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Chapter 5 from “After The Clockwork Universe”

The Mind of God, Many and One

Sally Goerner

The Universe is built on a plan, the profound symmetry of which is somehow present in the inner structure of our intellect.

Paul Valéry

Evolution did not stop with life per se. At the very least it built brains from which sprang minds from which sprang consciousness, the greatest of the world's many mysteries. This chapter takes up the question of brains, minds and consciousness. The not-so-surprising implication here, is that these greatest of creation's wonders are also part of the story. No longer in long, slow, cycles of blind self-organization, somehow the Great Ordering Oneness found a way to build a system which consciously shapes the world and itself as if by plan. More self-aware and more potentially powerful than anything that has ever existed, thinking beings are a world-transforming force in their own right.

There is, of course, a reason I haven't mentioned much about mind. Mind is even more incomprehensible to clockwork thinkers than life. Early clockwork thinkers thought that we were merely separated, mind from body. Later ones described mind as an epiphenomenon, an illusion of a few lifeless chemicals. After all, when you break brains down, there is no mind to be found. Traditional evolutionary theory has essentially ignored mind, preferring genes instead. All of this is likely to end in the relatively foreseeable future.

Currents of change can already be seen. Once a taboo topic, consciousness is becoming an increasingly common subject in the popular press. Books such as *The Celestine Prophecy*, for instance, paint a picture of humanity reaching a new level of consciousness. People trapped in the cloying maze of modern reality, suddenly discover an invisible web of awareness growing within themselves and others. Individually and collectively, human beings are struggling precariously toward a new, more integral perception. The potential is high. So is the need. The birth of a new level of consciousness seems to be part and parcel of the project to save the world.

Now, I am not going to tell a romantic tale of New Age seers in the Andes. I think it is important to stay more grounded than this, lest the realists in the audience run for the hills. Yet, I also believe there is a valid intuition behind such works. Books like *The Celestine Prophecy* are part of the same instinctive reaction to clockwork omissions seen elsewhere. Clockwork bleakness strikes again. Millions of highly educated people the world over now read such books and harbor secret hopes that they are true.

Understanding the science behind this intuition, gives human hope a better foundation. Thus, brain researchers too are hoping that new understandings of consciousness will help bring about a global

civilization which is less apt to destroy itself and the world. Their hope seems particularly reasonable since mind and consciousness are so central to the human condition. Indeed, I would make a stronger statement — one *cannot* understand our condition or our times without understanding the phenomenon of mind, including ways of looking at the world and patterns of collective knowing.

Today, powerful new views are building which will have a profound affect on our sense of ourselves. They quite literally redefine what the human project is about. Not a lumbering automaton or a ruthless beast, here human beings (one and many) become the ultimate learning system, the finest and foremost spark of a learning world. That is the story that will unfold here, it will simply be much more integrated into the larger story of evolution than most people imagine.

The theory of mind presented here is new in its fine points largely because I include the energy connection and other rarely-popularized points. Yet, the core image is again remarkably old. Mind is a natural, interwoven outcome of a much larger flow. What is interesting is its implications for our times.

The Enigma of Mind

I doubt whether there is a more decisive moment for a thinking being than when the scales fall from his eyes and he discovers that he is not an isolated unit lost in the cosmic solitudes, and realises that a universal will to live converges and is hominised in him.

Sir Julian Huxley

Any pursuit of mind and consciousness should start with a necessary admission: there is no universal agreement as to what these are, much less how they came to be, or how they work. Most people try to understand mind by focusing on brains. Still, no matter how much we know about brains, there remains an explanatory gap between brain operation and the enigma of mind. This explanatory gap is what led reductionists to describe mind as an illusion of brain chemistry. As emergence becomes more scientifically acceptable, however, so does mind.

The new brain science, thus, brings with it a new interest in the age-old mystery of mind. In most new views 'mind' is more than the sum of brain parts, but it is nevertheless a phenomenon of this real world. The more daring even wonder how consciousness came into being.

How does the new science approach the enigma of mind? Our three old friends — energy, organization and the Great Ordering Oneness — provide some new paths by which to tread deftly through the minefield. Hence, here 'mind' is mostly a matter of *dynamic organization*, the ways bits of matter work together to produce the mind-like behaviors (described below). Minds arose from older self-organizing drives which came together in radically new ways. To properly understand mind, therefore, we must begin long before there were brains.

Mind, From the Bottom Up

...if we expect to get anywhere with the mind-body problem at the brain level, then our concepts must at least be adequate...to explain the symbol-matter relation in single cells where it all started.

Howard Pattee

How can we understand mind as a type of organization? A dictionary provides the first clues. One of its definitions of mind is a “system which exhibits purpose, intention, or will.” What Pattee suggests in the opening quote (1982), is that the best way to build an understanding of mind, is to look for the earliest possible stirrings of these three. When you do this, you find that mind-like behaviors started long before brains. If you start at the first stirrings, you can then follow mind-like behaviors throughout evolution. Here, human consciousness appears as the cutting edge of a long-standing drive. What follows is an energy story of mind from the bottom-up.

Actually, we’ve already started the journey. In the last chapter, I described how early cells began to search for food. This is a very mind-like thing to do. What few people mention is that finding food involves a new kind of energy activity, one in which small amounts of energy provide information about something else. Thus, whether there is a chemical trail or a pattern of light bouncing off food, cells must find food by following energy trails which lead to a bigger energy concentration in the vicinity. These small bits of energy are information in its physical form. Life had to learn to follow energy information in order to eat (see Fig. 1).

Pattee points out, therefore, that early life represents the first type of mind. Cells don’t think and they aren’t self-aware, but they do begin responding to information in a functional way.

cell-food

Figure 1. Cells Follow Energy-Trails (Information) to Food

Note too that the entire cellular system is tied up with this pursuit of information. For life to reach food, little energy blips from outside must trigger some form of locomotion that moves the cell toward its food. In turn, locomotion (whether by flagellum or pseudopod) requires energy from the cell’s metabolic cycles. Hence, metabolism has to speed up in order to answer the demand. In short, an entire, interlocked system must kick into action in response to little energy nudges from the outside. Furthermore, the system must respond differently to different kinds of nudges!

If you look closely, you'll see that this means mind activities (such as following information) and bodily activities (metabolism and locomotion) are inseparable. Getting food requires that the ability *to perceive* information and *to act* appropriately be linked in one very well-connected loop. Survival depends on this. If any part of the loop doesn't work, the cell does not get food and dies. This means that a whole lot of systems inside the cell had to co-evolve in tight conjunction from very early on. Furthermore, internal cycles had to be intertwined in a *functional way* from the start.

If you put these kinds of ideas together, a fascinating picture begins to emerge. First, mind-like behaviors started long before brains. These mind-like behaviors appear to be based in energy, now in the guise of information. Secondly, mind elements and body elements are One. Break the chain anywhere and the system doesn't work and the cell doesn't survive. Life, therefore, had to be a kind of well-wired, little proto-mind from the beginning. Finally, if you look at mind from the bottom-up, you find that what is most special about life is exactly its mind nature. Life is an integrated perceiving-acting system. It also manages to preserve information in its genes. It is much more than self-organizing. Biologists Humberto Maturana and Francisco Varela sum up the image nicely, "To live is to cognize."

Increasing Intelligence

Obviously, nature did not stop with the mind of a cell. Hence, looking at mind from the bottom up, also opens the door to an aspect of evolution I haven't mentioned yet. Not only does nature make things more physically complicated, she also makes them smarter. As living forms evolved, they learned to handle more and more information in more and more complex ways. Handling more information in more complex ways also led to more intelligent action. Thus, the path from cell minds to human minds is notable for *increasing intelligence*, as well as increasing intricacy.

Increasing intelligence is still tied to energy, but in a very different way. Hence, what we call information starts out as small energy blips. The energy in these blips is minuscule compared to the big build-ups which push shapes (like whirlpools) into being. In life, however, small nudges actually move more material than the big build-ups. For instance, it takes less energy to get you to move your finger away from a hot stove, than it does to make a whirlpool rise.

Rod Swenson at the University of Connecticut, thus, points out that life involves two distinct types of energy interactions. First, there are what he calls "mass-driving gradients." These big energy flows are the kind that maintain a whirlpool's shape. Inside living organisms, these flows form metabolism, the energy cycles which allow life to move and hold itself together. Thus, mass-driving gradients are behind an organism's overall structure and motion.

An organism's activity, however, is also governed by microscopic energy blips (information). Hence, bacteria find desirable resources by perceiving and acting on a trail of observables — that is, a fine-grained energy trail *related* to molecules they consume. Information is based in energy, it is just very fine-grained energy with a level of indirection. Hence, Swenson says living systems respond to "patterns" in energy flow.

