

Lively Planet

I. Intro

The Adventure of Mind

Every day is its own challenge. Individuals and their institutions are each struggling to maintain their existence against nature's tendency to decay and subside into less energetic states. Our earth has existed for about 4,000,000,000 years. The existence of modern man as a biological species history extends back 200,000 years +/- . All of civilized history fits in just 10,000 years, and the age of modern science has lasted only the last 500 years. Not only has our story been filled with adventure; also, the rate of change has changed rapidly on the face of our planet. Events are accelerating at an ever increasing pace.

This ups the ante as far as our society is concerned. Both for good and evil. A rising tide lifts all boats. We are at the point where the passage of time brings with it far larger effects than ever before, and over briefer periods. We have the ability to guide and maximize the forces of nature as never before. Our technologies permit us to communicate instantaneously with each other all over the world. Although sunamis, earthquakes and hurricanes can and do wreak havoc in particular places, we can in many instances provide against the ravages of nature for the majority of people. Medical science understands physiology at an unprecedented level, and year by year there are more and more disease processes that we can control more and more effectively.

Nature's Experiment

We also have within our hands and our control the most destructive machines and weapons the world has ever known. The engines of our scientific and technological progress are as capable of destructiveness as they are of improvement of the human condition. We can see our stance and our position in history in terms of their immediate factors: the implication our acts have for the direct good or ill of individuals, groups or societies. And, in fact, we need to be informed on that level.

But there is a broader field on which our actions and adventures need to be considered, and this is a perspective which is pursued in these pages. This perspective focuses on our planet in several important ways.

Nature has been carrying out an experiment on the face of Planet Earth. The experiment is nothing less than the survival of mind in the universe. In a sense, every effort that nature makes - I intend the personification - in the evolutionary venture is an experiment. When a new species comes into existence, it is an "effort" nature undertakes to make a successful adaptation. And clearly nature has experienced a lot of failures.

Tyrannosaurus Rex is an example. In fact, as biologists know well, the majority of species that have existed on earth throughout the ages are today extinct.,

On the other hand, although many species have marched into oblivion, it should be recognized that the life niches presented by the Earth today are fairly well filled. Nature has evolved into them. And, everything that is alive today is the descendant only of successful progenitors. Animals which left no progeny did not affect permanently the ongoing stream of life. This is, in fact, a tautology: unsuccessful progenitors have no offspring. But it is not just a verbal tautology. It is a biological one, and one that is at the

heart of the natural selection process. It is a tautology written in the basic language of life.

Man's Uniqueness

The human race, though it shares much with its fellow fauna, is also unique in this corner of the universe. Mankind is the sole animal that has evolved a cognitively reflexive brain, true language, and, therefore, *intelligence*. As the sole inhabitant of the reflexive consciousness niche, the human race is a biological experiment in the evolution of *mind*. And we can and should view it explicitly as such. Man, the species, is nature's experiment in producing mind in the universe. Mind is an incredibly interesting and perhaps dangerous development for nature to attempt.

Well, yes!

We should note that as an experiment, its success is not guaranteed. Throughout history, man has viewed himself in many different ways. Many of these have been fanciful or incomplete. Scientific advances we have made recently have given us the raw material for new and important perspectives on man and the human experience. Certainly, we are far from done in our efforts to push back the horizons of our ignorance, but we have come a long way down the road, too. The task at hand is to take the progress in understanding that we have made and weave it into a fabric of meaning and value which can serve us in our efforts to determine in a positive way our future on the planet.

The human mind is an outgrowth of – a developmental aspect of – the physical universe. That this is true continues to be more and more clear. And, even more importantly, we can see more and more clearly *how* this is true. That is to say, we are at a position to understand not only the fact, but also the process through which this has come to pass on our planet.

Oneness with Nature

Even though we are in important ways unique in our niche, the phenomenon of mind is nonetheless a seamless process with nature, and it has occurred here, at this time, in our life space, on this earth. This tells us much concerning both nature, as a complex of processes, and ourselves, as the product of these processes. We came into being not by a magical act of a supreme being, but as the most complex and wonderful emergent process of nature itself, and how and when that is true is now within our mental grasp. Mind is us, and mind is in a position to understand its own origin and nature, in a way that was never before available to members of our species.

This is not by any means the same thing as saying that we live in an exclusively materialistic universe. In a way, quite the opposite is true. Spirit may turn out to be what really matters, but there are some perhaps surprising things about the realities and relationships involved. Reality turns out to be rather different than we might have expected. But, beyond doubt, it is well to be taught by reality itself.

Mind, as it turns out, is an evolutionary phenomenon from matter. Once having evolved, mind has the capacity to exercise a considerable span of sway over matter, and to craft its own destiny. In fact, these are challenges which cannot very well be escaped, as things become more interdependent on each other. It will matter profoundly what principles we rely upon to work with what proves to be an increasingly dicey situation.

Surprises!

The nature and origin of man turn out to be a good deal different than we had thought. We are developmental from the background of matter rather than grafted onto it by sudden or magical means. We therefore are more a relational part of the universe than we had suspected. But the universe, then, must be fertile in surprising ways, since our functions and operations are quite different from matter as we otherwise know it to be. At the time of our American Civil War, Abraham Lincoln, in the Gettysburg Address, enunciated thoughts which may well have a broader applicability on a broader stage today:

“Four score and seven years ago, our fathers brought forth on this continent a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation, or any nation, so conceived and so dedicated, can long endure.”

Not using Lincoln so much as an authority as drawing attention to the content of his ideas, I would argue for the case that we are at a somewhat analogous crossroads. Nature has brought forth a new phenomenon on this planet, the phenomenon of mind – by definable processes. We are, to paraphrase Lincoln, engaged in a great natural experiment, testing whether that phenomenon, or any phenomenon so conceived and so generated, can long endure.

As we follow the story of mankind throughout history, it may seem that for long periods of time, the march of human events has been measured, and even fairly static. Currently, we are a maelstrom of change and uncertainty. It is an exciting time to be alive, but also one fraught with danger and uncertainty. We need to fight against a tendency to bury concern and focus on the pleasures and sorrows of today.

Scary World

On a nice day in the middle of the United States – or other favored places, too, for that matter - it is easy to think that the world is a rather pleasant place, and that human life isn't so bad, after all. A philosophy of doom and gloom is not a very good idea. Only a dolt or small-minded person could fail to recognize the grandeur and beauty of nature – of earth and sky around us. Only a tried and true misanthrope would look at man – and woman – and miss the wonder that we are. The world should not be turned into a place of worry and despair. Far from it. Life is far too interesting, and the promise of what these next years might bring is far too bright.

But there are many issues today which can move from remotely dangerous to critical in brief time. It is more than ever important that we have our bearings throughout the years ahead.

Problems today express themselves with exponential rapidity. So short a time ago as the period of our revolution from England – two brief centuries – it took Jefferson several days to travel from Monticello in Virginia to Washington. Now the trip can be made in a few hours. We jump across the Atlantic in less time than it takes to go from breakfast to dinner, a thought which would have staggered Washington or Franklin. And now, with the Internet, communication world-wide is instantaneous. These advances are truly wonderful, for they link the family of man together in fashion never before possible or even dreamed. Ideas and business affairs can be transacted literally at the blink of an eye.

