moving away from us,

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\*The system indicates that the prodigious energies of quasars are due to differential rates of stellar recycling between distant galaxies and our own, together with the relative skipping of space frames during the billions of years that it takes the light to reach us. The energy must manifest in the cosmic movie despite the contraction in relative frame sequences over the long period that it takes light to reach us. We also share a common present with distant galaxies via the quantum mode. The huge energies are thus an observational effect integrating the history from galaxies with higher stellar reflux rates through black holes at their centers.

the more these lines are shifted toward the red end of the spectrum. You have no doubt noticed how the pitch or frequency in the sound of an approaching vehicle changes as it passes on the highway. This is called the Doppler shift. Spectral fingerprints are similarly affected, because of the radial velocity of the source. Their frequency shifts toward the red end of the spectrum, the faster an object is moving away from us.”

“I see, says Watson thoughtfully. “This is why you are so confident that the universe is expanding. Knowing the rates of recession and distances of the galaxies, can you then calculate the origin of the big bang?”

“It is not quite that straightforward, Watson. Hubble’s constant may change over long periods of time, depending on the nature of the universe. As you know, Einstein’s general relativity theory greatly revised Newton’s concept of space and time. Newton believed that space and time are independent from one another and from the material content of the universe. Within this framework, he recognized that force is related to the acceleration of mass—not to velocity as was thought previously. The measure of acceleration in any moving frame of reference is the same; observers in different moving reference frames will agree on the magnitude of a force acting on a body, but will not agree on its velocity. When it was discovered then that the velocity of light is the same for all observers, regardless of their relative velocity, a serious conflict arose.”

Watson interrupts. “Sometimes I get the feeling that I actually understand all your talk about relativity. If the measure of acceleration is the same in any moving frame of reference, and if the velocity of light is also the same, then something must change in the different reference frames themselves. The measurement of mass, space, and time must change.”

“That’s the general idea Watson. In his special theory of relativity, Einstein recognized that inertial mass is not constant, but varies with velocity, and velocity is a measure of space and time. In other words, space and time are not independent from one another, nor are they independent from the material content of the universe, as Newton thought. Space, time, and mass are intimately related. In order to extend this idea into a general theory of relativity, including gravity, Einstein had to make the additional assumption that gravity and acceleration are equivalent. For instance, if a person is accelerating upward in an elevator, he feels heavier, just as if there was an increase in gravity. By making this assumption Einstein was able to avoid “spooky” implications about gravity’s universal action-at-a-distance. It is now believed to act because of the local curvature of a continuous space-time field. The resulting gene-

ralized theory defines the universe as a space-time continuum, with a curvature conditioned by the distribution of its mass. The universe may conform to one of three possibilities; in each case, Hubble's constant will change in a different way.”\*

“It all sounds very complicated,” complains Watson. “The assumption that gravity and acceleration are equivalent seems to me to be a troublesome point. It is like saying that a bucket of water and a bucket of wine are the same because they may look and weigh the same. Nevertheless, I gather from what you say that the general theory of relativity favors the idea that the universe originated from a singular state, from which it has expanded since the big bang. This appears to fit in with Hubble's law. If you can determine the curvature of the space-time continuum from observations, then you can divine the historical origin of the universe. You should then also be able to divine the ultimate destiny of the universe. Is that the idea, Holmes?”

Holmes is very casual about the whole affair, as if he is talking about last week's cricket match. “Yes, that's the general idea. For instance, if the universe is of sufficient density, the rate of expansion will not exceed the velocity of mutual escape between galaxies. Gravitational attraction will win the tug of war with expansion, slowing it down until it stops and reverses into the singularity from which it began. In this case the curvature of the space-time continuum is closed or spherical, perhaps resulting in an oscillating universe that goes through an endless series of big bangs. If the universe is closed, the last big bang likely occurred about ten billion years ago. It should collapse into a singular state again in about seventy billion years.”

“I think I am beginning to see what you're getting at,” says Watson a little skeptically. “If I throw a cricket ball up in the air, it will slow to a stop as it rises to its maximum height, then fall back to earth again. This

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\*System 3, the primary activity, is consistent with the assumption of special relativity that mass, space and time are intimately related. But in providing a mechanism for the primary projection of atomic matter, System 3 offers an explanation as to how and why this is so. The creative process is rendered transparent. At the same time it is not consistent with the concept of a space-time continuum that is fundamental to general relativity, nor with the assumption that gravity and acceleration amount to the same thing. The inferred curvatures of space-time associated with gravitational mass are associated with the relative skipping of space frames in the coherent integration of the cosmic movie. On a cosmic scale this is inconsistent with the big bang scenario suggested by general relativity.

is because I am not strong enough to accelerate the ball beyond the reach of the gravitational pull between the earth and the ball. In a similar way, if the density of the universe is great enough, the big bang may not have been strong enough to accelerate the expanding galaxies beyond the reach of their mutual gravitational pull. If the mass of the universe is not great enough, then one big bang is all there can ever be, and the universe will keep expanding indefinitely, I presume. It is like throwing the cricket ball up so fast that it never comes down.”

“Yes, you’re getting the drift of it, Watson. You really are quite a clever chap to catch on so quickly. If the cricket ball doesn’t come down the curvature of the space-time continuum will be flat if forces are equal, or open if it continues to accelerate. The galaxies will fade from view as mutual recessional velocities eventually approach the speed of light. Moreover, the stars in our own Milky Way will gradually expend their energies, marching through their life cycles to a heat-death doom. One by one the sparks will be snuffed out for a final time, leaving a frigid wasteland of discarded cinders.”

Watson undoes the top button of his shirt and loosens his tie. “You certainly don’t offer much hope,” he pants. “Either the universe is going to be crushed again into an unthinkable singularity smaller than nothing, or it is headed for a frigid oblivion of eternal night. Either possibility, however distant, leaves me wrenched of a sense of humanity.”

“Nonsense, Watson! There is no room for anthropomorphic feelings in science. It is all a big bakeshop, I tell you, and the evidence strongly suggests a big bang beginning. The bakeshop started at infinite temperature and density, cooling very rapidly as it expanded. After the first one-hundredth of a second, the temperature had cooled to 100 billion degrees Kelvin; after the first second, to ten billion degrees; and after three minutes, to one billion degrees, though it was still seventy times hotter than the center of the sun.”

Beads of sweat are standing out on Watson’s forehead. He feels entrapped by a web of evidence. Holmes seems to take morbid delight in his friend’s discomfort. It is the old triumphant feeling that comes with closing in to wrap up a case. He continues.

“Before thirty-five minutes had passed, a neutron-proton balance was reached that determined the primary proportions of hydrogen and helium that predominate in the universe. The universe was still much too hot for atoms of any kind to form. Radiation predominated over matter for about the first million years. As the temperature dropped to about 4,000° K, free electrons were used up in the formation of stable atoms,

the universe becoming transparent to radiation. With this decoupling of matter and radiation, gravitational influences began to hold sway. Matter condensed and fragmented into the clusters of galaxies that we observe expanding away from one another today. This all took about one hundred million years, a short time, when you consider the universe is presently ten to fifteen billion years old.”

“I see,” says Watson slowly, trying hard to maintain his composure. “Everything exploded from a pinprick for some completely unexplained reason, condensing into galaxies a hundred million years later. Let me take a moment to recapitulate. The universe had a heat birth. Unless it contracts into a singularity again, it is headed for a heat death. The bake-shop’s energies will all be dissipated into darkness, never more to cook a cake. The first fruit of cooking was the nuclei of hydrogen and helium, the predominant constituents of stars and interstellar gas, which still constitute about 98 percent of the universe. The heavier elements are cooked in the centers of stars, then distributed by large old stars that go through their life cycles more quickly, ending in a supernova. The gas and dust thus dispersed collect again into a second generation of stars. Five to ten billion years after the creation of the universe, our earth was born with a second generation star, along with the good fortune to have conditions amenable to the evolution of biological life. This process itself took four billion years, until we humans accidentally happened on the scene, puzzled by the whole affair. After a few thousand years of wars and wondering, we gradually begin to gather evidence, then upon devising some laws to explain the evidence, we conclude that it is all an accidental bake-shop. We ourselves are mindless puppets of laws that we have concocted. Is it not possible that there has been some misinterpretation of the evidence? Surely there are other possible alternatives.”

Holmes, who has begun to chew rather nervously on his pipe stem, is obliged to confess some weaknesses in his theories. “Other alternatives have been considered, Watson, and, to be sure, there are a few embarrassing bits of evidence to detract from the big bang options. Steady-state models have been considered, but because the universe is expanding, these must postulate the continuous creation of matter from nothing to compensate for the expansion. Otherwise, the receding galaxies would all long ago have disappeared from view. Also, there is no known process that turns heavy elements back into hydrogen—the nuclear cooking going on in stars should have run its course eons ago. On the other hand, steady state theories offer the advantage of avoiding the singular state in

the big bang, which negates all the physical laws that are invoked to explain the universe. A steady-state universe has no beginning or end.”

“Surely the continuous creation of matter is less objectionable the creation of matter all at once from absolutely nothing in a big bang,” protests Watson. “Why aren’t steady state theories favored?”

“Because the evidence still favors the big bang alternatives, especially since the discovery of a background radiation that permeates the universe. It is thought to have expanded and cooled with the universe from a time early in its creation, when the decoupling between matter and radiation occurred, corresponding now to a very low temperature of about three degrees Kelvin. Steady state models have difficulty in offering a convincing explanation.”

“But it could be anything!” Watson interjects. “And universal phenomena of one kind or another keep cropping up. Universal gravitation, universal speed of light, universal quantum of action, universal electrons, protons, and photons, universal charge, universal laws that you keep looking for...”

Holmes senses that Watson may be getting wound up again, and he interrupts. “Get to the point, Watson!”

“The point is that you don’t want to acknowledge that there are universal influences in the nature of things, yet you can’t make them go away and you can’t explain them by adding up local particular effects. Particulars are dependent upon universals for their very identity, which is why you are obliged to seek out universal laws. A dynamic interdependent relationship between universals and particulars is the most fundamental of laws.”

Holmes removes his unlit pipe from his clenched teeth. “Such an arbitrary statement doesn’t constitute a law. Give me an example!” he snaps.

Watson is defiant. “Think for a minute about the red shift in the frequency of light spectra from distant galaxies. Maybe it can happen for more than one reason. We know that matter itself behaves as both waves and particles, so maybe the whole physical universe is synchronously oscillating. In fact Planck’s universal quantum of action indicates that it must be. Then shouldn’t one suspect that the light frequency from distant galaxies can get out of synch with the observer’s frequency after ten billion years of travel? Most of the stars from which the light has come have completed their life cycles by now, while our sun was born and matured, both in the framework of a synchronously oscillating whole.

The red shift may indicate only great distance and time. Maybe the universe is not expanding at all.”\*

Holmes, annoyed at Watson's impertinence, fires a question back. “What then is to keep the universe from collapsing under its own gravity? Magic? Before it was it was known that the universe is expanding, Einstein accepted a kind of magic in his equations in the form of a cosmological constant that balanced gravity, permitting a static universe. He later rejected the idea as the biggest blunder of his life.”

“And I hear by the grape vine that lately you have been thinking of resurrecting the cosmological constant to patch up some holes in your big bang,” protests Watson. “And I'm not suggesting magic as an alternative. Galaxies are dynamic interdependent systems, not static collections of stars. A bicycle will collapse under the pull of gravity if it's not moving, but balance is easy with the wheels turning. Cyclic relationships of the particular to the universal are indications of an organic system of order where parts have a place in relation to the whole.”

Holmes ignores the implications in Watson's remarks that the universe is intelligent and alive. Instead he resigns himself to what he considers a magnanimous, yet humble, philosophical viewpoint. “Of course, many things may be possible, Watson, and many questions of this sort have been explored. The problem with ideas of this kind is there are no coherent theories to support them. And science ought not to be surrendered to rampant superstition. We are left with the big bang options as the most credible alternative. If there is an underlying cosmic organization to the universe, it is probably forever beyond our grasp. Perhaps the cosmic mystery is too vast a case to be solved by the minds of men.”

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\* Watson is trying to explain the red shift in terms of the primary projection of matter as delineated by System 3. A single universal set regulates the oscillations of particular sets, as numerous as the number of atoms in the universe, back and forth between space frames and quantum frames. But due to their angular momentum, galaxies are recycling their stellar populations through black holes at their centers. They must maintain a degree of synchronicity with the universe at large, if the universe is to maintain integrity as a whole. The dissynchronicity compensated for by stellar recycling also shows up as a red shift in the light that was emitted from stars several billion years ago. Sufficient space frames have been skipped during the light's travels to shift its spectral fingerprints toward the red end of the rainbow. The effect is the same as if the galaxy was receding. Near the end of his life Einstein regarded a discontinuous universe entirely possible, in which case his theory would fail, along with the rest of modern physics.

Watson is not satisfied. He is unable to accept deficient answers to quench his sense of wonder, especially when those answers would deprive us of any transcending meaning or values in living. He can't help feel that there are obvious clues that have been overlooked. He sees that the examination of the evidence has been preconditioned by assumptions restricting the scope of investigation. The compulsion to seek an origin and an end to things is shackled to ideas of space and time.

The galaxies don't exhibit the distinctive life cycles that have been divined for stars. As huge communities of stars, there is no direct evidence that they ever had an origin or will ever face an end. More than mere collections of their member stars, galaxies may evolve and change, just as any community may. And the dark secret hovering in their hearts is an expression of the emotive engine of change. The mystery of the singularity and the center-periphery dilemma prescribes the need to reconcile the social mystery of each and all.