Living organisms, therefore, are made of energy flow *and* they follow energy patterns. Both sides are essential. Furthermore, life's two energy interactions are integrated, which is why mind is never

separate from body.

This integration also creates a great irony. In living organisms, subtle patterns are more powerful than big build-ups. Hence, as organisms began to respond to information in more complex ways, larger and larger amounts of matter moved in response to smaller and smaller bits of energy. As a result, increasing intelligence is accompanied by increasing *responsiveness* to ever more rarefied patterns. By the time one gets to reading words on a page, entire populations move in response to incredibly microscopic bits of energy. This is strange way to put it, but it is true.

Now, we certainly don't know how all this came to pass, but it is not so hard to imagine why it might. Natural selection favors every addition which helps life follow information *better* because following information is the main way life survives. The connection to physical energy became fainter and fainter as life (especially with brains) began to respond to very complex patterns. Yet, underneath, the phenomenon of information is still based in energy.

A Brief History of Better and Better Minds

Why did evolution move from the cellular mind to the wonder which is our brain? Oddly enough, the need to maintain collaboration played a major role. We know that mind and body are integrated and that life is a committed collaboration. In such a world, growing apart is deadly because responses *dis-integrate*. Let us see, therefore, how the pressure to stay collaboratively connected has contributed to increasing intelligence from nerves to brains.

The Birth of Nerves

Life brought the miracle of responding to information to find food. Still, though early cells represented a great leap in information processing, from our perspective they are crude. Their responses are knee-jerk and their horizons are limited. How did life get from there to here? The path is actually quite understandable.

As evolution proceeded, single cells gave rise to multi-cellular organisms. As we saw in Chapter 4, many-celled organisms are actually collectives of specialist cells bound in committed collaboration. Once upon a time specialist cells were capable of independent lives, but millions of years of evolution forged them into a whole whose members need each other to survive. Herein lies a rub of great importance to the evolution of mind. A living organism has to stay integrated to survive. Cells coordinate their activities by circulating chemical and electrical signals. Information must circulate thoroughly so that each cell can do its job intelligently. Lung cells, for instance, have to know what is happening with the legs because moving a leg requires more energy which requires faster metabolism which requires more oxygen. (This is why we breath faster when we run.)

Failure to communicate well inside, therefore, leads to death just as fast as failure to perceive information from outside. Limbs, eyes, guts, and so on, can only do their job if signals are timely and correct. If your lung cells don't get signals from your legs, for instance, they won't increase oxygen which means your legs won't get enough energy to catch the rabbit.

This brings me to the point of mentioning all this. As organisms got bigger, internal communication became harder. Information exchange happens easily when cells are in close proximity. But signals dissipate over distance. As bodies got bigger, member cells began to lose touch with each other (literally). The whole began to fall out of sync. Unfortunately, when cells depend on one another for basics such as oxygen (lungs) and nutrients (gut), growing apart can be deadly.

Because losing sync is deadly, the evolutionary pressure to find a way to stay connected grew. No doubt many organisms died as collaboration began to fail. Others stopped growing and settled into a safe niche. Yet, eventually (through some quirk of diversity), some organisms developed a new means of staying cooperatively connected. A new type of specialist cell emerged whose job was to carry signals between distant groups. We call them nerves. (see Fig. 2)

single
cell

Single-celled life

collaboration

Committed collaboration (specialize and integrate)

Apart

Growing apart (collaboration fails)

Nerve-cells

Nerve cells (restores coherence by circulating information)

Figure 2. Growth Crises, From Clone Clusters to Nerve Cells

Nerves are particularly important because they allowed the organism's mind-nature to grow more sophisticated. The quality of an organism's response to the outside world depends almost entirely on internal collaboration which in turn depends heavily on information flow. Mind-body integration is crucial! Nerves improved intelligence by increasing information flow which in turn improved collaboration. More cellular specialties could develop and life became vastly more complex and sophisticated too.

Brains - The Pattern Repeats

Evolution was not through, however. In simple forms of life, such as the giant sea slug today, a single nerve cell often serves a whole organism. But as life became more complex, the same pattern of growth and crisis played out again. As bodies grew bigger, collaboration began to fail again. Pressure to stay connected grew.

At first, nerve cells multiplied forming multi-lane information highways as it were. Nerve highways brought signals from all over and spread information throughout. Where nerves overlapped, signals from many directions intermingled. At dense cross-roads, a new kind of cell began to emerge. We call this one a brain cell.

Brain cells had a unique view. Positioned atop a cross-roads with information pouring in from all over, the information they got was rich and multi-dimensional. As a result, brain cells began to respond to extremely subtle patterns in complex streams of energy (information). The horizons this opened up were truly vast.

Brain cells responding to rarefied patterns in massive amounts of information were actually beginning to respond to conglomerate pictures. Complex pictures helped organisms see contexts and make choices. The brain's owner began to see how any bit of information fit in a larger whole. For example, an organism with a brain is able to see that food *and* a predator means something different than food

alone. Unlike a planaria which responds to information in a knee-jerk way, life with a brain began to learn to decipher and choose. As brains learned to synthesize ever more complex pictures, questions of how bits fit got complex indeed.

Brains also allowed life to develop complex responses based on subtle nuances in the outside world. Sitting astride mixing centers allowed brains to coordinate incredibly complex response patterns involving all parts of the body. Like a keystone on top, brains solidified life's ability to perceive and act as a truly coordinated whole. Thus, brains are what brought life out of the ooze and allowed multicellular organisms to locomote with legs and fins.

The irony of brains is that 'staying connected' produced a whole new stage of evolution. Brains and other mixing centers (like ganglia) helped an increasingly vast collective act like a truly coordinate whole. Mind-like behaviors also began to take the forms we associate with minds today — choices, contexts, significance, meaning. We are still deciphering like mad. Underneath, however, the same evolutionary principles applied. United they stood! Multicellular organisms became a multi-level society of mind because selection favored cells that 1) worked together for the common well-being and 2) stayed linked.

The Fractal Nature of Mind and Body

Note, however, that the brain did not become the sole arbiter of intelligence nor the controller of everything underneath. This is a machine image. Local cells don't just send information to the brain and wait to be told what to do. Instead, most bodily responses are handled locally and a lot of processing is done at various stages from bottom to top. Processing information at lower levels increases the speed and often the appropriateness of the response. It is also one of the reasons one's body can operate on auto-pilot while one's thoughts spin off into space.

Nature thus built new levels of intelligence while keeping the old. Furthermore, everywhere you look, cells work in groups. A brain is a mind system which is still integrated into a larger mind system called the body which is organized into smaller working groups, like lungs and liver. The whole thing appears to work on a subsidiary principle reminiscent of one used by the medieval Catholic Church — decisions should be made at the lowest level possible.

This, of course, does not fit our usual picture of how a hierarchy works. It means instead that intelligence is *distributed fractally*, down to lower levels. This kind of organization is crucial. Without it, life would be too slow and stupid to live.

Social Learning in Higher Organisms

Nature also did not stop with brains. Organisms with brains became great sorters of information who chose paths based on subtle patterns. Freed from knee-jerk responses, animals with brains began to explore the world and to learn lots of new lessons. Most of these lessons were stored in the brain of the beholder, in circuits etched by experience. (They were not stored in genes.) Storing lessons in the brain allowed organisms to learn faster and to learn without having to die.

Still, there was a problem. Lessons stored in a brain were lost when the individual who owned the

brain died. The next great evolutionary development was the ability to preserve lessons by passing them between different individuals and across generations. The two big agents here were modeling and signaling. They too started for understandable reasons.

Since cooperation enhances survival, animals began to congregate in families or herds. Communication between animals in a herd has the same benefit as communication between cells in your body. Whether a honey-bee dancing directions to a cache of nectar or a deer signaling the approach of a predator, communication between members is an old and honored way for individuals to survive better by working together.

Animal communication, no doubt, began in the usual haphazard way, with twitches that eventually became associated with a meaning. These eventually developed into clear signals. Active signaling also brought modeling. Young and old alike learned common signals and worthwhile patterns of behavior. These began to trickle down the generations. The herd was now working on patterns of perceiving and acting. Learning accumulated from many members was preserved over increasing periods of time. All of it enhanced survival.

The Social Nature of Mind and Learning

Brains consist of neurons, which in turn are composed of organelles, molecules and atoms. They are designed by biological evolution to work in pairs, families, tribes and, by cultural evolution, to work in cities, nations and empires...biologists have largely neglected those biological properties by which brains join together in social cooperation.