Twentieth Century

The recently completed twentieth century was a period of struggle and immense contradiction. It was also a time of unparalleled advances. It was filled with invention and discovery in just about every imaginable area. Radio and telecommunications were developed, linking the world together in closer network than ever before. The fundamental nature of matter and physics yielded in unprecedented fashion to our curiosity and experimentation. Special and general relativity were understood for the first time, and soon became matters of ordinary education. The planetary model of the atom was developed, along with the physics of subatomic particles. This created a new background for the understanding of chemistry and the nature of the elements. The double helix of the genetic system was discovered, and vast inroads were made into an understanding of its workings. The endocrine systems of living things were explored and to a large degree elucidated. The marvelous functioning of the neuron was studied and many of its mysteries were probed. The structure and function of the brain itself became clear, at least in the main, and solid foundations were laid for continuing research. Probing into space, we learned that the universe is expanding, and we worked out the general theory of the Big Bang, the origin of the physical universe itself. We came to understand our physical place in our home galaxy, and the nature and approximate number of galaxies themselves. We learned about the natural history of stars and the mysteries of deep space.

The vast majority of these areas of fundamental understanding were only hints and dreams in 1900. By 2000, these, and much more, were standard material in high school textbooks. There had never been such an explosion of knowledge among the children of man.

The Dark Side

The twentieth century was a time of unparalleled advance in just about every area of science and technology that could be imagined. At the same time, in apparent contradiction to such remarkable signs of discovery and process, the twentieth century was also a period of unparalleled inhumanity, of man's unbridled destructiveness towards his fellows on the planet.

Twice during the century the world was enveloped in conflagrations violent enough to be called World Wars, and many times did "lesser" upheavals and human disruptions occur. From the genocide of the Armenian nation in 1915, to the Russian revolution, to the Cambodian killing fields, to the American struggles in Korea and Vietnam, to mention but a few.

The twentieth century on Planet Earth saw the invention and development of flight and of space exploration. It also witnessed more disease, internecine perfidy and genocide than mankind had ever wrought. Mother Earth drank in her children's blood in seemingly limitless quantity. She was several times in several places intoxicated with the sustaining vital fluids of the offspring it had taken her four billion years to incubate and bring forth.

Choice

There is generosity, love and creativity on the planet. As we cruise into the twenty-first century, what we feel about things, what we do about things makes a larger difference than it ever made before. Our choices are important. As a race, we have the ability, to

carry it to an extreme, either to support and foster the aims and objectives of our race, or, worst case scenario, to extinguish it. Short of that, we have the ability to control to a great extent the character of the atmosphere and the civilization in which humans have the opportunity to live their lives.

We can chose to craft a society which ensures human rights or one which subordinates human values to other less altruistic ends. Forces are operative in modern society which if unchecked would result an erosion of the freedom and the quality of human existence. It is surely important what we do and what we choose. One of the foundation stones of modern democracy it the right of individuals and groups to amass wealth and possessions. This, like anything else, can be overemphasized, and if allowed to control the process would end up corrupting the entire human undertaking. A total plutocracy will end up being its own sort of tyranny. On the other hand, it is by no means clear that the solution to this quandary is socialism. The state should facilitate supporting the needs of the individual, and not the other way round.

One thing which is incontrovertibly true is that our individual choices and attitudes do flow together to create the values and convictions of society, and it does make a difference what we feel and what we decide. Falling into the trap of a purely materialistic secularism is not a great deal better – if at all – than supporting a rigid theocracy. The moral fiber of society does make a difference. Ultimately, it may make *the* difference. These current pages do not represent a moral treatise. There is, however, an underlying presupposition, and that is that the universe is knowable, and we will be in a better position to make humane decisions if we have a more just understanding of what the universe is like in which we craft our existence.

Somnium Scipionis

Marcus Tullius Cicero was a statesman of the old Roman republic, held most available Roman offices as he was maturing, and for many years flourished in the Roman Senate as an orator and politician. Roman public life during the first century BCE was often a tumultuous affair, and periods of peace and tranquility were few indeed. When the second triumvirate came into power in 43 BCE, Cicero was placed on the proscription list, and was ignominiously slain during an attempt to flee Rome. In bloody violence, thus ended the life of one of Rome's most scholarly and noble-minded citizens. Not at all a good comment on the ability of developed society to establish its priorities.

Cicero was a prolific writer, and much of his output has been preserved for us. In addition to the many political and oratorical works survived, Cicero also wrote a large number of philosophical essays, some of which we have. These works in their aggregate establish Cicero's place as a foremost Roman philosopher. The majority of Roman literature did not survive Rome's fall and the subsequent neglect of the dark ages. Precious as it is, what we have is only a remnant of this once great civilization.

One fragment, from Cicero's *Republic*, recounts a dream which Scipio the Younger experienced while on a trip to Africa. This is a curious piece, a flight of cosmic imagination, surprising in the breadth of its vision of history and human affairs. Scipio, after an evening of social conversation, lapses into a deep sleep, in which he experiences a moving dream sequence. He finds himself with his father and grandfather viewing the universe from the Milky Way. Together, they look down on the Earth below and converse about the vicissitudes and meaning of human existence.

In his practical life, Cicero knew turmoil, civil turbulence and perfidy. He had seen more than enough of the destructiveness of human frailty. Notwithstanding, his vision in the *Somnium* is anything but petty. He views what he considers to be Rome's greatest achievement, and that for him was Rome's contribution to law and governance. His view of virtue and success was above all social. Human greatness was for Cicero being part of, and contributing to, the stability and humanity of the body politic. This he saw as Rome's greatest contribution and destiny. History's judgment would scarcely be otherwise.

Star Trek

How distinctly modern! One aspect of the adventures of the Starship Enterprise, so clear a product of twentieth century imagination, was the creation of a perspective on human strengths and foibles provided by a view from outer space. Whether the encounter might be with a primitive society not so highly developed as that on earth, or a life form evolved beyond corporeality, the viewpoint was always how things would appear beyond earth's constraints, beyond the usual trivia of ordinary society.

We wouldn't ordinarily consider that an ancient Roman politician might use a similar literary device. We wouldn't ordinarily think that an ancient Roman would jump to outer space to establish his perspective.

In truth, the Romans had little specific knowledge of things among the stars. The Earth was not yet fixed as the center of the Solar system. There was no least suspicion of the number of existing galaxies, nor of the vast dimensions of space. Yet Cicero seems to have been aware that the stars were "up there," and the earth on which we tread "down here." And he intuitively understood that if one were to look at human affairs from an observation point far, far away, he could get a more objective perspective on the human drama.

Our viewpoint here is very much entrenched in earth, but it aims at a higher objectivity, too.

We have not finished our homework yet. Our homework is to capitalize on the capacities of human living, but it is also to find out what reality is all about. And, an important perspective we aspire to is that we have come a long way down the road of discovery and understanding, and it is important to put things together in the best way possible. Earth is our home, and our homework is to figure out what that is, and is all about. Life gave us life, and part of our homework is to answer the question, "so what?"

The ideas in these pages are not agnostic, nor yet are they doctrinaire. A general theory of the way the universe is is given, but the reasons for conclusions are also identified. Things will need to stand on their own merit.

A long time ago, at the beginning of his *Metaphysics*, Aristotle said, "by nature, man wants to know." I couldn't agree more. I would add, "man *can* know," and that's what this important part of living is all about.

Overcoming Darkness

Here then we are, early in the 21st Century.

We have made incredible empirical advance in understanding the physical universe and mastering technology. And, this can only be expected to continue.

Our philosophical and spiritual progress has not kept step with the broadening of our empirical and technological assault on the universe about us, which at best is disconcerting. We have not matured spiritually along with growth in our comprehension of how the world works physically and materially.