Holmes and Watson sit quietly gazing at the simulated stars. Watson doesn't pursue his feelings with his trusted friend. He can't formulate them properly into words, and he feels that Holmes is in a similar fix. Despite Holmes's commitment to his theories, Watson is aware that in silence they share a common sense of wonder. They share the social mystery of each and all through wonder. It is in words that they become divided. Even in a man-made theater of stars, words tend to pale to insignificance.\*

In nature's theater, the whole of space and time is bubbling full of history. Ghost images are streaking through the cosmos at the speed of light, metering out the scenes in the celestial drama with memories of the way things were. Events of yesterday are shaping up the scenery for today.

A ghostly mist is settling in the bays again. Dank, wan spirits, converging for a seance, are reticent at first then progressively encouraged by their swelling numbers. The sphere of stars has been severed by a ring of spooks with forebodings of some sorcery to come. Their spell infiltrates slowly into the haze to dim and daze the asteroids. A caterpillar of ghoulish green light begins to creep across the northern sky. Vertical shafts of the aurora shunt in undulating bunches through a phosphorescent crest that wavers unsteadily above one of the asteroids. A trough, reflected underneath, provides the mate to a pair of terribly trembling

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\*The author of Sherlock Holmes, the late Sir Arthur Conan Doyle, was a physician, spiritualist, lay preacher, and an outspoken critic of the scientific method.

hands that fear to fully grasp the spiny boulder stranded in the firmament. Suddenly the hands jump away, then spread in forks like crooked scissors clipping at the sky. The ghosts that gird the ragged heavens absorb and then exude the fiendish flickering neon glow of green.

Gradually the shears exchange their shape for sabers, that slice the night in iridescent slivers, rising almost to the zenith. The slivers fade to greenish yellow, as complex shifting patterns begin to wind in switchbacks, like mountain trails weaving up a trelliswork. Caravans of angels are ascending and descending a zigzag Jacob's ladder into paradise. Their mission of forewarning has cast a horoscope across the sky with mesmerizing omens of redress. Slowly the trails begin to slip and slide as colors deepen into a nest of squirming serpents. Greens and yellows change to hues of red, as firespewing dragons wage incendiary war. The northern sky has ignited into flame. Ghoulish ghosts, encircling the waters of a fiery pit, transform to vampire shades, injected full with bursts of blood. The canoe is suspended in a holocaust. Purgation comes as hell fires fade to greens and yellows, rising into another trelliswork. Processions of angels have revived to bridge the heavens with redeeming grace.

The stars have been relegated a backseat to the display, but some peer on from overhead and from the south, with reassuring twinkles that the galaxy goes on eternally. The experience indicated that the universe is eternally sustained, through the polar balance of partitioned energies. All order in the universe is dependent on the most intricate balance between particular and universal hemispheres that define the social mystery of each and all. The experience demonstrated a responsible human relationship to this dilemma of a cosmic mind.

The Cosmic Being went on to show how memories work, how energies are refluxed through the nervous system into the creation of ideas. Memories went streaming out through the eyes into ideas. Visibly organized with active interfaces of energy, they transformed rapidly through a sequence before they vanished in the void. They were animated with images of light in living colors. Their pattern of organization was projected in three dimensions, similar in essence to the diagrams that have been used to depict the system.

As the ideas began streaming from the eyes into the city of light, each time there was an inversion of emotional energy through the autonomic nervous system, like a master shift transformation regulating the event. The significance of the city became more apparent as ideas began streaming into it from other "places" in the void. There is a gathering of experience going on. We are building an eternal home through the crea-

tive reflux of energies from the void in such a way that they have eternal value. What's more, the gathering is not confined to strictly human experience. The landscape vividly illustrated that the same process relates to hills and forests, rivers, ravines, and desert shrubs. The whole biosphere is involved. This series of experiences, involving the recall, creation, and gathering of ideas, all concerned a dynamic routine to creative activity resulting in the explicit formation of images of light. The bottom two tiers in the universal hierarchy were explicitly involved.

Following this came the series of bursts of light in which everything was known. Questions and thoughts kept coming to mind, which brought a discretionary gathering of refined energies from the void in an extended area surrounding the body. Personal discretion was involved as these refined energies infused the body. As they did, each burst of white light was experienced. Each time, there was a coalescence that involved both the autonomic and central nervous systems, yet the bursts were not confined to the nervous system nor to the body. Everything about each question or thought was spontaneously known as each burst occurred. There were inferences of images and patterns within each burst of light, but there were no specific shapes or forms or movements. The knowing was in the experience of the light itself, with the implication that completely coherent knowledge is possible for every meaningful question or subject of wonder that can be formulated by the human mind. This knowledge is an experience accessible by human individuals. It is not a knowledge that can be reduced to formalized information. This series of experiences was also orchestrated by the Cosmic Being though he was no longer visible behind, and although personal discretion was involved. Knowledge, the third level in the hierarchy, was thus represented as a higher level of delegation.

The fourth level in the universal hierarchy, idea, was manifest in the Cosmic Being, through the singularity of his nature in the intelligently ordered integration of the universe. The communication of the System was the idea.

The orchestration of the experience was performed within the subsuming context of the primary activity through the identity between form and emptiness. The Cosmic Being demonstrated that he transcends the void, and with it all of space and time. He suspended the entire universe of form. His discretionary access knows no bounds and he recreated form within the void as he wished. He consumed the void, gathering energies from throughout, and recommitting them as he wished. The process works the same with every human being, though not on the same scope

or scale as with the Cosmic Being. We also transcend the void, spanning space and time to the extent we are concerned. The experience ended with the realization that all experience is structured by the System. All possibilities, however endless, are prescribed by the manner in which the System works, yet the System itself rigidly predetermines nothing. Through knowing itself, the System also allows for transcending itself. It is not a loop, closed unto itself.

The attempts of science to reduce the universe to a physical and mathematical synthesis must inevitably face dual problems. They must take into account both universal and particular aspects that interact in a complex fashion. Pursuing the problem in the particulate direction leads to the enigma of the wave-particle duality. Pursuing the problem in the universal direction leads to curvatures in a space-time continuum and to the enigma of the singularity. These problems are mutually opposed expressions of the creative dilemma. They can find no objective resolution frozen into mathematical equations, because space and time are not determining conditions of the creative process. We cannot relegate the responsibility for living to man-made laws. Science is a social tool, not a god.

The hell fires have returned. An inferno is devouring the northern sky, searing into the depths of the abysmal pit beneath. The ghoulish spirits are closing in from all directions. Having already eaten through the asteroids along the water line, they will not be satisfied until they consume the interface between two hells. A loon attempts a lullaby to soothe the apprehension at the conflagration in the skies. The lonely call is answered only by a distant wolf. It is not a night for music.

The inferno makes no offering of warmth. The night is cold. It is time to paddle back to the refuge of the tent.

# Chapter 16

## Graveyard Chess

It is late September; the weather has been damp and cold for a couple of weeks. Sometimes September is a warm and pleasant month, but this year there have already been several frosts. One day it snowed hard for a while. Fish have been difficult to catch; the daily swim has become a shivering ordeal. It is time to break camp and head for home.

Adam and Agnes stopped in for a visit the other day and offered a place to sleep at their camp tonight. It will make the trip back much easier. Things can be loaded in the boat and canoe today, so that it will be possible to get an early start from their camp tomorrow morning.

The small tents have been taken down and packed, and many things have already been loaded in the boat. After lunch the remaining food supplies are packed, along with the stove, the pots and pans and dishes. The big tent is thoroughly cleaned out, then taken down and folded. Fortunately the weather is clear and dry today, although there is a cold north wind.

The whiskey jacks fly into camp and can't seem to understand what is going on. They flit from tree to tree, chirping and watching as things are carried down to the boat. They wait patiently until the loading is completed to get their ration of pancakes. An extra batch was made this morning to give them a special treat. They eat some, then cram their bills as full as they can to fly away and hide the rest. Some is tossed in the bushes for the ground sparrows, and the whiskey jacks soon dispense with the remainder. Their curiosity appeased, they leave.

The campsite is cleaned up. The garbage and refuse are burned along with the bough bed that was under the tent floor. A few tin cans are buried, then the embers in the camp fire are thoroughly doused. A last check is made to make sure that nothing has been forgotten.

The canoe is pushed out, then tied on a length of rope behind the boat. As the boat is paddled out and turned, the whiskey jacks come back. They flit anxiously from tree to tree, chirping as before, then they start to whistle. They have been good company for nearly three months.

Now their friend and food supply is leaving. All of us will miss the daily visits. I whistle back a few times, start the motor and head up the lake. The birds fly from tree to tree around the point as I take a last look at the island that has come to feel like home.

The load is not as heavy as on the trip in, but with a strong head wind it takes about an hour to reach Adam and Agnes's camp. After supper, we sit out on the chairs looking up the lake and talking.

Agnes has just finished showing me pictures of her children and grandchildren, also telling a few stories about the small Indian village she lived in as a child. One winter when she was still quite young, her father fell through the thin river ice, and the current carried him away. There must have been some difficult times afterward, but she doesn't dwell on this.

The conversation changes to the fishing. Adam has also been having trouble catching enough to eat. Live bait is often better when the fishing is poor—Adam uses minnows a lot. There is a pond nearby where he can trap them easily.

"I should shoot a moose before the season starts," he says, explaining, "Indians don't have to wait till hunting season."

"I've seen one a couple of times in the small bays near the island," I suggest.

"Maybe it's the same one I've had my eye on in the next long bay to the north. Sometimes they go back and forth between the marshes there. The next day or two I'll go down and try and get him. We won't have to depend on the fishing then."

"Biologists are concerned about the fishing," I interject.

"What do you mean?" queries Adam. "Not near enough people come way in here to fish the lakes out."

"It has to do with acid rain. If the lakes become slightly more acid than there are at present, nothing can live in them. Have you ever been down to Sudbury?"

"Not for a long time," Adam answers with a long face. "There's no reason to go back. Pollution from the nickel smelters has killed everything for miles around. There's no trees, no grass, no birds. No fish either. Even the bare rock has turned black."

Adam looks off in the distance. He doesn't say anything for a while and gets very serious. Then he mumbles, "The Lord is going to turn the world over someday."

"What did you say?" I am uncertain that I heard him right.

He makes a flipping motion with his hands and repeats, "The Lord is going to turn the world over someday."

It is a strange thing to say—he is not sure what he means by it. He is anything but a religious fanatic, and he doesn't try to explain. He seems to sense that somehow, someday, a balance must be restored. A little sorry that I brought the subject up, I return to the moose hunt.

"I wish I could stay and help you get the moose."

"Why don't you. It shouldn't take long."

"Everything is packed now, and I can't depend on the weather. Besides, if I want to hunt I have to buy a license and hunt in season. I'm not lucky enough to be Indian. If I were, I might build a camp like yours and stay here."

"I'll help you find a good Indian wife," offers Agnes cheerfully.

"When are you coming back?" asks Adam.

"I don't know. I must go away to work. Whitemen need too much money."

"I have a steady job," says Adam. "I'm the caretaker of the lake. The money is not very good, but I like the work."

"The weather is already getting cold. How much longer will you stay?"

"Until just before freeze up. Sometime in November. We'll trap a few beaver before we go, and maybe I'll come back alone for a short stay during winter."

"Winter too cold for me now," explains Agnes. "I'm getting old. Can't go on snow shoes anymore."

Before we know it, we have talked away the evening. Adam shows me to one of the sleeping cabins and leaves me with a lantern. The next morning, after an early breakfast, we say our good-byes.

"Come back and stay," urges Agnes, waving from the dock as I paddle the boat out.

"We'll look for you on the island in the spring," says Adam.

"I'll be back. I'm just not sure when. Good luck. Take care." Waving back, I start the motor and maneuver the canoe into tow. Waving again, they walk back to camp as I begin the long trip home.

It has been a good summer, with time to absorb many things never fully appreciated before. Even growing up close to the wilderness is not the same as living alone with it for an extended period of time. So much of our experience is preconditioned by thoughts constrained by language that focuses on transient social situations. We depend most heavily on our senses of sight and hearing, integrating the information we receive

according to predetermined social feelings. These feelings are like social spirits we have come to accept, often without any special notice. Alone in the wilderness, feelings become integrated in a different way. The spirit of the wilderness is also a social community that has been working out a social harmony for much longer than humanity's faltering efforts. Prolonged exposure brings direct absorption, not just through the eyes and ears and thought, but also through the skin and visceral organs. The spirit of the biosphere is absorbed directly into feeling. Our natural heritage is our heart. Immersed in wilderness, the inadequacies of social feelings constrained by language become much more apparent.

We try to use words far beyond their usefulness. Language is a social instrument, yet we try to extend it beyond the social sphere into a means of deciding ultimate solutions to the human dilemma. The human dilemma, however, concerns a creative process that can neither be constrained nor brushed aside by words, although language is an essential feature. We seek a balance between the three polar dimensions of experience.

The first few days of the experience exemplified such a balance on an organic level. There was a complete feeling of harmony with the biosphere and a visual perception of the energy processes involved in living things. Everything was bathed in living light. The whole of creation was a living dance of light. This ended when the ghostlike face of all humanity appeared. The deficiencies of human understanding were written in the suffering of the face, in the incredible forbearance of its being. The dilemma that it faces is far beyond the power of language to express. It concerns the collective burden of humanity's social failures and the karmic result that lies in store. The eternal ledger keeping must exact its dues to produce a balance sheet, according to the cosmic order.