Walter Freeman, Neurophysiologist

Notice the parallels in the patterns discussed so far. In the web view, cooperation is the central path of evolution. Cooperative groups depend on communication between members to survive. Growth, however, pulls groups apart and makes collaboration break down. Hence, developmental leaps often come from an invention which helps keep the group integrated.

Perhaps the most unusual observation in the new science, therefore, is that each mind is a many-bodied *society of mind*. New levels of intelligent action always arise from the cooperative, intricately-ordered activity of smaller parts. The farther up the line one goes, the more clearly those smaller parts are seen to be individuals which once lived independent lives. A complex eucaryotic cell, for instance, is a society built out of previously-independent life forms. Its mind-like behaviors depend on collaboration among individuals. The idea holds all the way up to brains. As Margulis says:

Our nerve cells are the outcome of an ancient, nearly immortal marriage of two arch enemies who have managed to coexist: the former spirochetes and former archaebacteria that now comprise our brains...These former free-living bacteria are inextricably united. They probably have been united for more than one thousand million years. (Cited in Combs, 1995, p.40)

The idea that all minds are built of lower societies and into higher ones, fits nicely in a self-organizing world which builds macrocosms out of microcosms. It helps us come to grips with the fact that intelligence is distributed throughout our body and is not just limited to our brain. It is startling because it puts community at the center of mind as well as body. It is also important because it helps us rethink human societies.

The Cutting Edge of Collaborative Learning

In human beings, signaling evolved into language which made passing information extremely precise. Speaking allowed highly-structured information tapestries to be shot from one brain to another. When writing emerged, these tapestries could be stored outside human bodies and compared and contrasted over huge periods of time. People living today, for instance, can benefit from learning accrued by people who lived five thousand years ago.

Language and writing add tremendous survival value because they allow lessons from many individuals to be synthesized into extremely precise patterns of knowing and doing. Eventually, these highly synthesized systems of knowing and doing became what human beings call culture. Myths, paradigms, worldviews and scientific theories are all made of these.

In human beings, cooperative learning became unbelievably refined. Language allowed learning to accumulate at tremendous rates. Information tapestries became knowledge webs which grew over the ages. Where nature had once searched the realm of possibility by casting about blindly, human beings now search the realm of possibility with brains which process huge amounts of information from personal, group and historical experience in order to maximize the foresight, planning and prediction. These big brains eventually gave rise to self-awareness, which we call consciousness.

Evolution's second side, increasing intelligence, was leading to more and more mass being moved by ever more subtle blips. As Swenson says:

In this way, the explosion in mass communication and globalization going on at present is but a new phase of...the same evolutionary order-building behavior started some 4 billion years ago.

The Learning Universe

That which created us, designed us to create back. - J.S. May

Mind too evolved as part of the larger process. It went from crude information-following behaviors to truly astounding activities like language, writing and culture. It appears to be involved with energy, especially of the information variety. It is a very social process.

Energy's role in this process became invisible with the advent of brains. No one can follow how physical energy gets transformed from blips to meaning through the biochemistry of brains. We are responding to patterns in masses of information, to *flows about flows about flows*. Nevertheless,

energy parallels still play out. Increasing intelligence is accompanied by greater intricacy and energy flow. The human brain is the most intricate and fastest energy cycling (per unity density) system on the planet. Furthermore, brains also help increase energy flow in the world at large. This is particularly true of big-brained humans who began restructuring the outside world as part of their drive to survive. As a result, human organizations such as cities also increase energy flow.

But seeing mind just as increasing energy flow is not very satisfying. So, let us look at a more appealing explanation which also fits the facts. In this story, human beings try to understand the world because the universe itself is trying to learn. We are the leading edge of a learning universe, the product of an evolutionary push that endlessly strives to find new ways. This story, from evolutionary theorist Rod Swenson, is easy to understand. Yet, in it, our view of ourselves and the world is utterly transformed.

The Stages of the Learning Universe

Swenson starts by pointing out that evolution is a learning process, the primordial one. Learning is induced by problems. In energy terms, the universe is faced with the problem of how to distribute energy as fast as possible given inertia and the disorder that abound. It learns in that it configures and reconfigures itself toward greater and greater intricacy and efficiency. Learning is not intentional. Like a baby growing, the goal is not in mind. But it is directed toward future states which are more intricate, and more ‘developed.’

Furthermore, the pressure to flow faster also involves a pressure to learn better ways. Each stage is a current-best solution that works until the things it cannot do, the efficiency it cannot achieve, creates a shortfall and a crisis which begs for something more. At each stage the field uses diversity to cast about in search of new ways to flow. The field also searches by cobbling existing pieces into new forms which produce astounding new behaviors. (Physicists call this coupling.)

With each cycle, the universe also learns how to perform some activity better. Table 1 shows first four stages of the Learning Universe.

- **Shaping change.** In the beginning the universe found ways to organize shapes and networks which made energy flow faster.
- **Life-forms pursuing information.** In the second stage, the universe learned how to build systems that began to learn on their own. Life-forms followed information and moved about in hitherto unknown ways. The universe learned faster because living organisms learned faster and preserved more.
- **Brains organizing information into tapestries.** In the third stage, brains accelerated learning even more, and even amazing behaviors emerged. Individual learning was now preserved in brain circuits etched by experience. Modeling allowed individual learning to be passed to others and preserved in habit patterns passed from generation to generation. The universe began to learn as never before because brains began to learn more intentionally and to preserve exquisite details of experience.

- **Communal learning via culture.** The fourth great stage of learning came with the human brain and society. In fourth-order organizations, such as science and human culture, learning moves beyond the individual's lifetime and is turned back on the environment. What is learned is how to restructure the environment itself, now with tools. The ability to learn intentionally and cooperatively makes learning rates explode.

Table 1. Four Stages of the Learning Universe.

We are the epitome of the fourth stage. With humankind, the Great Ordering Oneness has produced an organism which can restructure the world more powerfully than anything that has ever existed. Yet, since our brains were created by the Oneness (as well as earned by us), chauvinism is not appropriate. We too are servants of a higher process. Our project is to endlessly strive to learn more.

This brings me to the final and most intriguing assertion of the Learning Universe story: a fifth stage is now waiting in the wings. Conscious beings should eventually evolve to the place where they begin to actively shape the world, not for selfish personal ends, but wisely, responsibly, and for the good of the whole. Books like the *Celestine Prophecies* are not so far off. Fully conscious beings become stewards of the world because they 'know' that they are part of something larger. They serve themselves, their fellows, the biosphere and the larger process because everything is intertwined. Fully conscious beings become the ultimate agents of the evolutionary process because four billion years of learning has taught them to see how pieces fit. The fifth great stage is Integral Consciousness and global learning aimed at the greater good of the planet.

We are the leading edge of a learning universe. We have the capacity and the need to help the world as ourselves. Still, apparently we aren't there yet. Rather, at the moment, we seem to be more of a threat to the world, than a caretaker. Hence, right now, the Learning Universe view seems a bit hard to swallow. The pragmatist looks around at the current violent, dysfunctional state of the world and doubts that a vision this gentle could have much basis in fact. But to understand why we are such a strange blend of killer and angel requires we understand the specifics of our brain and its evolution. That is the story I take up next.

The Evolution of Humanity's Society of Mind

The concept of societies of mind is extremely important because it allows us to rethink human societies as a collective struggling to act as an intelligent whole. There is already ample reason to believe the analogy holds. Hence, as Gaia's James Lovelock says:

What is remarkable about man is not the size of his brain, no greater than that of a dolphin, nor his loose incomplete development as a social animal, nor even the faculty of speech or his ability to use tools. Man is remarkable because by the combination of all

these things he has created an entirely new entity. When socially organized and equipped with a technology even as rudimentary as that of a Stone Age tribal group, man has the novel capacity to collect, store, and process information, and then use it to manipulate the environment in a purposeful and anticipatory fashion. (1979, p. 132)

Lovelock's point is simple. What is unique about humankind is that, *as a collective*, we gather, digest and apply information to help us survive and prosper like no other species. This is our evolutionary strategy. We are not swift of feet, strong of body, sharp of tooth or clever in niche finding. We can change our behavior dramatically and we are very, *very*, good at discerning patterns.

We bet our survival on behavioral flexibility and the pursuit of better ways of knowing. In the process, we gained dominance of the earth. And the one most overlooked fact is that now, as in the primordial beginning, creating better ways of knowing is a profoundly social event.