The development of history has left us with major internal dissonances in our culture – and those dissonances profoundly affect the ways in which we view ourselves and the way we cope with the demands made upon us. Reality in this way presents itself with some very significant obscurities. Life is not easy to understand, but at the same time it is not unintelligible.

Rome didn't fall. It slumped from greatness into decay. The city of Rome was sacked more than once, but it never became uninhabited. And the thought, structure and legal heritage of Rome has never lost its effects on human destiny.

Following the decline of the Roman Empire, there developed in Western culture a new way of thinking. More important than the political changes that occurred, there was a major groundshift in the quality and nature of thought. From a definitely minority social and religious position in one of Rome's lesser provinces, the attitudes and beliefs of Christianity came to dominate the West, however much we might happen to agree or disagree with it.

In our own age, the development of empirical discovery has created profound insight into the physical and measurable universe, without a concomitant clarification of how mind and spirituality fit into life and reality, although mind, morality and human value may in the long run be what is most important.

This presents to us a major conundrum, or, more accurately, a system of nested conundrums.

II. Mundus Mendax

Objective

When man arrived at a place in cultural development where he could begin to form theories about his universe, he was hampered by two circumstances: 1) he had not carried with him an active memory of his own development over millennia, and 2) he had no idea of his own biological complexity.

The world presented itself to him in daily experience, with a flood of sensory impressions but no obvious hint of its objective complexity either in its developmental antecedents or its functional structure. In that sense, the world was deceptive. Experience fooled man into thinking that its comprehensibility was closer to the surface than it really was.

Experience in that sense was dishonest. The world was mendacious. It “fooled” man into channels of thought and theory which were not objectively substantiated, and this affected the shared consciousness of the human race in profound ways for centuries. In fact, our beliefs and patterns of thinking still respond to underlying tendencies which can be traced back to these cognitive forces.

The family of man was a late-comer in the history of planet Earth. When this large-brained animal showed up, a new chapter in the natural history of the universe started to be written. We are in the midst of that phenomenon. More than that. We are it. What distinguished man from the other animals in his surrounding was the wild proliferation of his brain – his neocortex. This is a sense is the entire ballgame. Without that, there would be no civilization, no human story, no search for glory or truth, no worry about finding explanations for things.

Adaptation vs. Truth

Two things matter: more intelligent adaptation, and the question of truth. These two aspects of the adventure are clearly interrelated with each other, but they are not the same. With his mind, man could build ships to bring grain from distant shores. He could learn to construct buildings, and also to construct systems of law and bureaucracy. But he could also ask what makes the wind blow, and what are the ultimate forces of nature. He could use fire to cook his venison, but he could also puzzle whether his fire was an ultimate element, or whether it was made up of atoms. His increased ability to manipulate his environment also saddled him with the exciting but at times pesky burden of figuring things out. Whatever well enough is, we cannot leave it alone.

And as he built areas of knowledge and theories about things, he also created for himself a singularly human problem: the problem of truth. Not only was it a question whether he got the facts right about a particular observational area.. Of equal, or perhaps greater importance, was the question whether his theories objectively described the universe.

Pandora

Our ancestors picked up at the very beginning of things that there was something wrong with us. And they made up tales to account for the twistedness. Every society on the planet developed mythologies to explain their origin and in some sense the forces of the universe. In Western lands, the culture of the Greeks came to exert wide intellectual and cultural influence. Their mythology established a particular primacy in the thought, art and literature of the West.

The Greek myths were not just pretty stories. They were often profoundly insightful allegories into the way things were at core.

Zeus, the Father of the Gods, in the early days, when the fundamental processes of the world were still young and fresh, instructed Hephaestus, the grand artificer of the gods, to fashion a fit gift for mankind. Hephaestus created woman.

He went to each of the gods and got from each of them a gift with which to endow this new creation. This became her glory, as well as the source of her name. Pandora means the all-gifted. From Athena, she was granted intelligence; from Aphrodite, beauty; from Apollo, healing and music; from Hera, curiosity; from Hermes, charm. The gods endowed her with their very best.

But – there was a catch. She was also given a wonderful casket, a chest, for safekeeping. She was told that, whatever might happen, she must not open it. For a happy time, all went well. She and her consort, Epimethius, loved each other and lived in great happiness. The earth bloomed. Man was productive and content.

Unfortunately, that primal innocence proved to be too fragile to endure. Pandora could not keep away from that magical casket. All her needs were handsomely met, to be sure. But her curiosity kept pricking her, and the great richness with which she was surrounded proved not to be enough. One day, she went to that fateful box and lifted open the lid.

Zeus had crowded into that casket all the possible ills of mankind: pestilence, war, suffering, shame, perfidy, poverty, ignorance, and the wide brotherhood of possible human evils. Out they flew, to pester humanity and poison the beautiful world that the gods initially intended for the family of man.

Pandora was dismayed. Suddenly she realized the folly of her action. She tried to clap shut the casket, but she was unable to do so quick enough. Everything else escaped.

Only Hope crouched with the casket, remaining to live with man and lighten the burden of his pains and sorrows.

Why, when the world is so beautiful and rich, and men and women are capable of such creativity and nobility, is there so much dross and sadness in our lives and in the world around us?

To phrase the question differently, why is there evil in the world? This clearly is a problem that has dogged our existence since the beginning of time, and we still grapple with it.

The Rift in the Lute

There are two streams which historically have contributed in major fashion to the formation of Western culture. There are others, to be sure. Society and civilization have been enriched from many sources. But a strong primacy was exerted by the civilizations of the Greeks, and from not far away geographically, of the Hebrews. Both of these cultures invented writing during the second millennium BCE, and both of them left us literatures which have been overpowering in their influence on later times.

Pandora is a Greek myth, and it has the distinctive flavor of Greek spirit: imagination, art, deep humanity and a spiritual plasticity which later flowered in the measured intellectuality of the Parthenon.

Eve is the Hebrew Pandora, and the history of events in the Garden of Eden is clearly a mythological parallel to Pandora's sad adventure. Eve's story is theistically more sparse and in its own way a deeply human account. Possibly it is somewhat less poetically

sensitive. It was portentous that of the two, as a culture, we accepted one as a matter of fact revealed by God himself. It became a cornerstone of religious belief, while we relegated the other to a realm of literature and art. But, obviously, their subject matter was identical: that evil strode upon the human stage early in the game, and that man was the cause of sullyng his own nest, even as he struggled with his own potential greatness. Prehistoric man and woman learned how to control fire and make stone weapons. He and she could build their families and plan for their offspring. They could also suddenly or with foresight slay the intruder into their territory, thereby destroying a person with equal vital endowment and claim to life. Intrinsic to that situation was a mixture in its very structure of victorious exaltation and blood guilt. Human life is morally conflicted at its core. Original sin is not apple poaching on the sly. It is the contradiction woven into the fabric of our being.

The human approach to understanding the universe has been no less conflicted. The venture is intertwined with systematic obscurity. At the beginning of the story, we invented mythologies to account for what we encountered in experience. That is totally understandable, and contributed greatly to the advancement of culture and society. There was a downside. This very human tendency also introduced distortions of objective truth that we since have been grappling with. We have not yet completely found our way out of the woods.

The Dawn of Civilization

Man did not consciously craft his own appearance on the stage of life. Neither individually nor racially did he/she sit down and say, "Let's be an actor in the drama of reality."

We do not ask for an invitation to life's banquet. Quite the contrary. We find ourselves awake and alert in life's stream.

Intelligent life is a matter of history. And it is up to us, generally, to make what we can out of the experience.