The trip back to the cottage takes most of a day. Although everything looks the same, it feels very strange to be back in civilization. Lunch in a roadside restaurant seems almost weird. Obvious things usually taken for granted—an electric light, a paper napkin, curtains, chrome, manufactured textures, pleasant service, and a menu with a wide selection—are appreciated in a different way. No fish today!

At the cottage, things are unloaded into the porch. There will be time to unpack and put them away later. The canoe is turned over in the shade, the boat returned to the lake and tied up at the dock. It is a treat to look across the old familiar lake again.

There is much more deciduous forest here than further north, and it has exploded into flaming colors in its usual spectacular fashion. The autumn air is reeking with special fragrances. Many of the leaves have already fallen. The wooded hills are doing their annual striptease, exposing naked limbs to public view. Patches of pine and spruce punctuate the hillsides, all in green, as if some governing authority has declared their nudity taboo. The white birch and poplar along the shore are always late to don their costume for the show. There is no variance to their color, only the purity of a yellow-gold garland held in place for dramatic effect until the end.

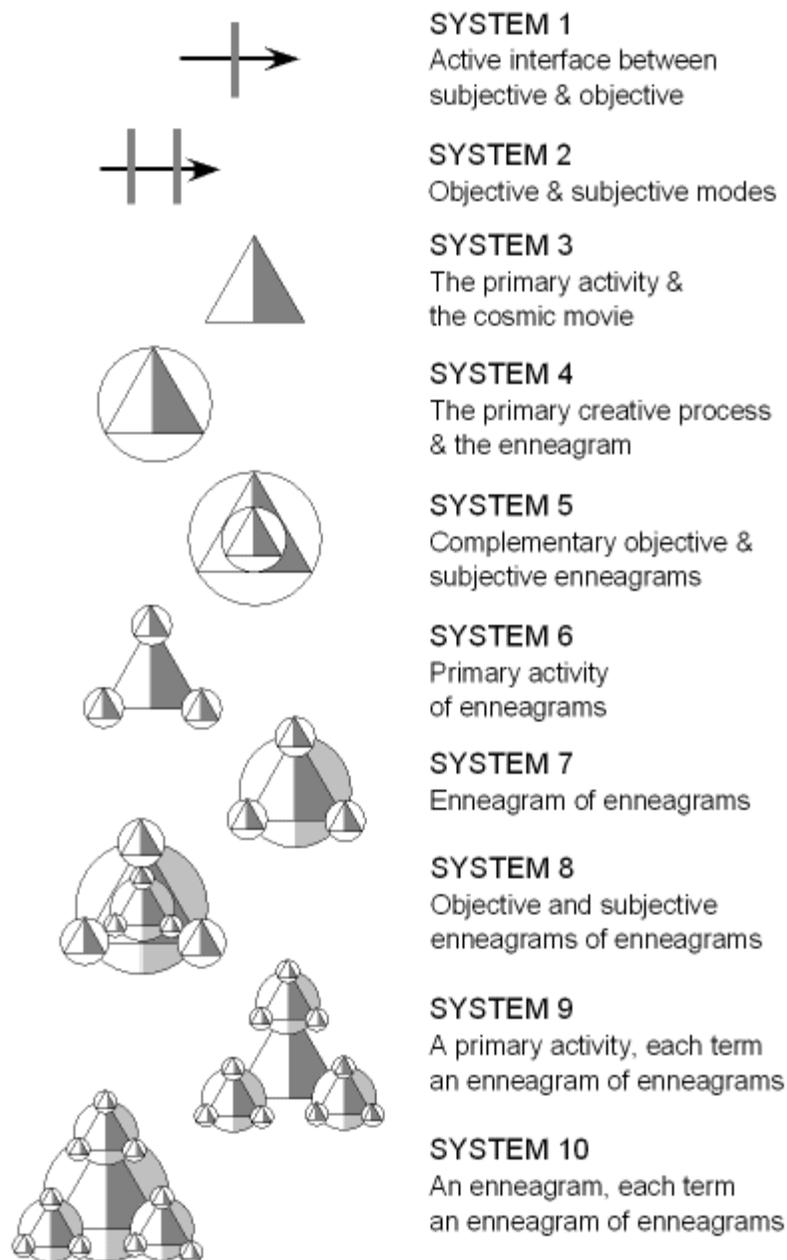
Soon everything will be covered with a soft blanket of snow. The ducks and geese have already begun their migrations south. Some nights the geese can be heard honking their way across the sky, performing their miracle of navigation in the dark. A marvel of avian intuition guides them with unerring accuracy on their journey through the biosphere.

The journey to an understanding of the system is a long and sometimes arduous one. Those who have made the trip thus far may see that it is only just beginning. It is a multifaceted evolving expedition of growing to appreciate the social mystery of each and all.

As the system unfolds in the higher systems the universal hierarchy keeps recurring in different disguises. This has been compared to a movie, where the primary technique of movie projection exhibited in System 3 is elaborated upon with an evolving plot as exhibited in System 4. This elaboration of the movie continues in distinct stages with each higher system.

There is an interesting feature to this elaboration from each higher system to the next. There is a pattern to the pattern of elaboration that recurs every third system. System 1, for instance, consists of one center, whereas System 4 consists of one enneagram. System 2 consists of alternating expressive and regenerative modes defined by two centers, whereas System 5 is made up of two enneagrams, one open in an expressive mode, one closed in a regenerative mode. System 3 defines a primary form to activity, through its terms, whereas System 6 is a primary activity made up of enneagrams. The pattern appears to continue in this way, as shown in Figure 43.

*The Proliferation of the System*



*Figure 43*

Although there is an orderly series to the increasing number of terms from system to system, it cannot account for active variants. The number increases quite rapidly. System 4 has 9 terms, System 5 has 20, System 6 has 48, System 7 has 115, System 8 has 296, etc.. Within each system, all of its terms are ordered into a single, integrated pattern of transformations with coherent meaning, so that there is a high degree of complexity to the higher systems. They also exhibit a high degree of integrative power. Some terms of the lower systems persist within the core of some terms of the higher systems, acquiring a discretionary capacity. Some terms are related, sharing the same term positions in different sequences of transformations. Other terms display more than one mode of organization with different sequences. Perceptual images within terms begin to come into play with System 5 and higher systems.

From this brief survey of the higher systems, it can be seen that there are hierarchies of a more elaborate sort associated with each increasing number of centers. There are enneagrams subsumed within enneagrams. In other words, there are creative processes taking place within creative processes. Each enneagram has universal and particular sets of centers; the degree of universality is constrained by the subsuming context.

This is exemplified throughout the natural order of things. For instance, within the biospheric hierarchy, each higher tier of biological life reflexes energies from the lower tiers, from plants to invertebrates to vertebrates and man. Although each tier represents a level of independent creative activity, each higher tier is dependent upon all the lower tiers. We know that plants support all higher forms of life. In a similar way, patterns of sensitive response worked out by the invertebrates are essential to all of the vertebrates and man. Likewise, patterns of conscious reflection explored by the vertebrates are essential to man's mentation. (Refer back to Figure 8.)

The successive delegation of tiers in nature's hierarchy also introduces a pattern of discretionary subsumption that accompanies the biological dependence outlined above. Humanity at the top subsumes the whole hierarchy, while being totally dependent upon it. This accentuates the need for an appropriate balance in the resonating spirit of the biosphere.

The tiers in the biospheric hierarchy have evolved in dramatic jumps, with abrupt adjustments in the hierarchy, just as one might expect in the delegation of new levels in the hierarchy of a company. For example, the rapid extinction of the dinosaurs was accompanied by the rapid

appearance of many mammalian species. There are other similar examples, such as the extinction of the giant club mosses and horse tails after they had existed for millions of years, only to be replaced by the gymnosperms. There have been analogous but less dramatic periods when giant insects, mollusks, cephalopods and mammals have vanished with the appearance of more refined species on higher tiers in the hierarchy. It is a pervading evolutionary pattern.

In view of these patterns, humanity is faced with a unique evolutionary challenge. We have been invested with great creative potential through language and the bilateral polarization of brain function. We have the capacity not only to comprehend a biospheric balance, but to experience it through the reciprocal mirroring across the limbic polarity. However, language alone does more to inhibit than to help. Every language embodies structural principles that are implicitly accepted as the basis for integrating meaning. In this way there is a limited degree of self-similarity between language and the system, the nature of which varies from one language to the next. For instance, the Chinese and the Greeks think quite differently, largely due to differences in language. Every language has its strengths and weaknesses, all of them harboring deficiencies of thought.

Quite apart from the shortcomings of languages themselves—including the languages of science and mathematics—they don't embrace the whole of experience. Tools of social expression, they are predominantly confined to one hemisphere of the brain. The intuitive hemisphere is much better at assessing and conceptualizing structural relationships, but it is mute, hampered by the shortcomings of the language hemisphere. The limbic polarity, the third dimension of the triad, can only voice its displeasure at the imbalance between its two partners through animated grunts and grimaces.

All of this serves to indicate the importance of delineating the system in a way that is not dependent on language. The diagrams that have been used to show how the system works facilitate a direct insight into the structural dynamics of experience. They are not confined to implicit linguistic assumptions regarding structure. They function as a kind of science for the intuitive hemisphere of the brain, so that better guidance can be provided to the language hemisphere. In this way languages can be liberated from some of their deficiencies as social tools.

This is not so easy as it may seem on the surface. The two hemispheres of the brain do not work in isolation from the limbic polarity. They must deal with energies refluxed from experience through the auto-

nomic nervous system. All three polar dimensions are involved in working out a balance. The suitability of a balance with our natural heritage through the limbic polarity includes a cultural component reaching back thousands of years. An insight into the system cannot avoid calling cultural frameworks into question, thus introducing change, with all of its attendant problems.

Although the method of illustrating the system is not dependent on language, an understanding of the system is not divorced from language either. Neither can it be divorced from the evidence of experience—*all* experience, not just an objective component to suit the linguistic assumptions of science. Balance between the three polar dimensions necessarily implicates the language hemisphere of the brain, but through an insight into the system, it loses its dominant status. The other two polarities, the intuitive hemisphere and the emotive limbic polarity, can be taken into account and accorded proper recognition.

The three polar dimensions of conscious experience suggest the practice of three disciplines relating to them. One discipline relates to left brain language, one to right brain intuition, and one to limbic brain emotion.

Discipline is not really the right word. It carries with it feelings that are too closed and regimented, even dogmatically rigid and military. Maybe pursuit is a better word. Think of it as a discipline of pursuit. Although each polar dimension is intimately related to the other two, there is a discipline of pursuit associated with each that must be independently practiced. Most of us do this automatically to some extent, although often not in constructive ways. We aren't aware that we are practicing disciplines that control and direct our lives, and our personal evolution as human beings. By becoming aware, we can integrate our lives in more meaningful and satisfying ways.

First there is a left brain social discipline. It is more than social in the popular conception of the word, since it is essential to our physical survival. It concerns our bodily needs and our need to earn a living, as well as our personal social obligations. It includes all forms of behavior and social expression, all intellectual interests, all specialized techniques of explicit performance—from the arts and sciences, to mundane chores and recreation. There is a process of reflection and intellectual activity involved that selects and tailors a course of action to the needs of circumstance, as we perceive them. This is true whether we are practicing our golf swing, shopping at the super market, or working as a secretary, or a surgeon. It's obvious, of course. We work out the physical details of

our lives, fitting them together according to frameworks of understanding that we implicitly accept. Unfortunately these frameworks can become governed by fixed patterns of behavior, rather than governing behavior. They tend to become ossified, leaving one unprepared for changing circumstance.

Second, there is a right brain spiritual discipline that even the most refractory people tend to practice to some limited degree. It does not address intellectual questions of religious dogma, judgments good or bad, or matters of personal salvation, and it is not directly concerned with the specifics of behavior. Rather it seeks direct intuitive insight into the nature of experience. This pursuit is best not formulated or preconditioned by thought, nor can it be resolved in thought. Intuitive insight is experiential.

The main tool of this discipline is meditation, and because of the self-similar way that experience is organized, a few things can be said about it, even though the pursuit is mute. For example, it is necessary to still the process of left brain intellection, the endless dialogue that tends to dominate the mind. In order to do this it is helpful to minimize external sensory input. One should choose a quiet peaceful place, sit comfortably erect and close the eyes. Then one should also still the sympathetic feelings that keep cropping up, such as emotive impulses and wants of many kinds. Observe them arise, and follow them, and quietly put them to rest. It isn't that they are good or bad in themselves, so don't bother judging them. Just observe how they arise and flow, and put them to rest. They are not relevant to what you are doing at the moment, that's all. So it is best to avoid inviting a reactionary battle with them which can escalate and make it more difficult. (Refer back to Figure 10.)

It is helpful to consciously follow the breathing in doing this, since breathing is an autonomic function over which we have a degree of conscious control. To be aware of each breath, in and out, in a natural way, thus focuses the left brain intellect on the sympathetic energies that fuel it, and helps to bring them both to a natural state of quiet.

In this way one can access intuitive energies of a different kind, associated with our parasympathetic feelings, although not limited to them. They are archetypal by their nature and have a timeless character. Since they concern the integration of experience they can be very pleasurable, while at the same time being constructive. They can bring one to consummate feelings of unity. But even the most sublime bliss should simply be impartially observed, and then it teaches. One begins to intuitively see into many things. The nature of experience becomes transpa-

rent in a positive way. Cosmic insights may come eventually in rare instances, but this is not essential, nor necessarily relevant to the integration of one's personal experience in a satisfactory way.