We've also seen this image before. I started this book with the image of a hive mind, a great web of humanity reaching a turning point in an on-going evolution of ideas. We are part of an invisible dynamic network that is struggling to learn, in ways often unknown to itself. The glimmering possibility is that this is the normal state of affairs. We belong to a vast human society of mind which digests billions of bits of information coming from billions of individual minds. Every once in a while, our hive mind begins to come to new conclusions. That is what is happening today.

There are concrete reasons for believing that human civilization is a powerful (if struggling) society of mind. This idea also provides an image of humankind which is both strikingly different and strikingly reasonable. It is not selfishness and killing which define us. We are an information pooling, picture-making cooperative which is centered on a quest to understand the world.

So, the idea that civilization is a struggling society of mind is not lightly based. The goal of this section is to lay out why it makes sense in concrete terms. I start with why the human brain has several personalities because of how punctuation has played out.

Our Three Brains

...the brain has followed a now familiar formula. It has been a cooperative effort between separate and relatively autonomous subsystems...In this respect the brain follows the basic pattern for the entire human body, itself a cooperative venture between the living cells that make up its various organs...

Allan Combs

Human beings have not one, but three brains, each of which appears to have been the result of separate bursts of evolutionary activity. This fact is very important to the story of humanity's society of mind because each of these brains comes with a personality. Hence, we are not the result of a unified brain, but of a society of three brains each with their own personality.

In the 1930's Swiss psychologist C.G. Jung noted that people have a committee of personalities inside their head, a cast of differing voices which often pull in different directions. Brain research now suggests there is a physical basis for at least some of these voices. Thus, each of our three brains has a great deal of self-sufficiency. Each appears to have its own type of intelligence, its own motor, memory and other functions and even its own peculiar sense of subjective experience. Each new brain emerged on top of an earlier one, but underneath its predecessors still functioned and affected the whole.

Our three brain-personalities are particularly important because they affect our social relationships. Hence brains brought more than the ability to move legs and fins. They also brought complex interaction patterns between individuals, including nurturing, modeling, mating, self-defense and much more.

Our three brains are most important, however, because they represent three distinct survival strategies. Thus, each brain arose from pressures in particular evolutionary juncture and each personality reflects the strategy that successfully answered those pressures. We carry all three with us to this day.

Since these three brains and their personalities profoundly influence human society, one must understand them to understand it. So let us look more closely. The most famous description of our three brains comes from Paul MacLean's 1969 book *The Triune Brain*. He calls the three, the reptilian brain, the paleomammalian brain and the neomammalian brain. [[1]] Their personalities are as follows:

Crude...

The *reptilian*, or the 'lizard brain' as it is sometimes called, is the core brain for all vertebrates from early reptiles on up to mammals. This brain is famous for routine, repetitive and instinctual behaviors. Stylized mating rituals, migratory behavior, imprinting, threat displays, fleeing and patterns of home-building are its forte. It is heavily involved with the autonomic nervous system including systems that regulate heart and respiratory rates, digestive functions, and bodily cycles such as sleep and sex.

What you should envision with this brain is a scurrying lizard, with flicking tongue, blinking eyes, and fixed patterns of behavior with little flexibility and no thought. Still, you should also realize that this brain is largely responsible for early vertebrates learning to live complex lives in complex environments, particularly dry land.

Warm...

The *paleomammalian*, affectionately known as the 'furry mammal brain,' comes next. It was literally plopped on top of the lizard brain during a later burst of evolutionary activity.

The difference here is mainly emotion and behavioral flexibility. The lizard brain has a crude type of emotional system shared by fish and salamanders, but with the paleomammalian brain, emotion becomes much richer. This richness has two great benefits: faster learning and richer social relations. As neuropsychologist Allan Combs puts it:

the unique quality of the mammal is its ability to experience emotion, and through it to benefit from personal experiences, retained as emotional reactions to predators, friendly members of the same species, and so on. It also allows close emotional bonding between

mating partners, parents and infants, members of families and larger extended groups. (1995, p. 41)

Thus, where the lizard brain tends to react rigidly and acquire new behaviors slowly, the furry mammal brain learns faster and reacts with more diverse and flexible behaviors. The icing on the cake is that new forms of emotional bonding support a richer, more coherent social life and with it better social learning. Mammals nurture their young and cubs play together as youths. Both activities enhance learning.

Thoughtful...

The third brain, the *neomammalian* or ‘thinking brain,’ is the most recent of all. It is found only in higher primates—most notably ourselves. It is famed for vastly improved pattern recognition and problem solving (including tool making). It is also notable for increasing flexibility. Thinking beings can invent their own behavioral patterns to a remarkable degree. In humans, this brain is the seat of complex cognitive skills such as language, reading, writing, arithmetic and beyond.

Since the thinking brain is so crucial to humankind’s society of mind, let us take a closer look at how it came to be. [[2]]

The Big-Brain Project: Legs, Language, Tools, and Upheavals

Our first brain, the lizard one, represented a phenomenal advance in coordination which allowed life to become more complex. It, however, was inflexible. Our next brain, the furry mammal one, was a great leap because richer emotion improved individual and social learning. Yet, at some point it too was not enough.

Why did we develop big, hyper-sensitive, pattern-recognizing brains? Like many questions in science these days, this one is a topic of hot debate fueled by a flood of recent findings. I present here, not a final answer, but a budding theory of how our own big brains emerged in conjunction with legs, language, tools and environmental upheavals. The astonishing outcome was a society of mind such as the world has never known.

But, let us begin at the beginning. Four to six million years ago the apes that would become humankind came down from the trees and started walking on two legs. [[3]] Eventually they also began making tools and engaging in sophisticated information exchange (talking). This earned them the name hominid. Then, as the story goes, millennia of walking, talking, and tool-making accelerated brain growth, producing the well-known bulge of our big brains. Why did all this happen? One thing most researchers agree upon is that two-legged walking came first and led to the rest. But explaining walking is tough. As Stephen J. Gould once wrote:

Upright posture is the surprise, the difficult event, [it involves] the rapid and fundamental reconstruction of our anatomy. The subsequent enlargement of our brain is...secondary...an easy transformation. (1980, cited in Metzner, 1995)

So why two legs? Early researchers believed that the first tool-making hominids evolved in South Africa about two million years ago and that they lived in open grasslands. Hence, the traditional Savannah theory holds that our ancestors descended from the trees as their habitat changed from forest to grassland. Adaptations to stable grasslands then produced bipedalism which allowed free use of the hands for tool making. The Savannah Theory, however, is undergoing severe attacks as new evidence suggests that environmental shifts may have been more frequent and jarring than previously realized. Changes went not only from forest to grassland but from forests to lakes and back again, perhaps numerous times. For example, research at Olorgesailie in southern Kenya has uncovered evidence of dramatic environmental changes from 1.2 million to 500,000 years ago. The most noticeable changes are found in the structure of large lakes. Most early hominid skeletons have been found around such lakes.

What do lakes and frequent jarring shifts have to do with walking? Well, first the watery element fits with the aquatic ape theory of human origins first posed by Oxford University zoologist Sir Alister Hardy in 1960.[[4]] This theory holds that early hominids lived in partially aquatic environments and that such environments produced walking as well as numerous other distinctive human features such as hairlessness, subcutaneous fat, refined finger control, ventro/ventral sex, and the ability to consciously control breathing (this last being a prerequisite to complex speech).

The aquatic explanation of walking is easy to understand. It is also supported by the only other example of upright walking. Hence, many animals stand up on two legs briefly, to reach food or look about, but only one other primate, the Proboscis monkey of Borneo, *walks* on two feet — and it learned to walk on two legs while crossing stretches of water between the mangrove trees in the swamp in which it lives. As the monkey travels through the swamp, its head has to be elevated while its back legs push. Water helps support weight during walking and eventually an upright posture evolves. Presumably, early hominids experienced similar aids and pressures.

Other human traits also fit a watery background. Thus, fat babies float; smooth hairless skin moves easily in water; and fine motor control is common in shallow feeders (for example, raccoons). Conscious breath control is necessary for swimming under water. Even the long Omega-3 fatty acids needed to make large brains are best derived from marine food chains which humankind shares with other big-brained mammals such as dolphins (who apparently went back to water completely).