In the first century BCE, Marcus Tullius Cicero could create a frame of reference by imagining a conversation taking place on the Milky Way between historical figures. His purpose was to speculate concerning the place of the Roman polity in human affairs. Since Cicero's time, our view of time and man's adventure on Earth has shifted a good deal. We have spread out the bandwidth of time and can consider not just the political experience of our country, but the racial experience of our species. Our objective is analogous, to create a reference frame broader than the happenings of today's news. Using an imaginary spaceship to plunge into space and then look back on planet Earth through a time lens, we could imagine from a distance the gradual appearance of the human race, and the gradual attempt of the species to understand itself and its place in an often confusing universe. And, as we do that, there occurs to us a sudden paradox. Among the other animals on the planet, there is no doubt but what man is quite the cleverest critter around, yet, from the point of view of man himself, he appears on the scene with a serious dearth of knowledge and understanding about his surroundings. The intelligence he brought to the game of life far surpassed anything among the membership of the animal kingdom. Yet he brought with him a new kind of knowing, one that would enable his species to be in quite a different sort of contact with the environment. With his relatively massive and highly developed brain, he and his kind could, ultimately, figure

out not only how to trap and compete with the threatening cave bear, but, much more daunting, he could come to plumb the secret corners of the universe that spawned them both.

Flawed Beginnings

The Greek philosophers made systematically important ventures into the project of objective knowledge. Empedocles, Plato, and Aristotle were critical in the development of human thought. They asked questions which needed to be asked. It turns out, however, that from our current point of view, their approaches started out naively. But the point is that they did start out.

It is a rather odd thing. Reduced to a simplicity: the human mind is capable of understanding things in profound ways, but it seems to have been impossible to ask questions in the right order. Thought and culture build on each other. And, in overview, instead of going directly to certain sorts of necessary insights, we have had to try out certain sorts of investigation first, and then try others down the road, when the first efforts prove to be inadequate.

To create a homely example, suppose that seeing the world on the other side of the back fence is the objective. You estimate the height of the fence, and then decide what kinds of materials are necessary to build an observation deck. Later, when you have built the deck, you climb up to view the neighborhood around. What you see is the layout of several properties which you didn't even know existed, and you may see that beyond the edge of town there are broad fields spreading out to the horizon. And, there is a mountain range beyond. The problem proves to be a lot different than you thought it was, and your initial solution proves to be totally inadequate. You realize that you need to ask a lot of different sorts of questions, and you need to develop completely different observational tools. At the same time, you never would have got to that vantage point had you not built the platform, the purpose of which was to look over the backyard fence. That's the way our understanding of our universe has been.

No Racial Memory

In the valley of the Dordogne in southern France, there are countless relics of pre-historic human culture. Nature is hard and tends to destroy unprotected artifacts. Much of what has been saved is what was hidden away in natural grottoes. We know fully that what we have is but a shred of what once existed, but it is nonetheless of prime importance.

The chap who drew the cave pictures at Lascaux was every bit as bright as the man who drew the engineering blueprints for the space shuttle. But, he came along early in the game, and lived only at the beginning of the project. At the beginning, that is, of man's mental project to understand the world, yet only at the end of a long line of evolutionary development.

Over 5 million years from the first hominid to the painter at Lascaux. 20,000 years from Lascaux to today. Progress has become exponentially rapid.

During the last million or so (+/-) years leading to our Neolithic cave painter, biology had been very busy, although at a somewhat leisurely pace. During those last million years, what had been happening, from the point of view of our interests, had been occurring generation to generation between the ears of *homo erectus*, in his calvarium. His brain,

generation to generation, had been increasing in size and in complexity – both structural and functional.

Along with the brain – part of the same complex process – what had also been developing was language and the underlying thought process needed to support it.

The approach, however, to complicated racial memory was prolonged and difficult. Our remote ancestors were more concerned about bringing down a deer for dinner than writing a history of the experience. To be sure, they had not yet even dreamt of inventing such a marvelous intellectual tool as writing.

The key to understanding the significance of this is the realization that people in general do not remember things (at all) for more than a generation or two, unless specific steps are taken, through written documents or other objective memorials, to externalize individual experience. Farther than that away from events, things become lore – the “long ago.”

No Understanding of Complexity

No active racial memory of his own development was one of the things which hampered man in what would become his quest to understand his universe. The second was equally important – but equally understandable.

Man had not even the foggiest idea of the biological complexity that it took to make the human animal possible.

Consider a worst-case scenario. Suppose that in a battle to the death one prehistoric man succeeded literally in bashing out his enemy’s brains. Forgive me for the bluntness, but there’s a point to be made.

Our snapshot of this lethal scene is this: Og, our prehistoric victor, stands over the remains of Ban, the invader with whom he had recently been coupled in mortal combat. A bloody stone ax in hand, Og looks down at Ban’s shattered skull. Ban’s brain is laid bare, and partially squeezed out onto the ground. There is a possibility that Og may – or may not – consider that here’s his dinner. But there is not the very least possibility that Og has any idea whatsoever of the internal structure of the brain tissue before him, or what had until a moment ago been its function. It is, in fact, only within the last few centuries from current time that we have had even a hint of what this marvelous organ performs. And it is only in very recent time that our knowledge of brain function has developed any specificity.

Much less could Og have had a thought concerning the mind of man or its relation to this bloody mess in front of him.

We do not, actually, have a clue about what Og might have thought as he drew his marvelous pictures of aurochs on cave walls. Well, that is not quite true. We do have a clue, but not a great deal more than that. We have the pictures themselves.

Most of the pictures are of animals, somewhat idealized but still three-dimensional and naturalistic. These truly marvelous beasts are pictured floating in space rather than in settings. Humans in the pictures are rare, and oddly much more highly stylized. So we know that Og and friends were highly imaginative, concerned about nature and with the hunt. Beyond that, it is only speculative what may have been going through these peoples’ minds.

Mundus Mendax

Reflective, formal thinking experienced a remarkable flowering after 1000 BCE – 3000 years ago. This is a very brief period of time as far as the development of life on earth is concerned. But development has been exponentially rapid – and there is no indication that this trend has been changing.

The early thinkers in our culture used the perspectives available to them to begin their endeavors and discoveries. These perspectives were basically flawed, and that cannot be overemphasized in attempting to understand the human enterprise.

Two critical flaws, as I have identified were 1) early *civilized* man carried with him no active memory of his evolution, and 2) this same early thinker had no least idea of the complexity required to support both the universe around him and, specifically, his own functioning.

If you think about it, it couldn't have been any other way – but that quirk in developing thought seriously influenced – and in fact hindered – the development of human thinking. But, that's the way our history happened.

In brief, the world presented itself to these early thinkers different than it really was. It is not going too far, indeed, that the world was deceitful towards its most intelligent child. Along comes mind. Its possessors, the brightest animals in the general surround, were positively encouraged to develop answers to questions which were off base. The world was not as it presented itself. The world presented itself to man's fully developed mind without a hint either of its history or its functional complexity.

The world was therefore a deceitful world. And we have had to pay a heavy price for this deceitfulness. Because of the confusions introduced by these obscurities, our journey towards the truth has been hobbled. In today's world, there are disagreements and uncertain claims to where truth lies. Not entirely, but a significant amount of this skewing is attributable to the deceptiveness built into the cultural stream.

Point of Departure

The human animal, this most highly gifted representative of the animal kingdom, began its cognitive assault on himself and his surroundings from an oddly conflicted vantage point. He was not aware of this at the time, although it profoundly influenced the way he approached the project and his rate of discovery. Although there are no clear limits to what the mind is capable of comprehending, it clearly makes a great deal of difference how problems are approached, and how the searcher asks his or her questions.