The benefits available through ordinary meditation, without preconditions or specific expectations attached, has got to be one of the world's best kept secrets. The energies that are accessible can absorb one in states of pure joy and happiness. What's more they can open horizons to greater human potential. They lend coherent meaning to life that helps one to survive adversity intact. There is also a realization of timelessness to them that stills apprehensions over our inevitable march to the grave, not that this should be the prime motivation behind the pursuit. It's a fringe benefit. The tragedy is not that we die, it's how we live. The energies available can enhance the quality of everyday experience, and provide us the will to cope with circumstance in a constructive way. They can enrich personal relationships, lending positive energy.

The third discipline concerns the emotional brain that anchors us firmly to our evolutionary history, going back four hundred million years, but including our human cultural evolution, with a personal component. During the normal course of living, emotional energies are constantly percolating into our consciousness and they fuel our conscious mental processes, particularly our left brain social concerns that usually occupy our attention. These energies frequently pull us around blindly by the nose, and the right brain spiritual discipline will help to establish a constructive level of awareness behind them.

Emotional energies are more than emotions as we are taught to think of them as static qualities. They generally come in opposing tendencies that we are obliged to select between. They are patterned and they tend to impel us to respond to circumstances in ways that are consistent with the way they are patterned. Very often we are accustomed to a pattern of emotional response to a common circumstance, and we hardly give it a thought, but other times we are required to reflect and choose between conflicting emotional interests. Is this or that the right way to proceed, we wonder. If we don't identify with the patterns according to conditioned wants, but become consciously aware of them in the social and spiritual context of our lives, then we can make more appropriate choices and proceed to tailor the energies to better suit the circumstances. The alternate involuntarily side is blind and leads to unforeseen difficulties.

The meaning of the word spiritual has been seriously degraded also, and I wish there was a better word. We are often led to believe that spirits don't exist, yet few would deny that they have spirit. On the other

hand some people turn the spiritual realm into unsubstantiated superstition or speculation of no practical value. Emotional energies are spiritual in nature, however, and they tend to be transient (and recurrent), since they relate to changing ongoing circumstance that we are obliged to respond to in the course of living. Since they fuel our actions, they arise through our sympathetic nervous system. They animate us with a certain spirit of intention, and we project our intention in the course of our action. So the emotional discipline concerns not just what is done, as in the social discipline, but also how it is done, in what spirit, and with what intention. Sometimes an action can look very wrong on the surface and yet feel very right, or vice versa. Our conditioned expectations aren't always dependable, nor are they always reducible to logic. The focus of this emotional discipline is to act with right intention, as best one can according to circumstance. It concerns how we place our values in making commitments. It therefore has a moral flavor, without imposing a rigid moral regimen. Morality, or the lack of it, is not something one can write down on a piece of paper. It is felt.

So these three disciplined pursuits each have an independent focus, and yet it can readily be seen that they are mutually relevant and complementary. They reinforce one another, depending on how constructive our efforts are and how we proceed. If we make reasonably balanced and positive efforts, the general quality of our personal experience is enhanced accordingly.

The three disciplines are not a personal viewpoint that can be imposed, nor are they the exclusive property of any religious institution. The disciplines cannot in fact impose a specific viewpoint because they do not relate to specific behavior or to specific emotions. They relate to all emotional experience and to all social behavior, as well as to intuitive aspects that transcend our organic origins. The disciplines are not a belief system that one must rationally accept with the intellect. Believing in words or feelings, or identifying with them, is in fact counterproductive. The disciplines are something that one can simply practice in one's own way and learn from accordingly. The integration of one's own experience becomes more transparent. The approach has no value apart from independent practice and learning. This is a personal thing. It can enhance one's quality of life and experience as a human being. For some this may be a more arduous path than for others.

The quality of personal relationships can be enhanced by even modest efforts to bring these three dimensions of experience to a satisfactory mutual balance. This is in each person's best interest. It can provide a

basis of mutual trust between people that is independent of transient circumstances, or personal preferences that may evolve and change.\*

After a hot bath and some supper, the evening is spent unpacking a few things. It feels a sumptuous luxury to have a warm cottage, hot water, an electric stove, and lights.

A desk lamp on a small table near a window has attracted a large variety of insects on the outside surface of the glass. They are milling around endlessly in search of a hole, that they may reach the light. Each one is itself like a tiny center of light searching through the darkness for identity. The activity of the moths is especially interesting. They move with a rapid vibratory rhythm in time with a similar vibratory tremor through their wings and bodies. Their construction is exceedingly intricate, with two large eyes glowing brilliantly, themselves like windows flooding light into the darkness.

In the corner of the window, a spider, who has capitalized on the situation with a web, has found a regular bonanza. Nearby, a daddy long-legs crawls into view over the window sill. One small fly has a close escape as it buzzes frantically through the spider's legs before it can close the gaps between them. The next one is not so lucky. With stealthy quick movements the spider cages the fly within its legs, then with two shorter arms in front, it scoops the fly into its mandibles and crawls back out of view. In all, it is a regular mixed society of insects, complete with predators, the only ones that show indifference to the light except to use it to their own carnivorous advantage.

There is a certain analogue between the human social situation and that of insects. Insects live in an invertebrate jungle, the second major tier in the biospheric hierarchy. On a treadmill of activity determined by their species, they lack a capacity to individually reflect, as minnows do. The third tier vertebrates are able to integrate patterns of activity in a socially more meaningful way. Humans are the fourth tier in the hierarchy, but there are four self-similar tiers within the human tier that are associated with the development and use of language. This human dele-

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\*The three disciplines have been clearly expressed by a remarkable Hindu known as the Shivapuri Baba. He died in 1963 at the age of 137. He spent forty years of his life on a pilgrimage by foot around the world, completing the journey at the start of the First World War. He met a number of famous people on his travels, Queen Victoria among them. J. G. Bennett, *Long Pilgrimage* (Hodder and Stoughton, 1965).

gation in tiers includes the evolution of ideas, the manner in which human thought and behavior is organized.

The first human tier has been worked out at a functional level of understanding through diverse languages and cultures. It is with the second-tier development of ideas, those that exert control over natural resources that man's jungle instincts have come to the fore in grand fashion. Over the past few centuries this has blossomed to global proportions, as man has explored all manner of organized ideas in technology, applying them to more and more sophisticated machines. The development has been characterized by a competition for survival in a jungle of ideas. Behind every idea stand people with a social commitment that is often less than sociable, often hostile to the point of oppression, insurrection, revolution, genocide, or war. Human beings are not the masters of ideas but their slaves, chained to a treadmill of activity without a capacity to individually reflect, as minnows do.

We are like insects searching through the darkness for identity in the light of objective circumstance. We look for it in ideas—or reactions to them—of every kind. The list is very long: a capitalist ideal, a communist cause, a nationalist dream, a liberation front, a fundamentalist extreme, a cult, a movement, a far-out lifestyle, a work ethic, a cop out, a self indulgent pursuit, an ascetic discipline, whatever. The point is that we commit ourselves *to* organizations, not just *through* organizations for some positive result. This includes organizations of all sorts, even systems of ideas organized into sciences. We work for them, believe in them, strive for them, sacrifice for them, sometimes even kill or die for them.

There is no escape from the need to organize our thoughts and activities. We are biologically structured to reflux, refine and recommit energies according to how we think and behave. We have not yet recognized the need to reflect on the nature of organization itself. We have not yet begun to reflect on the System, on the relationship between all and each, universal and particular, one and many. Our organizations are structured in such a way that we commit ourselves to each as opposed to all. In order to refine and project energies at the administrative level of delegation, we must perform a metamorphosis from insects into minnows. This entails the reflux and restructuring of ideas in such a way that we can apprehend the nature of the social mystery.

The three disciplines are implicitly involved. In particular, this requires attention to our sciences, to the social discipline, from the perspective of the moral and spiritual disciplines. We are morally responsible for

our behavior through technology, and the dangers of denying a place to spiritual insight are already far too apparent. The two hemispheres of the new brain must learn to work in concert if we are to contribute to the music of the biosphere.

The plight of the insects on the window is brought to a halt by turning out the light. Although late, it is a beautiful, clear night that invites a walk before bedtime. The moon is almost full. The air is chill—frost may come before morning. The trees look lifeless, withdrawn to mere cardboard cutouts glued to a make-believe landscape. They stand with nearly leafless, outstretched limbs, like scrawny scarecrows silhouetted in the moonlight.

From the top of the hill behind the cottage, a mist has settled on the lake like a cloud captured in a pocket of the land. The moonlight glistening on the mist gives it an eerie, incandescent glow. Transcendent vapors are rising from a wizard's giant cauldron. It is a brew of life, teeming full of varied forms and sublimating essences according to a mysterious eternal plan. There's the wizard's helper up above. He doesn't provide ingredients, but he has seen them all go in, mixing them with the same unending rhythm. His face is slyly turned a little to one side as he casts an old familiar grin into the pot. The forlorn howl of a hound echoes in the distance. It sounds more like muffled incantations to the brew.

The top of the hill slopes gently in the direction of the graveyard. There is a place to get through the fence where it is partly down. It is particularly peaceful here. A pause by Father's grave, then a walk on amongst the tombstones which stand up like stolid chessmen in a partly finished game. The participants have left to await another move. The rules by which we are taught to play are very often misleading, because the real rules are nearly all implicit, to be discovered as we play. The game concerns the social mystery, by offering each of us a chance to find a relationship with all. It doesn't end with death. The stakes are eternal life, though we may incur an eternal debt instead.

A circle is taken around the graveyard past the big spruce tree in the center, then down the hill and through the rail fence into the cedars. It is a short distance through the dark shadows to the shore, where the mist is moving slowly in a semitransparent mass across the water. The damp, cold air sends a shudder through the body.

The experience transcended death. It demonstrated how energies are refluxed from the void through the nervous system and restructured for an eternal gathering. There was no gratuitous pledge of a holy city, a

promised land, or a happy hunting ground, although they were clearly shown. It was the manner through which energies become refluxed and restructured that the Cosmic Being stressed. There is a personal involvement and responsibility. Each of us quantizes particular elements of experience through how we make commitments. Those of value to the whole are gathered and sustained by a universal discretion that transcends human individuals. There is a relationship of each to all involved in an eternal creative work. It is much the same as making tables.

Misty spooks have begun to stray away from the lake into the cedars. Lonely souls are searching through the woods, pursuing doubts and dreams and crowding against the landscape of experience. Their quest is for a balance with eternal rest. The game of graveyard chess goes on beyond the grave.

# Chapter 17

## Harmony

Imagine, if you can, the stupendous stellar conflagration  
Through which the universe is born.  
To the puny mind of man,  
Its vastness is a mystery that seeks to be explored.  
To the mastermind that made it,  
No speck has been ignored.  
In what may seem to us a primal burst of being,  
Another kind of seeing sustains a stream of worlds.  
Countless suns, each in its turn,  
Is given space in which to burn,  
To cast its light upon the plight  
Of planets orbiting in flight.  
Moons and meteors have their place,  
While comets try to win a race,  
As rhythmic movements set a pace,  
To harmony.  
Energy—cascading through the cosmos—  
Works its wonders in the night,  
To bring to light a life that's right,  
In harmony.  
A theater has been constructed  
Without a place for view obstructed,  
That all participants might know the show  
To which they come,  
In harmony.

Our earth is there among the rest.  
It's not the worst; its not the best.  
It's birth is bleak—its pulse is weak.  
Within a shroud of cloud  
It starts to taste the breath of wind.  
Companion moon is there as well,

300 - *Fisherman's Guide*

And starts to tell the tempo for a tune.  
Unshaded from the sun,  
It knows the story's just begun.  
It beats its restless, wreathing rhythm  
Deep in a dank and dreary sea  
Of dreadful mighty mystery.  
Great oceans in convulsion,  
Revolving in revulsion,  
Have only wind to make it worse,  
Compounding this horrendous curse.  
What is this beating in the depths  
That seems to tell of other steps?  
Then just when things are at their worst  
The tremors start; it's going to burst!  
Eruption spawns eruption  
With uncontrollable seduction  
Till all seems ended in corruption  
To quench a primal thirst.  
But something's new!  
These were not here before!  
The oceans have been parted,  
Whole continents have started  
To show their face in place of misery.  
Mountains grown like fountains  
Spread their red hot running rock  
In shock proportions.  
Now ash spews into wind,  
Now rain is known.  
The ocean's roar is thwarted by a shore.  
That marvels such as these  
Should lie beneath the seas  
To tease a tested memory,  
That's harmony.  
But still the moon  
Beats out the tempo for a tune.

The continents are born in scorn.  
They shout bald faces to an acrid sky  
To question, why?  
They shift and tilt to find a place

301- *Harmony*

Without the guilt of being there.  
Stark shape stuck in gloom.  
Frightening lightning  
Ripping through a wretched rage of rain.  
Ceaseless driving drench,  
Eroding, eating, etching out  
The elements of life.  
Wind and torrent winning over rock  
To prepare a stock of soil  
Flooding onwards into valleys,  
While at the shore there's more  
From the pounding of the surf.  
But the continents are restless.  
They squirm to get more firm,  
As if to cry,  
"Is there a place for me to be?"  
Then one first fine day  
A ray of sun is seen to penetrate the sky.  
It glistens in a puddle  
To play its part in now another  
Start to life.  
A cell is born.  
A microscopic cell!  
But what is that amidst the hell?  
What kind of answer to a yell?  
Be still and listen to the moon.  
It beats the tempo for a tune.