So a watery background helps explain walking, better finger control, and precursors to talking. Frequent jarring changes then hearken to an even more important cause of our nature — the need to be *flexible*. Repeated climate change makes flexibility a crucial survival strategy with clear advantages over fixed or slowly changing responses. Discerning subtle patterns makes complete sense in this situation. We change our behavior by changing our mind. Collaborative learning also makes sense. The richer the perspectives, the richer (and more accurate) the resulting tapestry. The best way to survive frequent change is to pool information, synthesize it by communication and then change one's behavior based on a new view. This idea is becoming reasonable. Hence, as Richard Potts, an archeologist at the Smithsonian Institution in Washington, D.C. says:

The ratio of brain size to body size in early hominids had remained similar to the ratios for other primates. As a result of repeated climate and habitat shifts, however, hominid

brains began to bulge...This discovery dovetails with preliminary evidence that stone-age groups responded to recurring crisis situations by pooling information and making effective collective decisions. (*Science News*, Vol. 148 Nov. 25, 1995 p. 359)

Rethinking Human Nature

We can now reconstruct the origins of human nature from an interwoven perspective. Many threads came together to make us a talking, tool-making, pattern-recognizing, information-sharing animal such as the world had never seen.

Two of our brains, mammalian and thinking, spurred the transformation. The furry mammal brain produced the social bonding needed for sharing and group learning. The neocortex began with our ape ancestors, but continual crises plus aquatic additions now paved the way for a new burst of development. The picture-building process seen in brains, thus, accelerates in human tribes. Where brains create rich tapestries by gathering information from many cells, human societies create tapestries by pooling information from many individuals. Collecting information and developing pictures became a way of life that defined human groups.

Not only did individual brains become astute at pattern-finding, but pressure to collaborate pushed talking which, in turn, increased brain development. Thus, pooling information improved talking and talking led to better pooling. It was a circular, mutual-effect affair! It also led to more complex social relationships and group abilities which grew more sophisticated by the age.

Then too, that wonderful finger dexterity, born of shallow feeding, began to be applied to tools. Where our lowest brain coordinates our bodies, the thinking brain extends our bodies and our ability to act on the world by inventing tools. Humankind began its epic journey as ‘shaper of the outside world’ that would culminate in today’s ‘master of the universe’ mentality. What is often overlooked is that we have a two-way relationship with our tools too. We build tools, but tools also shape human societies. They extend what we can do, but they also tend to shape what we believe — leading to the “if all you have is a hammer” adage. Human societies actually *co-evolve* with their tools.

Yet, of all the characteristics we possess, flexibility is the most important. Thus, our thinking brain has a paradoxical personality whose main characteristic is *ability to change itself based on the patterns it perceives*. This brain allow us to redefine our relationships with others and the world depending on the patterns it perceives. As a result, we build our societies out of what we think we know. We have come back to James Burke’s thought, ‘Knowing leads to doing!’

Our new view of human nature is now complete. Human societies represent a major advance in learning, one that blended individual contribution and community commitment into a totally new form. Individuality brings richness through diversity of perspective. Emotional bonding brings sharing, caring and modeling. The combination makes human societies looser than insect societies such as ants, but closer than many mammals societies such as cows. (We are neither rigid automatons nor disinterested by-standers.)

Our great strategy lies in our ability to learn and to change ourselves via culture. We survived

upheavals by changing ourselves rapidly. There is already evidence that Cro-Magnon Man, the direct ancestor of modern human beings, survived where Neanderthals did not because Cro-Magnon showed greater ability to change behavior in face of changing environment. It was the ability to change appropriately that counted, not brain size per se (this last is a materialist assumption).

A complex blend of upheavals and other conditions, thus, made us the leading edge of the learning universe. Talking, walking, finger dexterity, big-brains and close bonding eventually created a society of mind more subtle and powerful than any before or since. We became a pattern-recognizing, information-sharing animal such as the world had never seen — one that preserved lessons in highly-structured little vibrations called words. These vibrations became the most powerful mover of mass in the history of the world.

Nature was still not through, however. The next stage brought pressure for individual minds to develop some distance from the collective in which they lived. Such separation might seem at odds with community-building, but it actually makes sense. Rich tapestries come from diverse views. The unexpected implication here is that individuation is good for the community. It increases accuracy by increasing the richness of input.

The next great evolutionary thrust was the evolution of consciousness. It involved the long, slow birth of ‘selves’ which see themselves as separate and distinct from the whole. The up-side of this evolution is that individuals with distinct egos make richer contributions. The down-side is that big egos have now become so self-absorbed that they do great harm to larger wholes at all levels from family to planet.

The Evolution of Human Consciousness

I do not propose to solve the enigma of the relationship of consciousness to the brain... My own view... however, places consciousness in a considerably larger context while at the same time not denying its involvement at the level of the brain.

Allan Combs

Hominids bring us to the beginning of complex minds and also to the glimmer of historical times. Cro-Magnon emerged 70,000 to 40,000 years ago and the great cave paintings about 20,000 years ago. Mesopotamian civilization and recorded history began about 6000 years ago (4000 BC). The gap between then and now is getting small. It is, therefore, time to leave the biological story and begin the journey to historical times and the kind of mind that experiences the world consciously.

Consciousness researchers ask the delicate question: what *kind* of minds live inside big brains?

How did consciousness — defined in Webster’s as, “an inward sensibility of something” — come into being? Once multicellulars grew brains and sense organs like eyes, they could see their own bodies and the first crude awareness of self could have emerged. From this point of view even lizards have at least some form of consciousness. Still, most people skim past lizard-level consciousness in search of

the more alluring question: what about our own?

The story of human consciousness too involves punctuation and cycles of co-evolution. Researchers base their theories of early stages on studies of cave paintings, burial practices, etc. and of later stages on writings, sculpture, philosophy. They also cross-check their theories by studying primitive peoples today who follow behavior patterns similar to ones seen long ago. For example, some remote tribes still have rituals similar to ones practiced by Cro-Magnon. Many insights into how consciousness changes come from studying peoples who act similarly today. The point is that, while the theories described here are clearly speculative, the sense that consciousness has evolved through stages is grounded in a lot of observation and evidence. It is not just New Age fantasy.

Gebser's Stages of Consciousness

What are the stages of consciousness? There are many theories. I use Swiss philosopher, Jean Gebser's theory of consciousness as described by complexity researcher Allan Combs in his book *The Radiance of Being*. The punctuated pattern should be familiar.

Gebser believed that consciousness evolved through stages. New forms emerged on top while underneath earlier forms still played a role. Each stage of consciousness has a distinctive perspective, personality and subjective experiences of the world. Each brings a different perception of time, space and of how individuals fit in the larger world. Finally, each stage also brings distinctive patterns of how people relate to each other. Hence, each implies a different kind of culture with a unique experience of the world.

Gebser described five major types of consciousness—*archaic*, *magic*, *mythical*, *mental*, and *integral*. Their history is as follows:

- Archaic** Embedded in nature (little different from animals)
- Magical** First symbols (greater separation from the world)
- Mythical** First cities, first myths (also the Agrarian Revolution)
- Mental** Individuation for richer contribution (also the Age of War)
- Integral** Strong selves *and* strong bonds (not there yet...)

1. Archaic Consciousness. Archaic consciousness belongs to the time when our hominid ancestors were still at one with the natural world. Gebser often likened it to a state of deep, dreamless sleep. The self experiences itself as completely embedded in the world and is not aware of itself as separate. Humankind is said to live in perfect harmony with Nature and probably in complete identity with it.

Who had this type of consciousness? Perhaps all three-brained primates have this type of consciousness, certainly the very early hominids are candidates. Hence, the archaic state is meant for protohumans who did *not* exhibit a recognizably human culture (that is, with tools and language). *Australopithecus*, a vegetarian ape that foraged in Africa from five to one million years ago, for example, and *Homo habilis* who dates from about 4 to 1.5 million years ago probably had archaic

consciousness. *Homo erectus*, “the Peking Man” who lived from 1.5 million to 75,000 years ago, may have represented a transitional case because hand axes found during their late period indicate that they were becoming adept tool makers.

2. Magical Consciousness. The next stage of consciousness, magical consciousness, brought language, adept tool use and also a new form of imagination seen in the beginnings of ceremony and symbolism.

Neanderthals, some 500,000 years ago, are thought to have had magic consciousness. They made a variety of tools and engaged in speech (albeit a crude speech, judging from throat development). More importantly Neanderthals were also the first to bury their dead ceremoniously as if to issue them into an afterlife. Bodies were often placed in sleeping postures, legs curled up and head cushioned on one arm, or in fetal postures, as if to suggest a sleep from which one might awaken or a hope of a rebirth. In some cases whole families have been found with a man and a woman placed heads together and children at the woman’s feet. Some Neanderthal finds even show evidence of religion in the form of bear worship.

These kinds of ceremonial practices mark a change from earlier times. Many scholars believe they signal a budding awareness of self as separate from nature, a form of individuation. This awareness brought a new concern with what happened to individuals even in death — hence new care with burials.