When man did get to the place in his development where he could make a formal assault on the bastions of understanding, his attack was anything but tidy, and the process has occurred by fits and starts rather than in a systematic or orderly fashion.

In the middle of the first millennium before the Common Era, there took place in Greece a marvelous intellectual phenomenon: the invention and development of philosophical thought. This was one of those magical times when forces played together to bring about an intellectual explosion, in its own way every bit as marvelous as the explosion of theoretical physics during the century just past.

There were several men who contributed to this movement: Anaxagoras, Parmenides, Socrates, Plato and Aristotle, to mention a few of the brighter lights.

In the center of the stream was Plato. Analogously, he could be compared, perhaps, to Einstein in the twentieth century. Not that philosophy is at all like physics. Their

theories were different, coming from different places and launching the intellectual assault on reality from different perspectives. But, both Plato and Einstein were the inheritors of seminal thinking. They both developed in the middle of periods of intense intellectual activity, and they both made major contributions to their fields of discovery. Plato was a pivotal thinker, a human being of towering intellect. It has often been said of him that he set the tone for the entire sweep of philosophical speculation. The rest of philosophy throughout the centuries has been characterized as little more than a collection of footnotes to Platonic thought. That is a gross oversimplification of the history of human thought, but like many half-truths, it makes a point. Flourishing during the first half of the fourth century BCE, in Athens (427-347), Plato was a central figure in the explosion of thought that was Greek philosophy. He raised questions across the board concerning the most fundamental of problems. And hazarded profound answers. But, as Einstein would not have been possible in Newton's day, so Plato, innovative though he was, would not even have been a possibility three hundred years before his time.

It is not that we could have started anywhere else. When you begin a journey, you have to start from where you are, not from somewhere that you ought to be.

Emerging From Ignorance

The other animals plateaued once they achieved a certain level. It is not easy to understand why it is that man kept the avenue for cognitive evolution open, though we are coming to understand more and more about how that happened. As we will see, the critical difference – that which resulted from complex causes, but in the aggregate was the “reason” why man continued his development was the fact the he continued to evolve his brain, and the functions that go with that.

As we will see, no one human trait developed by itself; the typically human aspects of homo sapiens developed in unison. You wouldn't have found an encephalized animal with paws. A panther with a highly evolved organ such as a feline paw, with its pads and its sheathed talons could not have backed up to a point of earlier plasticity and then taken the fork in the evolutionary road towards a symbolizing brain. But, man did emerge, and eventually got to a place where he was able to question and conjecture.

But we need to understand how it was that as man developed he came, first of all, to develop mythic ideas about his universe, which were a strange admixture of truth, insight and imagination, and then, constrained by the limitations of those mindsets, he struggled towards other interpretations of his experience and surroundings, which indeed solved certain problems while raising others.

The problem, generally stated, is that humans could work only with that span of evidence of which they were aware. And, awareness itself is a complicated matrix, with both subjective and objective elements. How far could he go, once he got to the place where complex mental process was possible?

The Limits of Mind

That is a question to which we do not have a satisfactory answer. What can we know? Obviously, a lot. Is there anything which exists which is intrinsically unknowable? Probably not. It things are real, they can be known. This is a principle which I am not going to try to defend or explain here, although it may well be true. Just for purposes of

the argument here, accept that as far as we know, the capacity of the human mind to understand reality is unlimited.

But, even if that is so, it does not follow that being “right” is easy or automatic. Some very bright people historically have had some very strange ideas about what constitutes reality. But, here is the way this worked out for us on our home planet.

In order to understand things, it is necessary to ask the right questions. And it seems that as civilized intelligence developed on our planet, it does not seem to have been possible to ask certain questions at the beginning of the process.

The reason this is true is that in order to ask certain questions or to develop certain investigations, it is necessary to develop the background and the process.

Galileo probably didn't drop lead weights and glass balls from the leaning tower of Pisa. He did, more importantly, something quite analogous, but a great deal easier to observe precisely. After he was silenced by the Inquisition and sentenced to house arrest, he continued his studies and his experiments. He developed physical laws about objects falling in a gravitational field. Simply stated, he stated that the distance traveled by a body in freefall is independent of mass but proportional to the square of time. He developed this law by rolling balls down an inclined plane. He took measurements and derived the applicable mathematics from the values. To great extent, this is the way empirical science works.

What was the difference between Og and Galileo? What was the difference between a Neolithic hunter-painter and an educated thinker of the Italian Renaissance?

It didn't have anything to do with their intelligence. It had everything to do with where in the stream of civilization they lived.

Top-Down – Bottom-Up

Top-Down thinking is looking at things and making generalizations about their nature and function.

For instance, if we look at the sun, we can see that it comes up in the East and goes down in the West. We feel its warmth, and see that plants grow more in sunlight than they do in a dark cave. We see, correctly, that the sun is important for many things in life around us. If we then decide that the sun is the most important thing in the world, we might consider it as God, as men frequently have done. If we then decide that it needs to be appeased, and wants to have virgins sacrificed to it, then we may end up sacrificing our daughters to it, and what started out as a reasonable observation ends up seriously contradicting some of the most important elements in human living. That's top-down thinking, and that is one of its major limitations.

The trouble with top-down thinking is that it ends up getting it wrong about important basic issues.

If we think that God is an ontological necessity to explain order in the universe, it's impossible to say that that's incorrect. However, if every time we find something in the world around us which is difficult to explain, we say that God makes it be so, that's a great conversation stopper, and ends investigation.

Top-down thinking has frequently been involved in missing the important relationships between spirit and matter.

For the sake of example, Cartesian dualism is an excellent example of top-down thinking. As he struggled to construct a system of thought, Descartes decided that he would accept

thoughts only if they were clear and distinct. He thought that we needed to start in the mind and build outwards to an acceptance of truth in the external world. This got him into all sorts of philosophical trouble, and ended up with a strong dualistic tendency in modern thought, the problem of the “ghost in the machine.”

It just happens that our fundamental knowledge relationship is with material reality, not ideas. If we pretend this isn't so, we open ourselves to all manner of self-deception.

Bottom-up thinking may not be a great deal better. Bottom-up thinking assumes that all we can know is the constituent parts of things.

Hume made the mistake of holding that all we can know is facts. We can never know causality, since cause is nothing we can ever see.

The trouble with bottom-up thinking is that it can never arrive at ultimates. More fundamentally, it tends to undermine our very contact with behavior and our place in a complex world. The purpose of a watch is to tell time, but that is not evidently contained in any of its constituent parts. It eventuates only in the complex relationship between parts. But our knowledge has to deal with realities of that sort, too.

God is not to be found in the world of empirical data. But maybe God at the end of the day is important.

The most important questions in the universe are not bottom-up questions.

The immediate lesson to be learned is this: reductionist thinking of any sort is dangerous. We need, indeed, to be able to focus thought on specifics; that's the way we learn. But concluding about any complex phenomenon that it is nothing but such and such is liable to lop off essentials.

Discovery and Scholarship – The Early Years

The point of *Mundus Mendax* is this: that we did not start out the adventure of understanding the universe from a neutral position, but from one skewed by a systematic ignorance of origins and complexity.