Alone in anonymity  
With only mud in its proximity,  
What can it do?  
In a muddle, in a puddle  
It cannot know the chore in store.  
But divide it can and does—  
So do its parts—  
To make from one a multitude of starts  
In mud.  
Lifted on the rising tide,  
It moves to ride the ocean's glide,  
Just to divide and thus provide

302 - *Fisherman's Guide*

Some company.  
Other versions, just begun,  
Join in the fun  
To catch the fleeting glimpses  
Of the sun across the surf.  
They move and jostle near the surface,  
Then they toss upon the earth as  
If a wave has bid them  
Stay there on the shore.  
The ones that dive there  
Cannot thrive there,  
So they die  
To lie in muted memory.  
From this selection, time's collection  
Gathers for a new election  
On the land.  
They will have a resurrection.  
So the past that didn't last  
Is started new with just a few  
Developments.  
These clutch on shores  
To mock the rock  
And spew their spores  
Upon the wind.  
The oceans now are teeming full,  
The land is covered with a wool  
That mildly mitigates the scene  
And wildly instigates an atmosphere of life.  
A tiny note was sounded—  
An endless cord resounded—  
To the tempo of a tune  
That's beat out by the moon.

The starkness of the stage has been subdued.  
The darkness of the stage has been imbued  
With filtered hues of light.  
The gloom is still receding,  
While life is still proceeding  
In a regular succeeding  
Leading pleadingly for more.

303- *Harmony*

Plants have grown in classes,  
While weeds have grown to masses  
That multiply to magnify the plight.  
Once food has been provided,  
A cell that once divided  
Is given to another kind of life.  
Now its division makes provision  
For a kind of vast revision  
That proceeds from an incision  
At its core.  
It grows a skin to be within,  
One it can wiggle like a fin,  
To move about, and so to scout  
For food along the shore.  
Thus cells that once divided  
Are given to a life provided  
With new miracles of mystic form  
And novel modes of motion.  
Microbes are turned to monsters  
That feed like fiends on former fellow friends!  
What new sudden shock is this?  
Have things been snatched from one abyss  
To turn and once more go amiss?  
Be still and listen to the moon.  
It beats the tempo for the tune.

An atmosphere has been transformed.  
The acrid murk has been reformed  
To furrowed clouds on wings of wind.  
Exposed and shy within their folds,  
There often holds  
The truest bluest hues of sky,  
And through them fly  
Some streaming beaming bands of light  
That march in flight across the lands.  
Crawling creatures now are many,  
Though you'd hardly notice any.  
Some have shells and suck on sand;  
Some have wings yet crawl on land.  
Some have left their humble croft

304 - *Fisherman's Guide*

To look up and leap aloft  
In ethereal celebration of an aerial liberation.  
Exceedingly incited by exhilarated insects,  
Certain seedlings strain to shed  
Their shackles with the ground.  
Plants take their ponderous plunge  
But can't even turn around.  
They soar to heights of dizzy sights  
But cannot get unbound.  
In consummate grandiloquence,  
With magniloquent munificence,  
Luxuriant splendiference abounds.  
Some critters crawl and cuddle,  
While others sneak and snuggle,  
In great forests as all struggle  
Goes unwound.  
The strife of life has been subdued  
In huge and horrid magnitude,  
And given to the work  
Of many mannered minds to manage.  
Let's rest awhile  
And watch their style.  
Tiny partners pertly prance,  
Shifting shadows suavely dance—  
Flowing movements to enhance  
Melodious magnificence.  
Hush, and listen to the moon.  
It beats the tempo to the tune.

Just when things were settling into place,  
A new disgrace has been concocted in the sea.  
Gigantic apparitions  
Without externalized partitions  
Have a bony structure housed within a hulk.  
The first configurations  
Of such a floppy form were few,  
But new ones grew  
Of even greater size,  
Complete with flippers, fins, and eyes.  
It wasn't long before a breed

305- *Harmony*

Had found a need  
To nudge their noses at the shore,  
Then, as before,  
A miracle of intervention  
Transformed a watery convention  
To the land.  
Horrible creatures now have terrifying features  
That they use to bring abuse  
To others of their kind.  
Gnashing teeth and slashing tails,  
They tear at flesh with screeching wails,  
To gorge their full on slivered meat,  
Lap the blood for added treat,  
Then leave the carcass in retreat  
For grubs that find the sinews sweet.  
Even grubs have turned carnivorous,  
Why has life turned so vociferous?  
What was a garden of revival  
Has turned into a trial of torture for survival.  
Disrupted by the rummages  
Of bungling trundling tonnages,  
The earth is trembling,  
Life's reassembling  
To maintain some sane resembling.  
How could all of this be caused  
In answer to the bliss that was?  
May we expect things to get worse?  
Will there be some bigger curse?  
Are things reverting now to ruin?  
Is an answer coming soon?  
Be still and listen to the moon.  
It beats the tempo for a tune.

In the face of this insane affliction  
New conviction  
Flouts ferocious fangs with fragrances of flowers.  
These smaller shoots have turned to beauty  
With a bloom for double duty.  
They show a place to trade sweet fare  
For pollen brought on insect hair;

306 - *Fisherman's Guide*

Then they bob upon the breeze  
To give their thanks in special silent prayer.  
They stretch their stalks toward the sky,  
To turn the purity of the eye  
Toward the sun—then linger some—  
Before they bow their tired heads  
To once more fertilize their beds.  
Brilliant colors unforeseen,  
Caress the meadow's former green,  
And infatuate the air  
With rare aromas for a queen.  
Very flattering indeed,  
As they spread from sprinkled seed,  
But can such fragrant fragile friends  
Make those monsters make amends?  
Hush and listen to the moon—  
It beats the tempo to the tune.

The dinosaurs are dying off  
As if their bulk was prying off  
A lid to life of lesser size  
But great diversity.  
Was their massive size and suffering  
To provide a psychic buffering,  
To break the ground for newly found  
Forms of fantasy?  
Is there through it all a plan,  
That's going to culminate in man,  
And guide him to some final destiny?  
It seems a door has been flung open  
To a flood of forms in legions,  
Marching through remotest regions  
In research of mystery.  
With new scales and skins and feathers,  
They fight and flock together,  
To measure every movement  
In their history.  
Into every nook and cranny  
Through every kind of weather,  
They suffer every spectacle of change.

307- *Harmony*

For each one the scene is different  
As they hunger, thirst, bleed, or burst,  
Burn or sneeze, or wheeze and freeze.  
They adjust and make some changes,  
Modify their ranges,  
And learn to bring some harmony to strife.  
But when finally all these things have been explored,  
Will there then be something more?  
Will there be another door?  
Is something better now in store?  
Be still, and listen to the moon—  
It beats the tempo for the tune.

The universe is ready,  
The pulse is strong and steady,  
The stage is set, a sigh is let,  
Then quietly  
The first crude forms of man appear.  
His life was earned through what was learned  
By multitudes in suffering.  
This struggle has been won,  
But another's just begun  
To shape itself from apely origin.  
The first great chore, to reexplore  
The limits to experience,  
Proceeds with bulges in the brain,  
But little other variance.  
This spans a vast expanse of time,  
To spare man's mind the rasp of time,  
To form a firm and finished base  
On which to build with quicker pace.  
He learns to cultivate the soil,  
To use the animals for toil,  
Then as his tools unlock his mind,  
He starts to find another kind of world.  
It's a world of his construction,  
Which often brings destruction,  
Through wars or insurrections,  
With periodical corrections  
In spasmodical erections

Requiring collections of society.  
By this alternation of creation,  
With hostile confrontation,  
The range of man expanded  
Till finally he landed round the globe.  
He's now begun to probe  
Into some superficial secrets,  
With a science of compliance  
To special rules of sorcery.  
He's making motorized contraptions  
With industrial adaptations.  
His taste has turned to waste  
In willful ways and wanton wars,  
He's utilizing brutalizing bombs,  
While stocking more,  
In case some need should intercede  
To eliminate it all.  
Overpopulating cannibals are killing off the animals,  
Destroying all the greenery, mutilating scenery,  
And poisoning the skin of soil and sea.  
Is this the purpose of the plight  
From out the darkest night  
Into the dawning of the light of life  
In myriads of form?  
Has all the sacrifice and care  
Been there throughout the ages,  
To end now in the rages  
Of a maniacal tear?  
Be still and listen to the moon.  
It beats the tempo for the tune.  
Long shadows reach toward the darkness,  
Blending streaks of cool relief on blushing cheeks,  
Beckoning the earth bride to her lover's bed.  
Her negligee of sky, transparent to the eye,  
Transforms its fluffy trim to crimson red.  
Her husband in the heaven  
Sinks his hallowed head into her bosom,  
Joyful at her answer to his light.  
Soft whispered breezes settle into slumber  
Under pandemonium of color,

309- *Harmony*

As a silent hand draws the shade of night.  
Sweet songs of day have left a last lament  
To a symphony of stars  
Swarming far into the firmament.  
Tired limbs are soothing in a pool of rest,  
Assimilating chords from distant humming hoards,  
Swirling in an unseen nest.  
The profound procession passes.  
A crowning halo, rousing in the east,  
Repeats its offer of a feast  
In harmony with heaven.  
The air's infused with angels, singing in the dawn  
To spawn anew the wonder of a world.  
Will they help us tend the garden,  
Learn its needs, distinguish weeds,  
Give it room, watch it bloom?  
Will we learn the answer soon?  
If we listen to the moon.  
It beats the tempo for the tune.



# Appendix 1

## *Further Discussion of System 4*

There are many other aspects to System 4 that could be elaborated upon, and a couple of further points deserve special mention. The universal triad reflects the *means, goal, consequence* pattern of the primary activity. The six-pointed sequence displays two such patterns, one subjectively represented by Terms 1, 4, 2, respectively, and one subjectively represented by Terms 8, 5, 7. They may be called reciprocal activities.

The manner in which the mediating triangle inverts at the middle of each cycle, then reverts back at the end of each cycle, does more than regulate the transitions back and forth from the expressive to the regenerative mode. It also induces alternating inverse activities in the operation of the six pointed figure, as shown in Figure A1-1.

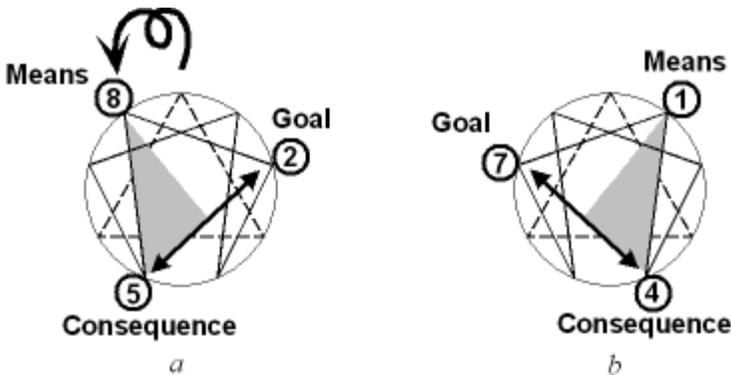


Figure A1-1

Figure *a* shows the inverted alignment of the mediating triangle. This induces a complementary inverse activity, as shown in Figure *b*. There two curious things about these inverse activities. First, the *goal-consequence* relationships are the inverse of what they are in the sequence. Terms 2 and 7 are consequence terms, while 4 and 5 are goal terms in the sequence. Secondly, the goal and consequence terms of the inverse activities occur together, and they are out of step with their respective means terms. The consequence terms do not succeed the goal terms. They do not occur as a consequence of realizing a goal. This fun-

damental contradiction introduces tensional components into the matrix that impels the sequence of transformations onward. It becomes an intentional process. The tensional pairs are also coupled. The idea in Term 2 is linked to production in Term 5. And memory recall in Term 7 is linked to Organized sensory input in Term 4. The tensionally coupled pairs are perceived from the perspective of Marketing and Sales, respectively.

To this point, all discussions have referred to the evolutionary form of the creative matrix, through which all experience is integrated. There is also an involutory form that leads to fragmentation. Outlined by exchanging the positions of Centers 3 and 4 in the terms of the matrix, it has an expressive and a regenerative mode as well. There will not be space to go into the involutory form in detail except to mention that it can come into play through an inverted perspective in the Perception of the Field term, Term 1. Values become inverted. Ideas become translated into routines rather than into forms with meaningful value. Things are done for their own sake, whether they make sense or not. Examples abound around us, from the profit motive that keeps people on endlessly escalating treadmills, to the kind of nationalism that becomes an end in itself rather than a channel through which to contribute to a better world.