The new awareness also brought a new concern about how to influence an increasingly separate world. Magic consciousness thus also brings humankind’s first attempts to manipulate the world through symbols. Magical consciousness gets its name because the first symbols were used for magical substitution. For example, paintings of animals in the cave sanctuaries such as Lascaux and Les Trois Frères, have been repeatedly struck by stone projectiles, presumably spears used to kill the animal magically before the real event. In short, just as voodoo practitioners hope to kill people by sticking pins in symbolic substitutes (dolls), so early man apparently tried to influence the killing of real animals by jabbing painted one (symbols).

Gebser believed that all magic started with symbolic substitution of one object for another. Yet, we must go slowly here. People in earlier stages of consciousness experienced the world very differently than most modern people do today. To understand magic consciousness one must realize that, in this state, symbol and actual are experienced as *equally real*. Thus, when Pygmy tribes in the Congo kill pictorial animals and actual animals in exactly the same manner, they experience both hunts as being equally real. Whenever we insist on taking our beliefs and views as equal to reality, we too are harkening back to this time.

Gebser believed that magical consciousness reached its heights with Cro-Magnon and his cave paintings. Yet, this stage (and all the others) is still buried within us. This has both pros and cons. Magic conscious is crude by current standards, but it also has a richness of community which is still buried within us today. As Combs says:

[Magical consciousness brings] a deep sense of community...of belonging to a family or any other group of people. Music, with its ability to transport us out of the moment, is

also a product of magic consciousness. On the negative side, there's a tendency for the magic structure to hold too tightly to other persons, sometimes refusing to allow them space to breathe. There's also a very dangerous tendency to follow the drumbeat of collective ideological movements, religious or politically totalitarian, as was experienced so widely before the Second World War and all too much today. The only remedy to these tendencies is to shift one's attention to the more recent structures of consciousness. (1995, p. 102)

Cro-Magnon, however, was probably also a transitional case and 20,000 BC probably marks the beginning of a slow transition to a new phase. This time witnessed an acceleration of tool making and social development which led to the kind of societies which mirror our own.

3. Mythical Consciousness. The next stage, mythical consciousness, was certainly in full sway by the time of the Neolithic farming revolution, which is usually given as around 14,000 to 8,000 BC. Nomadic life was giving way to stationary communities. Sophisticated speech was now the norm and so too were sophisticated tools. Animals were domesticated, crops were planted and villages blossomed into cities. Staying in one place allowed new technologies to flourish. Crafts like pottery and weaving emerged alongside the wheel, boats, musical instruments, and painting. New social specialties from policeman to priest grew with them. Religious symbolism became sophisticated and focused on the idea of fertility and bolstering life. The concept of law was invented and also central political control. In short, human societies began to look much like our own.

By 6500 BC an entire Old European civilization based on agriculture was well established throughout Eastern Europe and the Near East. This society brought commerce, metallurgy, new forms of artistry and even early forms of script. It probably also marked the height of mythical consciousness.

Mythical consciousness gets its name because this was the time of myths. Language was now sophisticated and the telling of tales was beginning. These stories allowed information to be preserved and passed along through time. Myths also helped usher in a new sense of time that is at least somewhat linear. This was probably not the modern sense of time, but what Gebser calls *temporicity*, the feeling of being *in* a certain time, for example, during the reign of a certain king. Hence, mythic tales take place 'once upon a time' or 'long ago and far away' and have a sense of an enchanted time that has long since escaped the world of day-to-day affairs.

This sense of enchantment also fed another theme The imagination that began in magical consciousness ripened into a deeper reverence for nature and the life force. Spirituality took a theme appropriate to the new agricultural society. This theme was the bountiful Earth/Mother Goddess.

The Goddess image was reflected everywhere. Thus, archeologists studying this era have uncovered large numbers of female figurines standing or seated, usually naked, often pregnant, and sometimes holding or nursing a child. But we must go slowly here lest we impose our own biases on these people too. Many experts argue that exaggerated breasts and pregnant abdomens symbolize fertility and were used to beg the Goddess for help with crops. No doubt this was partly the case. Yet, other researchers say that the people of mythical times felt a more present force. They were, after all, still immersed in

nature and in tune with it in ways we no longer are. This meant their experience of spirituality was more direct. Hence, as American mythologist Joseph Campbell says, Goddess images point “not to a new theory about how to make beans grow but to an actual experience in the depth of that *mysterium tremendum* that would break upon us even now if it were not so wonderfully masked.”

Hence, Goddess images probably represent recognition of and gratitude to the life force at work in the world. UCLA archaeologist Marija Gimbutas calls it, “the celebration of life energy.” We might call it the first articulated awareness of the Great Ordering Oneness.

Yet, this awareness was also blended with a new step toward individuation. No longer utterly embedded in Nature or lost in the tribe, humankind became a child of nature, at once awed by and grateful to the life force. Mythic consciousness thus brought humankind’s first covenant with nature. This age was “the time when human kind discovered its own soul and that of the world at large,” as Combs says. It expressed both in the worship of life.

Mythic culture thus brought the first high forms of technological, artistic and spiritual culture. It brought the main inventions of civilization from weaving and the wheel to cities. It climaxed in the great artistry and technology of ancient Greek civilizations, such as the Minoans on Crete (circa 3000 BC to 1500 BC). One might have imagined that this wondrously creative and soulful age would have simply continued to ever greater heights. But, times change and with them humankind.

The deep mythic experience, formed during the neolithic period carried over into ancient civilizations such as Sumer, Egypt, and Homeric Greece. But, by then, signs of a new mode of consciousness were emerging, one with a greater sense of individuality and ego. Then too, there was a crisis of some sort. Somewhere between 4000 and 2000 BC the Old Society civilization underwent a major transformation. Apparently consciousness changed with it.

4. Mental Consciousness. The next stage was mental consciousness, the time when thinking came into its own. Hence where stone tools signaled the change from archaic to magical consciousness, so cognitive tools highlighted the change from mythic to mental consciousness. Number systems began to appear in the Middle East about 3500 BC and by about 3100 BC writing was well developed. Time as the linear quantity we know today began, along with recorded history itself. The first calendars from the Middle East are found around 2800 BC. The first libraries are found in Egypt around 2500 BC.

Writing gives researchers a better glimpse into changing experiences. The Epic of Gilgamesh written about 2700 BC, for example, suggests self-reflection is becoming strong. Having failed in his quest for immortality Gilgamesh experiences an almost existential crisis, an exquisitely personal emergency not seen in recordings of more ancient myths.

The new stage, of course, also brought a new emphasis on thinking — especially as separate from feeling. Not surprisingly, this new type of consciousness places the sense of self somewhere in the head. This contrasts with earlier tradition seen in ancient Greeks and Native Americans who experience their essence as being in the heart.

Centering oneself in one's head brings, in turn, what Gebser called a *perspectival* element of consciousness. We perceive the world as if it comes in through our eyes and informs a 'self' which is located in the head right behind those eyes. This new perspective also reflects another major development, the birth of highly individuated egos. No longer embedded in Nature or the tribe, the separate, self-aware, and often self-serving ego emerges.

Evolving slowly since the time of Egypt, evidence of the new mental consciousness is strong by the classical Greek period (circa 600 to 400 BC) which brought us science, philosophy and drama. Socrates likened the soul with pure thought and by 480 BC Parmenides would say, "For thinking and being is one and the same."

Strongly associated with reason and critical thinking, mental consciousness had arrived. By the time of the Roman Empire some five hundred years later, the ego had become a highly individualistic, self-reflective center of inner life. Thus, where classical Greek statuary pursued universal perfection, busts of Roman citizens became studies in character and attempts to capture individual uniqueness. Autobiographical documents such as personal diaries also appear in Rome. Historian Morris Berman who traces the development of self awareness notes that periods of strong self awareness are usually accompanied by sharp increases in the use of mirrors. As he says, "Mirrors became so popular in Rome that they were even owned by servants; and Seneca reported his disgust at one Hostius Quadra, who had himself constantly surrounded by mirrors."

We are still in the age of Mental consciousness, but the next stage, Integral consciousness, is simmering. It is simmering because the current age is exhausted and a new way is needed. Let me take a moment, therefore, to expand on the problems that Mental consciousness is facing.

The Problem with Rational Thought

Mental consciousness begins the story of rational thinking, but, it is not the story one might expect. Gebser stressed that rational thought was not the pinnacle of mental consciousness. Indeed, he described it as an inferior form, a distortion of the true mental miracle.

Gebser said that each form of consciousness had an authentic and a distorted form (or as he said, an *efficient* and *deficient* form). The authentic form of mythic consciousness, for example, created myths which encapsulated deep insight in metaphoric form. We have a hard time grasping the deep meaning and hidden accuracy of such myth because we no longer understand the symbolism. The result is the distorted form of mythic consciousness — myths as tall tales. The stories of the Greek gods, for example, were eventually told as colorful yarns not intended to convey real meaning.