It has taken man a long time to get things straight – and the truth of the matter is, we don't have it done yet. We have learned a lot about a lot of things, but, as a culture and a race, we still haven't been able to put it together at all well. That doesn't mean at all that putting it together is an impossible job, or that the vision of integrated knowledge is a hopeless illusion. Quite the contrary. We are in the midst of a very rapidly expanding interest in intellectual revision, and it of great value to ourselves and the race to continue the endeavor.

The history of thought and of culture is organic, and understanding of it is difficult, but not impossible. By 1000 BCE, there had been very little formal attempt to understand the world in an organized way. By the end of the next millennium, most areas of theoretical investigation had been breached. Unfortunately getting to the heart of things has not been easy.

Lack of an active knowledge of evolution, biological and cultural, early man (3000 – 1000 BCE) led man to believe that he hadn't been around very long, and that he came into being, whether by nature or magic, pretty much the way he was at the time he was doing the thinking.

The Aegean Sea and the Eastern Mediterranean had been civilization's cradle for centuries.

Man's ancestors had fanned out of Africa into Europe and Asia. During the 2nd millennium BCE, there were important centers of culture in Egypt, the lands of Greece and Asia Minor, and the Fertile Crescent.

In order for a reflective and enduring spiritual and / or intellectual development to come about, it was absolutely necessary that a culture of powerful written language be developed. Absent that, a stable tradition of systematic study and development of thought would have been impossible.

Beyond Mythology

A lot happened between 20,000 BCE, when the Lascaux caves received on their walls the vibrant and beautiful paintings put there by Cro-Magnon hunters and 1000 BCE, when we pick up the story. Man had learned to live in cities, and commerce had come to flourish throughout the Mediterranean and the countries of the Near East. Egypt was old, and beyond the period of its greatest creativity.

Readily available writing was in the process of being perfected as a widely shared skill and means of communication – a fact which made all the difference as far as developing culture was concerned.

From culture to culture, early mythologies about the creation and origins of the human race were crystallizing and becoming a more or less stable part of civilization.

The Greeks, who were to make such important contributions to our intellectual and artistic culture, never during early times were a homogeneous or organized people. They were mostly a people of independent city states of only modest size, and this lack of unity was displayed in their ideas about the origin of the human race. This gave rise to many myths about early man. Humans were thought imaginatively to come either from the earth itself, or from the sowing of dragons' teeth after some heroic struggle, or as offspring of some commingling of nature's forces.

In some of the Greek mythologies, there were thought to have been different Ages, first of Gold, then Silver, then Bronze, then finally Iron – this final being our own age, and generally less noble.

It wouldn't have made a great deal of sense, at the time, to visit with these people and ask whether these accounts were historically accurate, or whether these things "really happened." The concept of critical truth had not yet been developed.

Genesis

Not terribly far from Greece geographically, but at a considerable distance culturally, were the Hebrews, who may have come from equally disorganized backgrounds, but as they descended into historical times had their culture cemented into a unity by their Book – the Bible.

Modern scholarship has teased apart different levels of creation myth in the stories of Genesis, but the dominant account of man's creation is the Adam and Eve story. God himself gathered together the dust of the earth to form man's body, and then blew spirit into his nostrils. Eve was formed as a companion to man from one of Adam's ribs, removed by God while Adam was in a profound slumber.

For our interests here, what is important is that in our early history, to the extent that there were theories about man's origin, it was more or less firmly believed that man came into being in form pretty much as he found himself, and, if time was an issue, not that long

ago. During early centuries of civilization and culture, there was no realization at all of the eons of time that it had taken to evolve the earth itself, or of the human race upon its surface.

The Development of Thought

At the fountainhead of thought, the Athenian thinkers set the stage for much that was to come.

What is important about Greek thought is that it sought for natural explanations for the world which surrounds us.

Plato looked at his world and dug into the problems which piqued his curiosity. The elementalists before him had wondered what were the underlying substances out of which everything else was formed.

Plato pondered more deeply than looking for common substances which make up objects around us. He asked how things could be the way they present themselves to us. Since there are many individuals which share the same nature, he reasoned that there must be some principle above and beyond the reality of the individual which caused their specificity. Since, he thought, there are many linden trees, there must be something more universal than individual trees. It seemed reasonable for him to conclude that an ideal form of "linden tree" must exist in itself which makes the individual to be what it is. He concluded, ultimately, to the reality of a world of ideal forms which make things around us to be what they are.

Aristotle took this thinking several steps further. He was unwilling to create in his mind an external world of forms, but he thought that each individual, within the fabric of its existence, had a substantial form, making it to be what it is. And, since things are repeated around us in abundance, he felt that there must be some sort of common matter, whatever that might be, which could be made by substantial form to be what it is specifically. This generated the general theory of hylomorphism, that things are composed of matter and form – a theory that would influence philosophical and scientific theory for centuries.

The Bible

The Roman Empire rose and fell. It lasted 500 years, give or take, and influenced profoundly the course of history. Its material development was far beyond anything previously seen. Its system of organization and government created social stability of a sort throughout most of the Mediterranean basin. Roman law has continued to influence legal philosophy and structure throughout the world. Rome's physical remains, in theaters, aqueducts, and other public buildings can still be seen throughout the Mediterranean basin. But, wonderful though its material achievements were, the Empire was materialistic, cruel, driven by riches and power, and, ultimately, devoid of higher significance for the individual.

In the fourth century CE, the emperor Constantine established Christianity as the official religion of the empire, a bizarre happenstance for an Eastern cult religion which a century earlier had been persecuted and harshly suppressed.

Why?

Libraries have been written to try to answer that question, but the sum of it was that Christianity gave to the individual promise of an assured spiritual destiny in a universe created and looked over by an all-powerful single deity.

The Jewish Bible, a world apart in terms of credentials and style from the speculations of the Greeks, became the handbook of the new religion, expanded by the New Testament, writings on the life and teachings of a young Jewish Rabbi, Jesus Christ.

The Bible was little concerned with whether the universe was made of modeling clay or green cheese.

It was not a physics treatise, nor even a philosophical investigation. It was a superview of what the universe is like, from a moral point of view. It was not built on reasoning, as was the thought of the Greeks, but on a spiritual insight into how things really were, on the highest of levels. There is clearly causality and order – of some sort – in the world. It is only from a very sophisticated and rarified point of view that a thoughtful person could fail to realize and acknowledge that.

To explain that, the writers of the Bible posited an infinitely wise and powerful God, who was the origin of everything and gave the universe its purpose and meaning.

This pervasive conviction, present in the tribal writings of the Jews since the early first millennium BCE, at least, was given focus and development in the life of Jesus Christ.

The human race, created in Eden, had fallen from grace in Adam's sin of disobedience, a cosmic dissonance which required rectification in the sacrificial death of the god-man at the hands of the officials of the Jewish people and the military strength of the Roman Empire.

This vision of the cosmos and the family of man gripped the Western mind, to the extent that it became, through centuries of development and struggle, the dominant intellectual blueprint for European civilization.

The Social Enterprise of Discovery

We will visit these cornerstones of civilization again down the road. The point that needs to be made here is, as we look back at it now, we can see that these two major pillars of our intellectual and spiritual edifice, Greek thought and Jewish spiritual insight, were intrinsically flawed at the very core of their perceptual base, a fact which colored much of our experience on the planet for two millennia.

It is not that there were no reasons for these perspectives. There were plenty of reasons, but there were systematic weaknesses, too. And, it was not that we could have started on the spiritual venture somewhere else. We had to start with the part of it we could wrap our minds around – and that's the way the world presented itself.