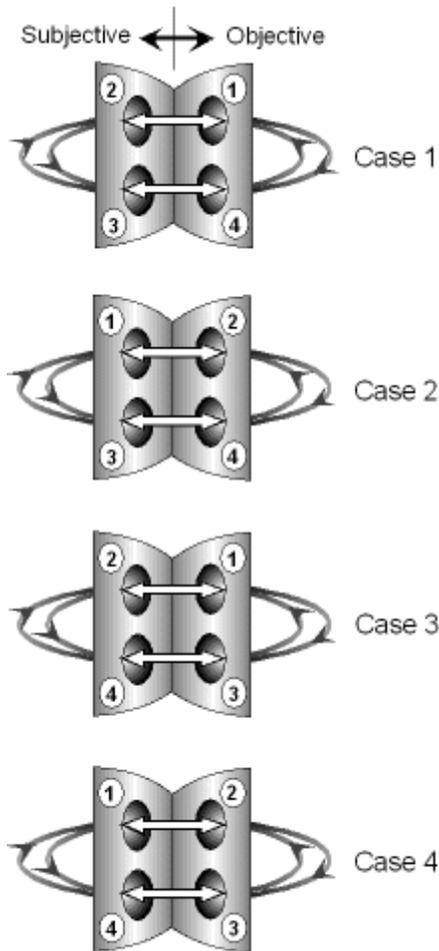
In addition, there are two more possible forms to System 4. They concern remembering, as distinct from recall that is directly committed to activity. Remembering in itself does not require overt activity. It can be restricted to a conscious process, such as remembering the car accident you had last week. Since there is both an evolutionary and an involutory remembering process, altogether there are a total of four possible forms to System 4, each with expressive and regenerative modes.\* The terms of the evolutionary remembering matrix involve the interchange in the positions of Centers 1 and 2 with Centers 4 and 3, respectively. In the involutory matrix, Centers 1 and 2 exchange places.

The perceptual-referent term, Term 1, plays a special role in determining which of the four forms of System 4 comes into play. How we perceive the context affects the outcome of the creative process. There are only four possible alignments for the coalesced pairs of centers in Term 1. They are shown in Figure A1-2. Cases 1 and 2 are the expressive and regenerative modes of evolutionary activity. Cases 3 and 4 are the expressive and regenerative modes of involutory activity. Cases 1 and 3 are the expressive and regenerative modes of evolutionary remembering. Cases 2 and 4 are the expressive and regenerative modes of involu-

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\*There are other possibilities but they lack conscious meaning.

tionary remembering. It is thus apparent that activity and remembering share a common perceptual referent in Case 1, as the evolutionary form of expression, and in Case 4 as the involutory form of regeneration.



*Figure A1-2*

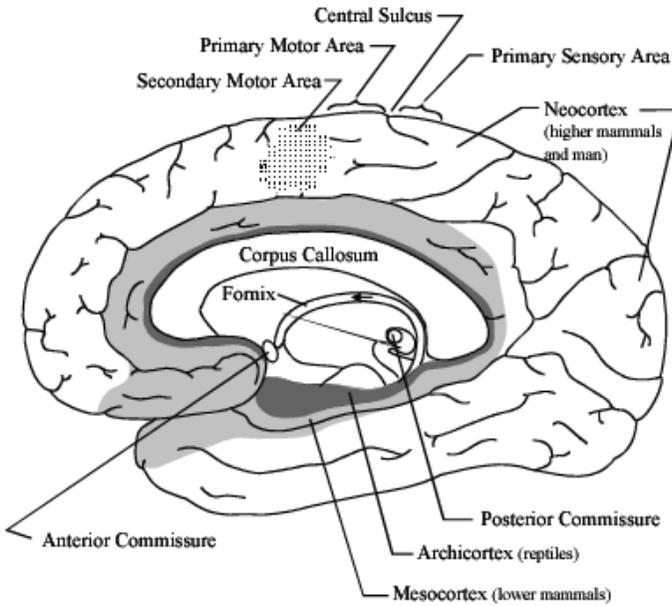
In Cases 2 and 3, the perceptual referents are at cross-purposes. Case 2 is the regenerative mode of evolutionary activity and the expressive mode of involutory remembering. This means that the same per-

ceptual referent can both sustain a remembering of past mistakes, and also guide the active formation of a creative idea. Case 3 is the expressive mode of involutory activity and the regenerative mode of evolutionary remembering. This means that the same perceptual referent can be used either to guide the regeneration of resources needed to perpetuate mistakes, or to guide a creative remembering of what should be done instead.

The remembering forms of the creative activity permit a cross linking of evolutionary and involutory activity. There is a tug-of-war involved, a moral struggle, through which involuted energies can be redeemed.

The Sales $\leftrightarrow$ Marketing polarity (T8 $\leftrightarrow$ T1) employs our emotive limbic brain. Since our emotional apparatus is anchored to our evolutionary history in the biosphere, the intentional quality of our efforts impacts our natural environment, in addition to affecting the quality of our own emotional experience.

# Appendix 2-1



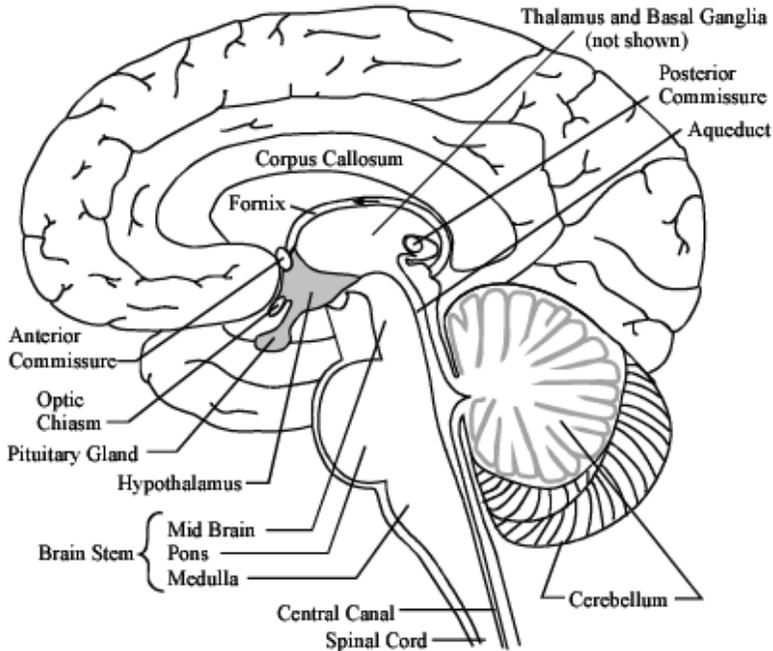
## THE LIMBIC CORTEX

The Limbic cortex consists of the archicortex, shown in dark gray, and the mesocortex in light gray. These old brains form the limb or edge around the inside medial surface of the newer neocortex. They are directly connected to the autonomic nervous system and emotion via the hypothalamus. The neocortex, to which we owe our intellectual capacity, has no direct controls over emotion. Our creative intellect, capable of building atomic bombs or sending rockets to the moon, is thus harnessed to the emotional capacity of a crocodile and a horse structured into the primitive parts of our brain. Prof. P.D. Maclean contributed many research papers on what he called this schizophysisiology, a built in split between emotion and intellect that accounts for the human social dilemma.

The medial surface of the right hemisphere is shown, along with the secondary motor area, so that these areas of both hemispheres face one another across the central fissure. This allows one side to act as a referent for the other side in the bilateral integration of movement. The brain stem and cerebellum are omitted. The primary motor and sensory areas are shown on the top surface of the neocortex. The secondary sensory areas are on the outer sides of the cortex.

The neocortical hemispheres are extensively interconnected by the corpus callosum, a huge nerve bundle. The fornix projects from the archicortex to the hypothalamus, and some fibers cross to the other side, thus constituting a limbic commissure, interconnecting the limbic hemispheres, as do the posterior and anterior commissures. The primitive limbic brain can thus function independently of the neocortical (new) brain.

## Appendix 2-2



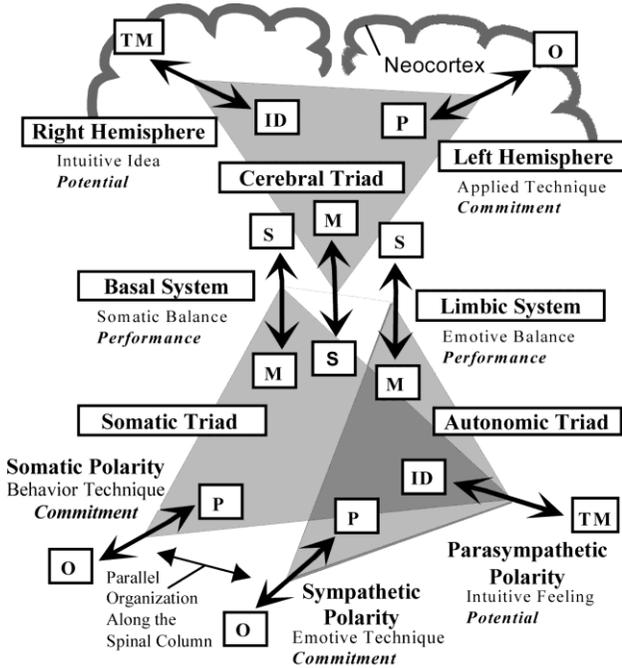
### THE HYPOTHALAMUS & CEREBELLUM

The hypothalamus receives major inputs from the limbic system via several routes, including the fornix. It also projects back to the limbic cortex, maintaining two-way communication. The hypothalamus integrates visceral sensory information from the body's internal organs. Descending projections from the hypothalamus are relayed via descending tracts activating autonomic functions and also directly influencing somatic activity. Direct connection to the pituitary gland complements autonomic activation of the endocrine glands. The hypothalamus is thus centrally concerned with both the feedback of emotional input to thought processes and also with emotional expression via the autonomic nervous system to fuel the body's actions.

The cerebellum and brain stem are shown sectioned through their midline. The cerebellum receives dense inputs from the proprioceptive nervous system together with the motor and sensory areas of the neocortex, with widespread input from other areas of the central nervous system including all sensory systems. The cerebellum projects to the vestibular system concerned with balance and also to the motor systems by various routes, including both direct and indirect projections to the motor areas of the neocortex and to the motor horns of the spinal column. Other motor projections go to both descending reticulo-spinal tracts, one somatic and one autonomic. Since these tracts are multi-synaptic they allow for the integration of patterned activity at different spinal levels. The cerebellum is thus situated to effect a balance between the three focal points of mentation in their self-similar somatic enactment, parallel to the emotional balance.

## Appendix 2-3

(Adapted from Science & Cosmic Order)

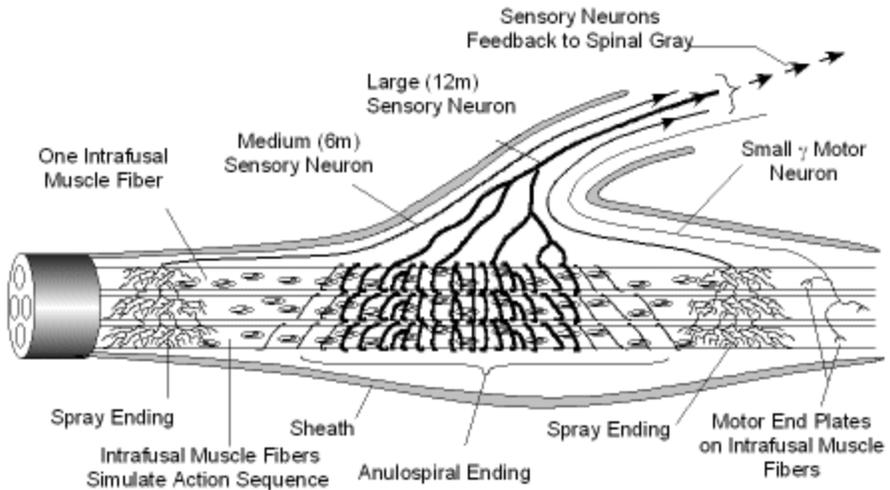


### COMPANY & NERVOUS SYSTEM INTEGRATION

The same symbolism can be used to illustrate the structure of both a business organization and the human nervous system. Both are expressions of the creative process, a business organization being an extension of how we integrate experience ourselves. The right brain ID↔TM polarity focuses on Idea Development (ID) in the context of the Treasury/Memory (TM). The Treasury is the resource capacity needed to make the Idea a reality. A company treasury mirrors the facilities, resources and creative *potential*. The human treasury is Memory of both physical & mental creative capacities and thus human *potential*. Ideas must relate to the resources needed to make them a reality. Left brain *commitment* to technique then Produces the Ideas in explicit form in relation to our social Organization, as in the P↔O polarity. Production in a company works in a self-similar way in the context of the Organization structure to give insight into the *commitment* dimension. The S↔M polarity relates Sales *performance* to Market need. Humans likewise must emotionally balance behavioral *performance* with perceived propriety in the social and natural marketplace. The Basal System seeks a somatic balance of Ideation with Behavior that parallels the emotional Limbic balance. Note that the autonomic and cerebral triads are the Market for cerebral thought and vice-versa. Limbic polarities thus mediate balances between thought, feeling and behavior according to insight into the *potential, commitment & performance* dimensions. Learning from experience takes place on this basis, often through trial and error.

## Appendix 2-4

Diagram of muscle spindle adapted from Cunningham's Textbook of Anatomy, 12<sup>th</sup> Edition. The diagram does not distinguish between nuclear bag and nuclear chain fibers that work in parallel, and it only shows the  $\gamma$  motor neurons that can activate the spindle independently of the parent muscle the spindle is in. There are spindles throughout the muscles of the body.