The authentic form of mental consciousness is *menos*: balanced thought which evolves through discussion. The object of balanced thought is to improve through dialogue and continual rethinking. Socrates dialectics and Plato's *Dialogues* are examples. 'Rational thinking is a distorted form because it was characterized by ratio, or as Combs says, "by divisive, immoderate, hair-splitting reason.'" The object rational thought is to pick things apart, often as a destructive act. The quest to refine understanding is lost to obsessive love of haranguing over microscopic bits. Small wonder Gebser saw

it as inferior. Understanding its inferior nature is of importance to our times because this hair-splitting thought is often held up as the one true form of thinking. As Gebser says:

Ratio must not be interpreted...as ‘understanding’ or ‘common sense,’ *ratio* implies calculation and, in particular, division...This dividing aspect inherent in ratio and Rationalism...is consistently overlooked, although it is of decisive importance to an assessment of our epoch. (Cited in Combs, 1995, p. 110.)

Rational thinking, therefore, is divisive and often destructive. If you add egos which can become big and self-absorbed you can see some of the threads which lead to a change. Self-centeredness and focus on division tends to thwart balanced, evolving thought (*menos*). Instead, one gets rigidity and an inability to go beyond one’s own perspective instead. Human learning shrivels.

These kinds of distortions help push a new stage of consciousness which Gebser believed was in the offing. On the other hand, a more pressing problem is simmering.

The Great Transition — From Collaboration to Coercion

Mental consciousness came with a new society, of course. The catch is that the epoch which brought it is best described as the Age of War (or, if you prefer, the Age of Empire-building). Hence, Mythic culture was shunted underneath and a new more violent culture rose in its place.

The Neolithic culture of Old Europe and the Middle East flourished in peace and prosperity for thousands of years. Then, in a crisis that would mirror that of many civilizations yet to come, it ended in a relatively abrupt, mysterious and violent manner. No one really knows what happened. Theories abound. Natural disasters may have been part of the problem with tectonic movement creating new rounds of floods and earthquakes. The story of Atlantis, for instance, is thought to come from a volcano and tidal wave that destroyed an Old Society civilization on the island of Thera in the Aegean circa 1628 BC. The other major theory is that the pre-ancient world was rocked by waves of barbarian invasions from nomadic Indo-European (Kurgan) tribes from the steppes to the east. [[5]] Whatever the cause, disaster and disruption appear to have brought a period of cultural regression and stagnation. Villages vanished as did painted pottery, frescoes, shrines, sculptures and script. The development of Old Society civilization came to a halt.

Whatever the cause, the most notable effect of the crisis period of 4,000 BC to 2000 BC was a large and distinctive shift in the direction of war. Metallurgy, for example, had been known for some time, but Old Society metal implements were religious, domestic and agricultural. Weapons of war were distinctly absent. The 3500-2500 BC time period, however, brought the Bronze Age and with it bronze weapons such as daggers, maceheads, and thin sharp axes. These appear first along what are believed to be the routes of barbarian attack — hence the theory that invaders brought change.

But, bronze weapons were just one symptom. The whole culture changed. Burial practices, for example, also changed. Large-boned male skeletons began being accompanied not only by weapons and riches but also by the skeletons of sacrificed women.

Mental consciousness was thus forged in the fires of what I call the Great Transition, a shift from a social system based on the life-force and mutual contribution to one based on war and domination. The contrast here is important. The original Neolithic culture was agricultural and egalitarian. Its people often lived in large townships where land and all principal means of production for example, animals, plows and looms were held in common. Social power was viewed as a responsibility, a trusteeship used for the benefit of all. Elder women or the heads of clans administered the distribution of the fruits of the Earth which were seen as belonging to all members of the group.

In short, the Old Society had a fundamentally cooperative social organization and absence of fortifications and weapons attests to the fact that they lived in peaceful coexistence. It was this peaceful society which brought many of the core inventions of civilization as we know it from the wheel and metallurgy to farming, pottery, music and religion. The palaces, arts and technologies — including indoor plumbing — of Minoan civilization show the heights to which it led. I call it a *mutualist* society because it is based on mutual benefit between members.

This cooperative culture was replaced by a socially-stratified patriarchal society that exalted war. The contrast in ideology is striking. Where weapons were nonexistent in Old Society imagery, the New Society symbols were the dagger and battle ax. Where Old Society religion focused on the cycle of birth, death, and regeneration, embodied in an Earth/Mother Goddess, the New Society worshipped virile, heroic warrior gods that forced their bloody will on the world. The biggest difference of all, however, was in social organization. Riane Eisler, perhaps the most famous researcher of the Great Transition, calls this a *dominator* society because it is based on domination. It included:

- A hierarchical social structure dominated by strong-man elites
- Accumulation of wealth for status,
- Coercive social power,
- Private ownership of land and means of production,
- Slavery and human sacrifice
- The reduction of women and children to the property of men,
- A central focus on war and militarism.

Dominator beliefs soon made struggle and war the order of the day. The Tigris-Euphrates valley, an invasion crossroads in Eisler's terms, spawned a series of aspiring empires — Sumerian, Babylonian, Assyrian and Hittite — known for their bloody ways. Sumer is often credited with inventing organized warfare as we know it. Yet, each of these societies also had a base in life-centered times and a memory of mutualism in a time before. Sumer is a good example. Sumer's early legends refer to the Supreme Deity as "Queen of Heaven" or "the Mighty Lady, the Creatress." Written about 2300 BC, the Urukagina Reforms of Sumeria even includes a requirement that food grown on Temple land be used, not just for priests, but for those in need '*as it had been in the times of old.*'

These kinds of contrasting before-and-after images have led some scholars to argue that the Garden of Eden is a myth about the Fertile Crescent. The harmony and abundance of early times was replaced with the baleful struggle for existence in a time of subjugation and endless war.

Mental consciousness, thus, grew up in a battle between radically different cultures. This struggle is particularly apparent in spirituality, one of the key aspects of consciousness. Hence the new culture brought Gods who exalted war. Religion also became part of the political control structure. As a matter of expedience, the king often served as head priest or even proclaimed himself a God. Religious hierarchies that pulled resources up and issued commands down became common. The new culture also remade older Gods in the new order's image. Struggles between the life-force Goddess of the old religion and new, violent, vengeful, male insurgents such as Horace, Marduk, Zeus, and Yahweh ensued. The recording of ancient traditions, thus, often includes a blending of old and new myths as priests rewrote ancient stories. This is clearly seen in the Bible with its conflicting images of a compassionate and a vengeful god.

I shall have more to say about these two cultures later. Meanwhile their struggles set the stage for mental consciousness and all the history to follow. We are still in this Age. For the last five thousand years human societies have been centered on war, empire-building and domination. The social structures listed above remain and so do many of the violent cultural ways. Human societies have not always been so, but most are today.

5. Integral Consciousness. Mental consciousness is still dominant, but there are problems. Indeed, many of today's problems can be traced to deficient aspects of mental consciousness.

Thus, the down side of the strong ego is the grandiose ego with its need to be the center of attention. The down side of balanced evolving thought (*menos*), is divisive, hair-splitting rationalism. Add a society centered on dominator imperatives and one gets the two egos of modern times the embattled, lonely ego...and the arrogant, self-centered ego which sees the world through the lens of conquest and domination. Naturally enough, individuals and communities both fail with alarming frequency. Gebser's description of failure, thus, echoes those of many observers of the Modern condition.

Isolation is visible everywhere, isolation of individuals, of entire nations and continents...in the political arena in the form of ideological monopolistic dictatorship, in everyday life in the form of immoderate, 'busy' activity devoid of any sense-direction or relationship to the world as a whole; isolation of thinking in the form of the deceptive dazzle of premature judgments or hypertrophied abstraction devoid of any connection with the world. And it is the same with mass phenomena: overproduction, inflation, the proliferation of political parties, rampant technology, atomization in all forms. (Cited in Combs, 1996)

Unfortunately, since mental consciousness still dominates, many academics view it as the highest and final form of consciousness. Gebser, however, saw things differently in part, because he had lived through the worst effects of the calamitous twentieth century.

Born to an aristocratic family in Poland in 1905 and studying in Berlin until encountering Nazi Brown Shirts in 1933, Gebser had little hope for a world controlled by men's egos. In the winter of 1933, however, he was struck by a realization that would become the core of his life's work. This realization was that a new and radically different form of consciousness was beginning to emerge. He believed this form of consciousness, *Integral consciousness*, had the potential to transform the fabric of

civilization from top to bottom just as mental consciousness had done in its time.