Our ancestors found themselves in the midst of their experience. They were equally as intelligent as any human beings since. Any increase in understanding of the universe since early times is not the result of nature turning out more intelligent humans, but rather the result of the internal development of the socially shared intellectual enterprise. Any advances that are made are made by individuals, but it is simultaneously true that discovery has been a social enterprise.

Our forebears made bold incursions into understanding reality. Looking back, we can see that their perspectives on the phenomenon of discovery were limited. Our early theories, distorted as they may have been, did two things. First, they moved the project ahead.

But second, by their very existence, they often came to stand in the way of further progress.

Establishing the Beachhead

Both the theories of the Greek philosophers and the cosmological beliefs of Christianity (and hence, in back of that, of the Jews) contained formulations concerning truth and reality that would not stand up under empirical scrutiny.

The case we make to explain this is that, arriving on the scene, but without a common memory of where they came from or any sense of the complexity it took to support their function, our ancestors made the best attacks they could on an intransigent universe.

Early speculation about the cosmos and human life did establish the existence of ideas which would test out mankind's investigative capacities. They also established patterns of thought which would put later discoveries to the challenge. This, in fact, is a process that continues.

Beyond that, in developing different theories about important topics, the machinery for learning, scholarship and intellectual tradition was developed, mechanisms which ongoing discovery would commandeer for its own benefit. Even though many of our initial attempts at understanding would ultimately need to be scrapped or modified, an important beachhead was established. The machinery of discovery and scholarship was developed.

Also, psychologically, humans became comfortable with the idea of taking up the challenge of questioning and investigation. It is certainly not that the speculations of our distant ancestors were wrong, and that's all there is to it. Far from it. Most importantly, even if some of their speculations were incorrect, they taught us how to think.

III. Cosmos I

Lively Planet

We have come a long way from that fateful day ten million or so years ago when an arboreal ancestor stretched out its paw and set it irrevocably on the soil of an African savannah, changing the fate of life on earth for all eons yet to come. That was a critical event, although it was not so identified at the time. The creature which took this emboldened step was looking for breakfast, and not reflexly aware of what she was doing, or of its consequences.

Unknown to our adventurer, life had been brewing for unrecorded and untold millennia, as a result of continuing upward evolutionary pressure. When this primate, a distant ancestor of man, “decided” to take this step, it was a unique event, in that this early relative of ours was moving into an ecological niche that was distinctly uncrowded. However, the event was anything but unique in the broader sense that life was only carrying out one of its basic imperatives: to survive, to provide and to adapt. But, the longest journeys begin but with a single step, and the event, when it happened, was portentous.

Planet earth, our home, had formed billions of years earlier from stardust swinging in stately cadence around its generating sun. Had there been an observing eye to behold it, earth for eons would have seemed a still and silent venue, with storms and earthquakes, to be sure, but no stirrings of life, and no birds breaking the silence of non-existing forests.

With the passage of time, however, nature learned how to take the first baby steps of life, and by the time our ancestors became emboldened to leave their arboreal home, planet earth was teeming with life and the sounds of animal striving.

Nature’s alchemy, which we come to understand better and better, had mastered the basic challenges of living organisms. A still and sterile conglomeration of cosmic real estate had become quite a lively place.

Man Appearing

The human animal appeared gradually on planet Earth. We were a long time in coming, and all of our recorded history is but a thin veneer on top of a lengthy story that all but disappeared from the anthropological record. Our appearance was a lengthy evolution, rather than a sudden event. We are intimately related to the flowers, the beasts of the field and forest, but at the same time, our evolution has placed us at great distance from the remainder of Earth’s biomass, in important respects.

Man is genetically as well as functionally related to all living beings on planet Earth, but the human animal is nonetheless highly distinctive. Among the denizens of field and forest, what characterizes man more than anything else is his way of knowing things, his particular way of being aware, and his way of relating cognitively to the world about him. As we strive to get mankind – ourselves – into perspective, it is impossible not to be struck with the emerging evidence that both the nature and experience of man have been developmental. There never was a definite time we could identify as the beginning of the human family. That is because more complicated life forms have developed from less complicated life forms – and the descendance of man goes back through long and complicated lines to the very beginning of life itself on the planet.

Although there is really no clear beginning to life, we can nonetheless identify periods of time for particular stages in the human drama. Even then, those time periods have fuzzy edges and are only approximate in their duration. As we peer in our imaginations back through time, we can still see our distant ancestors emerging through aged mists, gradually accumulating skills and functional capacities. At some point, we can see our forebears picking up stones to use as tools and learning to communicate with words and meanings, rather than merely with grunts and grimaces.

The Family of Man

The early chapters of the human story were written in northeast Africa. Man migrated from there throughout Europe and Asia, and eventually into the New World. Much of the detail of our early experience remains to be elaborated, and there are undoubtedly significant parts of the story that we will never be able to reconstruct.

Current theory says that although hominids had been found in Europe and into the Far East dating back hundreds of thousands of years ago, it is most likely that the existing human race have descended from a radiation that occurred out of Africa over the last 60,000 years – relatively recent. The Neanderthals, similar to modern man in many ways, had thrived in Europe for thousands of years, from 250,000 years ago until only about 30,000 years ago. Current thinking says they disappeared from the scene, rather than being absorbed into the newer Cro-Magnon population, possibly due to unsuccessful competition.

Going back as much as 2,000,000 years, a time referred to as the Paleolithic period, our ancestors had started using stone tools, although these individuals are generally classified as *homo erectus*, and not *homo sapiens*. These animals are, then, our cousins rather than our brothers.

There is an important balance between the life of an individual, and the larger life of the group. Each individual life is composed of a daily mosaic of countless events, some of them startling, most of them mundane and unexciting. To recount all the events in a person's life wouldn't be biography; it would be keeping a diary. To tell the story of someone's life is to distinguish what is important, and to weave that into a tapestry of words which both preserves some sense of daily rhythm, but also brings into emphasis and focus the importance and significance of life events. Both sides of that equation are important.

The balance between the life of an individual and the life of the group is often subtle, sometimes overwhelming. In one way, an individual's life is nothing but the sum total of his or her experiences. But, an individual's experiences can be largely determined by the circumstances in which one finds himself or herself. At best, life is full of choices and freedoms. At worst, one may have excruciatingly little to say about what happens.

And, beyond that infinitely variable calculus, throughout history, there have been tides and currents of historical and biological significance which have been determinative and are important to understand and know, to the extent that is possible. The evolution of the race is of overarching significance, and yet has little to do with the life of any individual.

The Adventure of Mind

Mind is process. It is a process that turns its power from one issue to another throughout the ages. Mind did not happen easily or quickly. It did not appear at the start of the

cosmic experience, but only quite far down the road – billions of years, in fact – from the time that this marvelous universe of ours had its explosive beginning.

The flow of consciousness goes back through time, increasing as biological organization and complexity increase. Reflexive consciousness, mind in the sense of intelligent, self-possessing awareness, exists only in highly developed animals. It doesn't make a lot of sense to talk about the "mind" of an earthworm, much less of a tree. There is, to be sure, no absolute meaning of words, and worms and trees are highly organized. But there is no evidence that they are conscious in the way we would ordinarily use that term. It makes a little more sense to talk about the mind of a dog or a tiger. It is not nonsensical to as "I wonder what goes on in the mind of a tiger as it stalks its prey."

However, mind in any sense that relates to us humans directly is restricted in the animal world to the hominid line, which is made up of man and the great apes. This is not meant to restrict our interest, but rather to focus it. Psychologists will continue to study the psychology of lower animals, and this is not meant to imply that they shouldn't. But, biologically, marvelous things happened when animals developed larger and more specialized brains, and started down the fateful path of developing language and abstract thinking. And, all of that is relatively speaking quite recent.