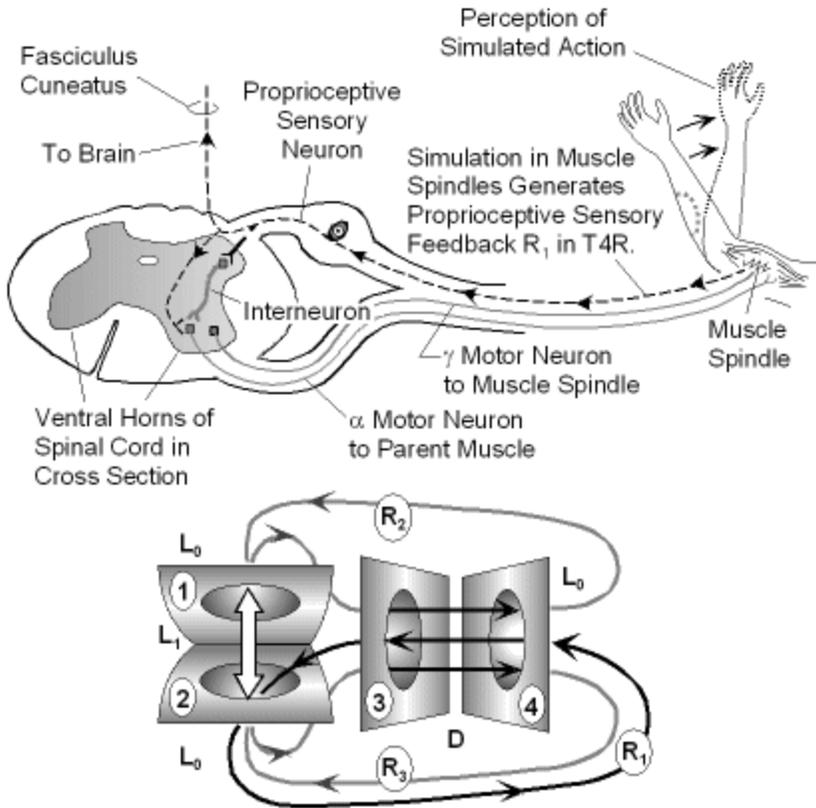


Recall of a suitable regenerative technique from T7R to T1R in the System 4 sequence initiates a motor simulation in the ventral horns of the spinal cord. This simulated pattern projects to those muscle spindles in parent muscles that will be involved in the spindle simulation that follows in the next System 4 Step.

In the T4R term that follows the motor simulation in T1R the muscles spindles enact a corresponding simulated pattern of action without movement in the parent muscles. Only the spindles move within the parent muscles involved. This simulated action pattern generates proprioceptive sensory feedback that provides a patterned feel for the action before the parent muscles actually move the body. This allows us to anticipate and evaluate an intended action before we make a commitment to actually do it.

## Appendix 2-5

(Adapted from Science & Cosmic Order)



### T4R – Mental Work, Simulated Sensory Organization

-  $\gamma$  Motor Simulation by term T1R in the ventral spinal cord projects to spindles in T4R. This mimics an anticipated act as a Known-Idea ( $C1 \leftrightarrow C2$ ) by simulating change in the body's Routines ( $C3$ ) with respect to environmental Form ( $C4$ ), represented by  $R_2$  &  $R_3$  above.

- The simulation generates proprioceptive feedback  $R_1$  to Known motor cells  $C2$  thus identifying them as involved in the actual future enactment of the simulation. This selection of motor cells must be reconciled with inputs from synchronous Terms T8E in Set 1 and T7E Set 2. This integrates inputs from past and future.



# Appendix 3

## *Science and Cosmic Order: A New Prospectus*

The following points will serve to summarize the cosmic order as it relates to the physical sciences and cosmology as presented above. They have been extracted mainly from the introductory chapter of an academic development of these ideas in a book by the author, entitled *Science and Cosmic Order: A New Prospectus*.

1) Planck's constant, the universal quantum of action, clearly points to two alternate modes for what we perceive as the material content of the universe. The one mode is fixed as particulate matter and is specifically determined in spatially complete form. The alternate mode, although quantized as bundles of energy that correspond to particulate matter, is non-specific and cannot be spatially identified. This strongly implies that the material content of the universe is in fact involved in a very rapid and universally synchronous oscillation between the two modes. One mode is spatially complete, the other mode spatially indeterminate, such that events are prescribed by sequential frames in a holographic movie of cosmic proportions. The spatially complete frames may be called *space frames*. The spatially indeterminate frames may be called *quantum frames*. The latter are void of form.

2) What we know as the wave character of matter is associated with the synchronous oscillation back and forth between the two modes. This means that the entire universe is vanishing and recurring very rapidly with and before our eyes, the continuity of events being provided by quantum jumps in position from one space frame to the next, through the agency of the intermediate quantum frames. This is analogous to an ordinary movie where the blank screen facilitates the projection of successive frames to lend the illusion of continuous action. The blank screen in this case is the spatially indeterminate quantum frames. They allow an ever changing assimilation and configuration of particulate matter in a series of space frames. There is thus a dynamic identity between spatial form and quantized energy as non-specific emptiness, the latter acting as a *master sensorium* or repository of experience between space frames. Because experience is in reflux and renewal, the sensorium also spans history and regulates dissynchronous elements.

3) The quantization of the electromagnetic spectrum, as it projects through space, is a universal measure of this fundamental oscillating action, hence Planck's relation  $E=h\nu$ . The quantization of energy,  $E$ , is a function of the frequency,  $\nu$ , because the universal action,  $h$ , is synchronous for all frequencies. The electromagnetic spectrum is being interrupted across its entire breadth by the successive disappearance and recurrence of space frames, thus requiring light to project as a series of pulses.

4) The speed of light, as measured in vacuum through space, is universally constant because the recurrence of space frames is universally synchronous irrespective of relative motions. Relative motions can be known only between relative positions in successive space frames. Light moves the same within each frame relative to the primary projection of each atom. It must close the space in each frame.

5) Time, as we are able to measure it as a linear phenomenon, is associated with the recurrence of space frames. We measure time by regular cyclic motions, such as the rotation of the earth, and these motions reflect a series of quantum jumps in position through successive space frames. Each successive frame thus specifies a universal primary interval of time. It is possible to measure the length of this interval in terms of classical units of time because each space frame recurs for a specific duration relative to the propagation of light. This primary interval is  $1.52 \times 10^{-16}$  seconds, the revolution period in the first electron orbit of hydrogen. It is also the time required for light to circumscribe the largest stable atom, since the atom must be spatially coherent within each space frame.

6) Although a common simultaneity for separate bodies, in relative motion through space, may not be established through direct measurements with clocks, as relativity theory maintains,<sup>1</sup> we may nevertheless attach a universal significance to the concept of synchronicity. Since there is sound evidence to clearly indicate that matter is inherently intermittent, it in fact must be synchronous if we are to perceive the material surroundings with any degree of integrity at all. Although synchronous distortions may be introduced through relative motions that affect spatial perceptions and our ability to make measurements, this does not discredit the fact that a preponderance of synchronous events still prevail. Even in extreme cases where synchronous distortions may be so severe as to result in black holes, these can only manifest relative to a preponderance of synchronous events.

7) Gravity is universally operative independent of transmission through space and time, since it is associated with a universal present in the synchronous projection of the movie. It is an expression of an underlying unity implicit in all particulate matter. The attractive force of gravity resides in the universal aspect common to diverse forms of matter separated in space, and it is effected through the quantum mode. The tendency to come together is an expression of the oneness of physical being, a oneness that is manifest in the spatially indeterminate quantum frame. In this respect the unity of the quantum frame is the inverse of the space frame where particulate matter is separate and distinct. (The universal law of gravitation can be derived from System 3, as can special relativity and other fundamental formulae of physics.)

8) Relative motions tend to distort the perception of space and time because light is unable to fully bridge the quantum jumps in position between successive synchronous frames, and yet the movie must cohere as a whole. In Newtonian physics this tendency manifests as a force required to accelerate one body with respect to another. This shows up as a discrepancy of units in the familiar relation  $F=ma$ . The units of force and mass are the same, leaving a discrepancy in distance per second per second. This is a discrepancy of change in position through successive frames. This distortion in the uniform perception of space and time is balanced by an external expenditure of energy as work. This is the inverse to the effect of gravity as an attractive force that functions from within. We shall see that gravity is one of a class of forces that function via the quantum mode. Also note the significance for general relativity that gravity is the inverse of acceleration, not its space-time equivalent as the theory assumes.

9) When relative velocities approach the speed of light a more severe kind of distortion becomes apparent because relative space frame sequences are perceived out of synchronization. There is a relative skipping of space frames balanced by a relative accumulation of quantum frames between different inertial systems, because light cannot otherwise bridge the jumps in position. The quantum sensorium spans the relative history. This shows up as the familiar relativistic discrepancies indicated by the Lorentz transformations of special relativity. There is still no sound reason to believe that these transformations "...do away with the absolute character of the concept of simultaneity," as Einstein stated.<sup>2</sup> They merely account for synchronous distortions between inertial systems.

10) Space frames are skipped in the inertial system of the *observer* with respect to the moving body. This is balanced by a relative accumulation of quantum frames with respect to the observed body in motion. There is no compelling reason to suggest that the position of a so-called stationary observer is necessarily an arbitrary matter and that we must accordingly seek out mathematically covariant laws with respect to continuous transformations of space-time coordinates. This basic principle of general relativity doesn't take cognizance of the fact that experience is not presented to us in this way. Uniform patterns of cyclic motions dominate the heavens in a highly organized hierarchical manner, cascading down from galaxies to suns to planets and moons. When we speak of inertial systems as resisting acceleration, we must therefore see it within the context of the theater in which we are observing the movie. Acceleration is always relative to the preponderance of synchronous patterns of momentum that prevail, for it both conforms to and disturbs those established patterns as they exist hierarchically. A classic example is Foucault's pendulum, where the arc of its swings rotate to counter the earth's rotation. The pendulum may be set in its swings by the gravitational pull of the earth, but the direction of its swings is synchronous with the position of the galaxy at large.

11) Momentum is a quantization of uniform relative motion. This is inferred by de Broglie's wave equation, where the quantum of action,  $h$ , is equivalent to the product of the relativistic momentum of a particle,  $p$ , and its wave length,  $\lambda$ . If the wave motion of matter is a result of the oscillation between quantum and space frames, then it follows that the wave length assigned to a particle should be associated with the quantum jumps in position from one space frame to the next, relative to its perceived place in the projection of the movie. A curious paradox arises at this point, because one would expect the wavelength to increase with the momentum, an increase in velocity representing an increase in wavelength from frame to frame. In fact the opposite must be true, because the product of the momentum and wavelength is equivalent to the universal constant,  $h$ . There is again a dimensional discrepancy of unit distance per second per second, which indicates that the paradox is associated with a synchronous distortion between the observer and the particle. If the uniform motion of the particle is offset by a relative skipping of *observer* space frames, the paradox is resolved, because the observer is also a collection of quantized momentum in the movie production, moving with the earth in its orbs within orbs. A relative skipping of observer space frames thus has the effect of increasing the apparent frequency of particle

space frames and reducing its relative wavelength accordingly. This is consistent with the alternate formulation of de Broglie's equation, where the momentum of the particle increases with the apparent frequency.

12) Uniform velocities may be considered inertial because particulate masses are independently assimilated in the movie. The duration of each space frame is sufficient to allow light to circumscribe any typical atom, but not larger conglomerates of atoms as molecules in concentrations of matter. The latter are assimilated through atomic characteristics that allow them to mutually relate collectively through interfaces of interaction. Within each space frame, however, activity is restricted to electromagnetic phenomena. The uniform motion of an atom, or a unified collection of atoms, is a quantized event, occurring from one space frame to the next, along with the preponderance of other synchronous events. If there is no change in the degree of synchronous relationships from space frame to space frame, then no forces are introduced associated with further synchronous distortions. Velocity, or the relative lack of it, is therefore inertial so long as the relative shifts in position from space frame to space frame are uniform. It should be noted here that this requires another kind of time that is distinct from linear time as defined above in point 5. There is a kind of duration that spans successive space frames to historically integrate the synchronization of events.<sup>3</sup> This underlying, or rather transcendent, duration is associated with the quantum mode, and has been referred to as the *quantum sensorium*. For instance, there is a relative accumulation of quantized energy associated with moving particles to balance the relative skipping of observer space frames. This is essentially a quantization of experience that does not actualize to the observer in spatially explicit form, although it remains associated with the moving particle as an increase in its relativistic mass, a physical contraction in the direction of motion, and a dilation of time. (the Lorentz transformations.)

13) Since a complete atom is a closed and spatially distinct entity, being circumscribed by electromagnetic energy, the intimate relationship of photon to electron and proton therein is a closed electrically neutral relationship. Each of the three members of the triad were not mysteriously created as separate entities, as big bang theory maintains, electrons and protons just happening to balance out in equal numbers. If, however, an electron becomes excited beyond the electromagnetic limits for an atom, then light is unable to bridge the distance within one space frame. It must span two or more space frames to close the relationship between electron and proton, and it is this spanning of space frames by light that gives rise

to electromagnetic fields. This also serves to integrate history over a succession of space frames, that is to say, light must link events over a period of linear time.

14) In the organization of moons, planets, suns and galaxies, there is a wide variety of phenomena that necessarily follow according to the above scenario, some of them well known. For example we know that somehow, since the consolidation of our solar system, that about 98% of the angular momentum has come to reside in the planets, even though 99% of the total mass resides in the sun. The rotational motion of the solar system introduces synchronous distortions with respect to the galaxy that are associated with angular velocity, although the mass of the solar system must be generally synchronous with the galaxy at large. This angular tendency to synchronous distortions manifests as a relative skipping of space frames in the center of the sun with respect to its own periphery and the peripheral planets. There is a corresponding accumulation of quantized momentum associated with the planets that cannot actualize, and yet it must manifest itself in some way, if it is not to build to unlimited extremes. Since we observe a differential rotation between the center of the sun and its periphery, it is reasonable to conclude that the accumulated momentum becomes translated as a force of retardation operative at the center of the sun. (The poles rotate in 33 days, the equator in 25 days, the inverse of what classical mechanics would predict.) This force is not transmitted externally through space, but rather internally via the quantum mode, as an internal winding down to preserve synchronicity. It is a force hitherto unidentified, and one of a possible variety of quantum forces operative on a cosmic scale.