Gebser spent many years charting evidence that Integral consciousness was emerging. His book, *The Ever-present Origin*, details that evidence in a impressive array of cultural forms including physics, mathematics, biology, sociology, philosophy, jurisprudence, music, painting, and literature. For instance, Gebser believed Integral consciousness brought a growing ability to make multiple view points appear as integral wholes. He saw this new ability evident in the paintings of Pablo Picasso and Paul Klee, for example. It suggested a new freedom from possessive, ego-based consciousness. The new consciousness also brought a new sense of time as a tangible experience, and not the abstract quantity known since the age of Newton. Gebser pointed to the works of writers such as T. S. Eliot, Hölderlin, and Rilke as evidence of this new sense of time. Born of World War I's lost generation, these writers cherished the reality of each moment, thus generating a revolutionary new fullness of existence.

Paradoxically, while time became more tangible, the experience of reality also became more fluid, or as Gebser called it, *diaphanous*. Using the Buddhist term *Void*, Gebser described this new experience as “a spiritual transparency by which we experience the whole almost as the whole lives through us.” He argued that this transparent quality came from a new spiritual awareness which was again grounded in felt experience of the creative force which permeates the world.

This new spiritual awareness was important. Mental consciousness had brought institutionalized religion heavily involved in social control. Such religions invariably moved toward increasingly rigid and often hair-splitting beliefs that smothered the spiritual awareness from which all true religions emerge. Integral consciousness brought a new spiritual depth, one which contained a solid clarity missing in earlier forms. This clarity was supported by a more integral reason, and new scientific abilities to apprehend the design in which humankind is embedded. Thus, no longer an awed child or an arrogant adolescent, humankind returns to its spiritual roots, now with a more lucid awareness of the *mysterium tremendum*.

Gebser saw a danger, however. Powerful contact with spiritual roots often left soulful selves lost in the light. These souls follow blindly, without judging ideas critically or cross-checking their validity (these last traits being mental consciousness' great strength). Thus, Integral consciousness had a deficit form, *diaphainon*, a shining through of spiritual light which lacked substance.

Well-meaning New Age romantics, filled with the light, but unable to separate quality from quackery, are an example of *diaphainon*. Unfortunately, the lack of grounding makes this kind of spirituality a natural feeding ground for charlatans, megalomaniacs, and psychopaths in many guises. The rise of charismatic cults producing horrific ends in this century is a sign of *diaphainon's* inability to discern. Jim Jones, David Koresh, Aum Shinrikiyo — the list is long. Charismatic leaders' ability to play on blind passion, is one reason that it is important to keep the new vision well-grounded.

Gebser hoped that the twentieth century's great calamities were part of the birth struggle of a new way. He viewed the outcome as uncertain, however. Hence, though he believed humankind's only hope lay in the embryonic new consciousness, he found that most people were still mired in egoistic, rationalistic consciousness and that the power structures that supported these traits still seemed secure.

As he said:

...the coming decades will decide whether a fundamental transformation will occur during the next two generations or not for the next two millennia.

The Evolution of Consciousness Revisited

Gebser's work helps us see that the evolution of consciousness is not a figment of New Age imagination. Whether you believe his theory in detail or not, this and other research makes it clear that changes have taken place *inside* our big beautiful brains. Consciousness changes are directly relevant to the kinds of cultures human beings produce.

The contrast between Integral and Mental consciousness also helps us see our crisis more clearly. Individuation enriches the community, but the pendulum has swung too far. Modern individuals often lose all sense that they are contributing to anything larger than themselves — a predicament enshrined in the image of selfish genes. Small wonder fragmentation now plagues the end-of-the-millennium world. As biologist David Sloan Wilson says, "Western societies seem to spawn far more self-absorption than sacrifice for any greater good."

Self-absorption among some, however, spawns the opposite among many. Frightened and alone selves often fall prey to blind, yearning need. They willingly submerge their identities to charismatic leaders and commit atrocities — usually in the name of community and soul.

Add the centrality of war and you get the modern world. The age of Mental consciousness has left us 1) brilliant but disconnected, 2) powerful but vicious, 3) antagonistic and often self-destructive.

This list helps us understand the direction of the return swing. Learning is enhanced by strong selves *and* strong bonds. The two must go together. Strong selves without strong bonds produce self-absorbed egos who ravage society and the world. Strong bonds without a strong self is the basis of pathological conformity. Integral consciousness must have both because either side without the other can lead to disaster — a society with very little group intelligence and a lot of destructive tendencies.

The Learning Universe Revisited

The story of the stars, that of life, of human beings, and of thought, are one and the same story.

Yves Coppens

We are back to our own time, now with a new sense of how our minds fit in evolution and history. Thanks to the Enlightenment, rational thought spread across the world along with public education.

Human societies of mind now reach phenomenal levels, best seen in that most rapidly-learning society of mind, science. On the other hand, big egos and the idea that war is central to the world also leave us ever-floundering on the edge of extinction. How can we achieve a more viable way? The next section explores some of the obstacles to human learning in detail. Meanwhile, let me close with a review.

Clockwork thinkers were apt to argue that life was an anomaly going nowhere. Consciousness was merely the latest pin-stripe on the lumbering automaton that selfish genes call home. An alternative view is emerging, however.

Just how differently might our descendants view the world? Perhaps they will believe that humankind's great strategy is a mind one. Our inquisitive, collaborative nature was forged in a cauldron of crisis. From this came our one defining task — 'knowing and doing' in ever better forms.

Then too, perhaps our descendants will believe that the Great Ordering Oneness gave us consciousness that we might consciously aid in the project of creating an ever-more harmonious, well-flowing world. After all, when mind is seen as a project of the world (and not just a human quirk), then one has to wonder whether the ability to see so far has some aim beyond, say, making money.

And so the noble thought. We were born of a universe which is driven to learn and this urge is implanted deeply in us. Following this urge is what makes us who we are. Following this urge *together* has made us the most remarkable creatures on the face of the earth. It is time we started using those big beautiful brains to envision something wiser and more loving than parochial self-interest and quality through war.

Humankind is not a finished product. Our ultimate place in history remains to be seen. Our existential question looms large. Yet, there is reason for hope. We can remake ourselves rapidly. That is what culture is for. We have done so many times before. So while our straits are dire, our potential is still great. If anything emerges from the ideas in this chapter, I hope it is that humankind's strategy is *learning*, done in community and aimed at wellbeing—our own, our society's and that of the world with which we are so tightly bound.

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END NOTES

1. The reptilian brain consists of the midbrain and basal ganglia, plus a thin shell of cortex including the hippocampus. It is found in all animals with a brain. It is called the lizard brain because salamanders were the favorite subjects of early researchers trying to study this brain in its most basic form. The paleomammalian brain surrounds this core reptilian brain and is primarily associated with the limbic system (the part of the brain most associated with emotion). It is found from lower mammals up to human beings. The neomammalian brain, found only in higher primates, is the neo-cortex.

2. Each brain's characteristics reflect pressures which gave it birth. Thus, the lizard brain would have been the brain that brought us out of the ooze. It provides a tremendous amount of coordination between primitive survival needs and internal visceral response. It represents a kind of primary consciousness based on millions of years of experience on the four basic elements of survival: feed, flee, fight and reproduce.

Unfortunately, the lizard brain is inflexible. As life evolved, simple lizard brain responses probably reached their limit. As the ecosystem began to fill with other animals, simple responses were not enough. Survival began to demand more complex responses and speedier learning. A new strategy came into being which used rich emotions to enhance personal learning and bonding emotions to enhance group learning. The furry-mammal brain allowed faster learning and produced more diverse responses. Modeling emerged as a way of transmitting learning to one's fellows. Yet, apparently at some point, this strategy too was insufficient and the thinking brain emerged.

3. Paleontology is a rapidly changing field and estimates of the dates of this event vary wildly. I am using a rather mid-range estimate. More recent work puts the split between the *Homo* genus and its nearest relative *Pan*, the genus of chimpanzees, about 8 million years ago during a tectonic shift that left an East/West rift in the African continent with mountains in between.

4. And now championed most strongly by Elaine Morgan, see *The Aquatic Ape* (1982) and *The Scars of Evolution* (1990).

5. Riane Eisler is the most famous proponent of this theory. In her book, *The Chalice and The Blade*, she reports three main waves of barbarian attack, No. 1 about 4300- 4200 BC; No. 2 about 3400- 3200 BC; and No. 3 about 3000- 2800 BC. (1987, p. 44).