15) The differential rotation of the sun accounts for the spiral wrapping of the sun's electromagnetic field around its girth, a portion of the field being swept out with the solar wind into the planetary disc and beyond. The great electromagnetic arches that pop out from the sun's surface, associated with sun spots and solar flares, appear as direct evidence of an electromagnetic bridging of discrepancies in angular synchronicity within the sun.<sup>4</sup> The sun's magnetic pole reversals, that occur approximately every eleven years, are also essential to balance synchronous distortions that would otherwise accumulate to unmanageable proportions. The earth's pole reversals are much less frequent, for synchronous problems have a different focus.

16) When we turn our attention to the galaxy, we find that the focus shifts to the regulation of its material content, as distinct from the angular distortions within solar systems. The material content of the entire galaxy

must be preponderantly synchronous, both with itself and with other galaxies, even though it may be in rotation with respect to other galaxies in the universe at large. In galaxies that tend to rotate as a unit, there will be a skipping of space frames in their centers with respect to their peripheries that will tend to accumulate to cosmic extremes. As we are beginning to discover, this can manifest as black holes in their centers, with a relative massive accumulation of unactualized momentum with respect to their peripheral rotation. But we can also see that black holes in the centers of any number of galaxies represent one, common, singular condition, with respect to the universal cosmic projection of atomic matter. The physical universe, as we see it, is one synchronous event. Black holes may also be expected in the centers of star clusters, where stars seem to move independently in elliptical orbits about a common center, and similar patterns may be expected in elliptical galaxies.

17) Because galaxies must be preponderantly synchronous, quantum forces may come into play in a variety of ways. Tendencies to angular synchronous distortions in solar systems, place them in instant communication with the galactic center, for the same singular condition exists at their respective centers via the quantum mode. The super abundance of accumulated momentum associated with the galaxy can thus be translated back to its stellar population as a regulatory force governing stellar migrations within the revolving disc. The entire stellar population of the galaxy becomes tensionally coupled within. It becomes one coherent whole. Stars must behave themselves within moderate limits and cannot go racing off without restraint at the beck and call of gravity, disturbing the synchronous integrity of the whole. Tendencies to excessive motions find a ready resistance. The apparent deficiencies in gravitational mass in current theories about galactic organization thus find new avenues of explanation that apply to many other phenomena as well.

18) There is a growing body of evidence to indicate that there is reflux of the material content of a galaxy through the galactic center. In this scenario, old stars tend to migrate toward the center, where they are drawn into an accretion disc and torn apart as they spiral in toward an apparent black hole. Then there are intermittent massive ejections of material from the center, with star formation apparent as it migrates out toward the peripheral disc.<sup>5</sup> As more data becomes available it should consolidate into a picture of eternal stellar regeneration.<sup>6</sup> In a synchronous universe, galaxies function as cells of creative reflux and efflux, the heavy elements, created through stellar processes, being recycled back into hydrogen in the galactic core (where they encounter the synchronous

and singular primary projection of matter). On the other hand, the spatial contraction of nuclear fusion in stellar centers tends to compensate for the skipping of space frames due to angular motions, linking stellar processes directly to galactic angular momentum.

19) When we look through our largest telescopes at the distant quasars, some of them emitting more energy than a thousand galaxies like our own, from a core only a light year or so in diameter, what are we seeing? When we see them oscillate with bursts of energy equivalent to the creation of many millions of suns over a period days, even hours or seconds, what are we seeing?<sup>7</sup> The light from a galaxy a few billion light years distant can be older than our solar system by the time it reaches us. We have circumscribed our galaxy a couple of dozen times, and the distant galaxies may be turning somewhat slower or faster, the rate of stellar reflux being adjusted accordingly. Yet we share the same synchronous present with that galaxy as it exists today, and somehow, in the projection of the cosmic movie, light must bridge the intervening discrepancies in linear time, to integrate the history. A number of effects are to be expected. For instance synchronous discrepancies alone can red shift the light that we see, and this is not necessarily associated with recessional velocity at all. It may only be associated with great distance and the associated burden of historic integration reflected in the distortion of the light that we see. Synchronous discrepancies accumulated over such a time can also greatly accelerate the apparent relative frequency of distant events, similar to de Broglie's moving particles but on a grand scale. Synchronous distortions may introduce intermittent compensations in the way that we perceive them, like a periodic relief valve, creating an illusion of intense emissions and violent eruptions as observed in quasars and BL Lacs, where none existed in reality. Such phenomena might be expected as observational homologues to real ejections of matter from galactic centers. There is no compelling reason to suggest that we are looking back in time toward the original creation of the entire universe. In view of the above, there are more compelling reasons to suggest that the universe never had an origin, that the creative process transcends events in linear time, that it is both eternal and intelligently organized via the quantum sensorium. The void is the big screen in the cosmic movie.

20) The background microwave radiation is there, of course, and real. But is it really a remnant of the separation of matter and radiation during the early epochs of a supposed big bang? Given the current state of our understanding, there may easily be other explanations. This single wisp of evidence is hardly sufficient to support the theory in the face of

mounting contradictions. To begin with, any theory of a universal physical origin at some primordial point in linear time must face formidable philosophical problems, fundamental contradictions of logic, reason, and self consistency, as is well known yet set aside. Such an origin negates any concept of natural order on which the theory may itself be based, placing us outside the whole of creation, divorced from our own experience. This renders the theory devoid of pragmatic value, for we find ourselves faced with a need to integrate history in order to cope with experience accordingly in an ongoing context. Then there is the long standing dichotomy between quantum mechanics and general relativity—an inability to marry them because the former proclaims experience to be quantized, the latter maintaining it is continuous—even though both are employed side by side in the big bang synthesis. These problems aside, we can hardly extrapolate experience with confidence many orders of magnitude beyond what we can ever hope to verify by observations or experiments of any kind. But even in the observations available to us there are serious problems—age discrepancies,<sup>8,9</sup> the clumpiness of the universe, the uniformity of the microwave radiation, the missing mass, the Hubble constant,<sup>10,11</sup> and so on. We are surely advised to look for more realistic alternatives than to undertake the invention of dark matter that does not interact with ordinary matter. Attempts at the computer modeling of cosmic evolution using various starting mixtures of dark matter are problematic even if it did exist.<sup>12</sup> The missing mass is not a problem to a synchronous universe where galaxies are eternal cells of creative reflux. The mass missing is accounted for by quantum events in the centers of galaxies with respect to their peripheries, integrating their dynamic integrity and their eternal regeneration. The universe may be clumpy. The age of stars does not have to be confined within an acceptable birth date for the entire universe. Galaxies may exhibit different characteristics, migrate, form loose associations, evolve and change, all within synchronous constraints. It can as readily be shown that the background microwave radiation is related to the primary interval of time, indicating an origin in the ongoing synchronous projection of the universe.

21) A synchronous universe introduces limitations in the application of mathematical methods currently available, because the properties of space and time, as we measure them, are not continuous. There is thus a minimum limit to the increment of the differential in the calculus that becomes very significant in quantum events. The uncertainty principle is related. The relative position of a moving particle can only be known

precisely within a single space frame, whereas the relative momentum can only be determined over a succession of space frames. These characteristics are implicit in the nature of phenomena whether our measurements interfere with them or not.

The list could go on indefinitely, for we have only begun a review of the evidence, and haven't mentioned planetary processes, biological or social evolution, neurological processes or the nature of the mind. The above points should nevertheless be sufficient to indicate a need for a more fundamental and comprehensive insight into the cosmic order. They also suggest some clues as to what we require, and the general pattern of what we might expect, as follows:

i) We are concerned with the historic integration of the whole of experience and thus with the relationship of parts to the whole. We must allow for all possible variants of experience.

ii) There is an all pervasive dynamic interdependence between universal and particular aspects of experience that is fundamental to understanding the nature of phenomena of every kind. This is intimately associated with alternate modes in the cosmic projection of experience.

iii) The integration of experience displays hierarchical elements associated with degrees of universality subsumed in levels, as in the synchronous relationship of galaxies to suns to planets and moons. These hierarchies, as they are spatially perceived, are specific manifestations of a transcendent universal order.

Limited copies of *Science and Cosmic Order: A New Prospectus* are available from the author.

### Notes and References:

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<sup>1</sup> Einstein, A., On The Electrodynamics of Moving Bodies, in *The Principle of Relativity, A Collection of Original Memoirs on the Special and General Theory of Relativity*, by H. A. Lorentz, A. Einstein, H. Minkowski and H. Weyl with notes by A. Sommerfeld, Methuen & Co., Ltd., London, 1924.

<sup>2</sup> Einstein, A., On the Generalized Theory of Gravitation, *Scientific American*, April, 1950.

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<sup>3</sup> It is noteworthy that Henri Bergson postulated two kinds of time, analogous in some ways to the distinction being made here, although here they derive from a common root. Hanna, Thomas, Ed., *The Bergsonian Heritage*, New York and London, 1962.

<sup>4</sup> Current theories are coming more in line with the interpretation of a synchronous universe. See Glanz, J., Does Magnetic Twist Crank Up the Sun's Outbursts? reporting in *Science*, **269**, 1517, 1995.

<sup>5</sup> Evidence has been accumulating for two or three decades. Bart J. Bok published a summary, *The Milky Way Galaxy*, in *Scientific American*, March 1981. He points out that there are about 4,000 giant molecular complexes known within 13,000 parsecs (about 42,000 light years) of the galactic center. Being sites of star formation, each typically contains predominantly molecular hydrogen equivalent to several hundred thousand solar masses. The outer boundary of the central bulge, 5000 parsecs from the center, is ringed by giant molecular complexes. The central bulge itself contains a dense concentration of old stars. Within it, four concentric rotating rings of hydrogen have been identified expanding radially away from the center of the galaxy, the outermost, at 3000 parsecs from the center, being discovered in 1964 by Jan H. Oort and G. W. Roegoor of the Leiden Observatory. Bart Bok comments, "*Perhaps the ring is a new spiral arm unfurling. One is equally tempted, however, to speculate that the center of the galaxy expelled a kind of smoke ring some 30 million years ago.*" At 1500 parsecs, Butler Burton of the University of Minnesota and Harvey S. Liszt of the National Radio Astronomy Observatory, identified another rotating expanding ring of atomic and molecular hydrogen. Another ring, some 300 parsecs from the center, has regions of hot atomic hydrogen containing newly formed blue-white super-giant stars. Another cooler and more dense ring exists only 10 parsecs from the center. It thus appears that huge amounts of material are being emitted periodically from the center of the galaxy, which is feedstock for new generations of stars. The central three parsecs contains the highest concentration of stars in the galaxy. Star sized clouds of ionized gas are speeding around the center at high velocities, their velocities increasing with their proximity to the center. This suggests old stars being torn apart as they are being drawn into a super massive region at the galactic center, presumably a black hole. The pattern of creative reflux is thus already suggested by radio and infrared observations. The pattern is generally consistent, even required, by a synchronous universe. The creative reflux of experience is a phenomenon that we see all around us in nature, something that we do ourselves every day. We should have good reason to expect to find it a common feature of galaxies also.

<sup>6</sup> A significant number of galaxies emit strongly in the infrared region indicating high rates of star formation. In some cases the rate is so high that the entire

galactic mass would be recycled in a billion years or less if the rate was sustained. Active periods are probably interspersed with quiet periods. Habing H. J. and Neugebauer, G., *The Infrared Sky*, *Scientific American*, Vol. 251, No. 5, Nov., 1984.

<sup>7</sup> Thierry J., Courvoisier L., and Robson E.I., *The Quasar 3C 273*, *Scientific American*, June 1991.

<sup>8</sup> Some globular clusters in the milky way and some galaxies appear to be about 15 billion years old, perhaps more, which stretches the upper limit for a big bang thesis. For example, radio galaxy 4C41.17 was found by Kenneth Chambers, George Miley, and Wil van Breugel to have a Doppler shift of 3.8, corresponding to 15 billion light years. Reported by Waldrop, M.M., *The Farthest Galaxies: A New Champion*, in *Science*, **241**, 905, 1988.

<sup>9</sup> A detailed study of seventeen of the oldest globular clusters in our galaxy places a median age in the distribution at 14.56 billion years. Chaboyer, B., Demarque, P., Kernan, P. J., Krauss, L. M., *A Lower Limit on the Age of the Universe*, *Science*, **271**, 957, 1996.

<sup>10</sup> Recent measurements of the Hubble constant favor numbers that are much too high to fit Big Bang theories, but the search goes on. Travis, J., *Hubble War Moves to High Ground*, reporting in *Science*, **266**, 539, 1994.

<sup>11</sup> Some globular clusters have been shown to have ages of about sixteen billion years, twice that allowed by some recent values proposed for the Hubble constant. Sidney van den Bergh, *Ages of the Oldest Clusters and the Age of the Universe*, *Science*, **270**, 1943, 1995; M. Bolte and C. J. Hogan, *Nature*, **376**, 399, 1995.

<sup>12</sup> Jayawardhana, R., *A Dark Matter Recipe is Tested—And Found Wanting*, reporting in *Science* **264**, 1845, 1994.