Evolution

On our lively planet, things got off to a start with the Big Bang. The universe had a finite beginning, and time and space came into existence. Prior to that ... well, there wasn't any prior to that. The existence we know had a beginning, to which it is corollary that there was nothing prior. Life, which entails a high level of chemical and physiological complexity, happened only slowly after millions and millions of years. Finally, no one was present to watch it, but animals and plants appeared gradually on the planet, with evolution occurring at last to the family of hominids, and, latterly, to the emergence of man, particularly through Homo Erectus over the last million years. Homo sapiens, our own species, appeared only over the last couple of hundred thousand years, with a meteoric development of culture over the last few thousands of years, once the process got going. We continue to strive to understand the detail.

This vision, it should be noted, is one that has emerged very recently, over the last several decades. It is not a vision that was available to Aristotle, Augustine, Newton, or, for that matter, even Einstein. The picture is quite new, and continuing to develop before our eyes. Man had to try to understand himself without understanding his origins, which historically contributed to a wide range of misconceptions.

Intelligence didn't happen suddenly, or discretely from the other processes on the planet. Rather, it emerged gradually. The vehicle or conduit for its appearance was the organized brain, or, more accurately, the organized brain – language complex. Although steps are not by any means certain, it seems more and more clear and conclusive that that brain and language developed together, and, in fact, in an intimately connected relationship. Man did not develop his brain, and then find out that he could use it to talk. The brain developed the way it did *because* it was being utilized for communication.

Grantedly this raises serious questions about process, but identifying the facts probably has to be antecedent to understanding the mechanisms of development, and it is important to try to get things as correct as possible. Many think they understand more about this than they really do ... but we are making progress, nonetheless. At current writing,

explanations have to some extent to be theoretical. We need to keep our minds open and inquisitive.

The Golden Thread

The human animal by its very constitution gets entangled with truth. Unconflicted humanity would be a serious internal contradiction. At the root of this problem is man's brain and his way of knowing. The human brain provided the physical substrate for a symbolic way of knowing things, and that portended trouble from the beginning. Move ahead man must, but there was no way of doing it smoothly.

Symbolic representation in the mind created a capacity for seeing situations in conflicted ways. Members of one's group might have a right to be protected. At the same time, another actor in the drama might have a right to sustain life by taking the major share of the day's kill. This might raise the conflict of pursuing one's own rights at the expense of someone else's. Other animals are not gifted – or burdened, from a different point of view – with this capacity. Other animals sort things out by instinct. Humans have to use their brains.

Everyone likes a story. It's a way of relating to ourselves and the canvas of our existence. The story of our race is the biggest story of all. Why then can't we tell it once and for all and have it over with? The reason is that we continue to learn more facts about events on earth, and that changes the point of view. So the story has had to be retold, again and again. Humans will continue to do this until the end of time, and it will help us to get where we need to go. There are parts of the story which we can agree on, without too much controversy, and it's worthwhile trying to solidify those rocks in the midst of the flooding stream.

We too have a version of the human story to tell, yet one more time. New facts have created new perspectives.

Mysteries, Secrets and Discoveries

Our interest here is not an attempt just to recreate a sense of the continuity of events. That has been done, and will continue to be done, in other places. Our concern has much more to do with identifying major shiftings of viewpoints that have happened in the history of human spiritual experience. We have had a unique tendency to cast off the very fabric and pattern of our prevailing thoughts, as we have progressed through time, and it is important to have grasp of what those major efforts at refocusing and reevaluation have been. We have not been able to craft just one picture and nail it to the wall of our intellectual castle.

As our ancestors walked out of the forest into open daylight, they had set their feet on the road to truth. Initially, they were not in a position to realize this aspect of their experience, though we can in retrospect.

Since early humans left very few vestiges of their thought processes in a way that allows us to appreciate the content of their ideas, it is necessary to use imagination and art in constructing a sense of their consciousness.

We, and our forebears as well, have always had to take care of every day and its demands, whether that meant fending off a sabertooth tiger or tending to the needs of our young. The needs of current events have always been an urgent set of factors in our

existence. But also, there has been the insistent demand of understanding what is going on about us – of developing an understanding of the world and of ourselves.

There has, in other words, been a truth demand made upon us. We have needed to understand and to develop theory about what makes things tick.

The truth content of the moment is a golden thread which has run through the fabric of every day. It is a thread that we can profit from and make additions to. Its expression has changed much from age to age and life to life. But, it is a dimension of culture which is strictly and specifically human. It is an aspect that makes us be what we are. In addition to hunters, farmers and parents, we are also seekers after truth, and the progress of that project from generation to generation is what, in large extent, *Lively Planet* is about.

Prehistory

Pushed back far enough, mind emerged from sensation, and, in back of that, ultimately from the fundamental reactive forces of nature itself. For the purposes of getting our ancestry into focus, we can point to the australopithecines, bipedal animals, of which “Lucy” is an example, which roamed parts of Africa 3,000,000 + years ago. *Homo Habilis* was somewhat larger, with a larger brain, and lived from 3 million to 2 million years ago. *Homo Erectus* spread out of Africa, into Europe and along the southern coast of Asia into the Far East, roughly from two million years forward.

A million years can be a long time, speaking in biological terms. All of civilization as we identify it fits in the last 5 to 10 thousand years, and a million years is 100 times that long.

What that means is this: the large part of our physical development happened a long time ago. Anything within the recorded memory of man happened in the last 1% of man’s existence. That’s not the last 1% of the world’s history. That’s the last 1% of human history.

Or, actually, we don’t refer to this early period as history, but as prehistory. History, technically, involves the development of a written record, and throughout most of the vast length of time we have been around, we preserved no recorded verbal record of our experience. We had to walk many a country mile through the arches of unrecorded experience before even learning how to write – before inventing writing, that is.

Our ancestors were making stone tools at least a million and a half years ago. These were large-brained, intelligent creatures, looking quite a bit like us, very close to us in height and heft, and trying to understand their world. The roots of the early mythologies of all races are sunk deep within these laborious eons.

Homo Erectus

Man arrived on the scene thinking about surviving and how get along practically. He did not arrive with a Ph.D. or a library of books. The fossil record of our early ancestral line is very incomplete. The circumstances necessary for the provision of fossil preservation are rare, and the vast majority of individuals in a species decay and disintegrate into unrecoverable atoms.

Piecing things together, however, one generalization seems pretty clear. Unfortunately, it is one which recognizes major gaps in our knowledge.

Our ancestors had been evolving since their split from chimpanzee ancestors 7,000,000 years ago. By 2,000,000 years ago, our ancestors had developed into a species called

homo erectus. The remains of this widely flung group have been discovered in Africa, the Mid-East, and into the Far East as well. What is unfortunate, in terms of understanding ourselves, is that our knowledge of these animals is quite limited. It was during these years that our ancestors underwent the major evolutionary transformation into modern man. *Homo erectus* used and fashioned tools. His years are defined as the Paleolithic period – the old stone age.

The brains of these animals developed throughout the period of their existence from approximately 800 cc to 1300 cc – from primate to fully human brains. Unfortunately, much of our early development went on during this period, but we will never know in detail about their thoughts or their language, for they left no vestige of those things. Based on the size of their brains and the sophistication of their stone implements, there is no doubt in my mind but what these animals became as they developed were fully capable of human speech. Please note that this conviction is not shared by all thinkers.

Writing – 1000 BC

Like any great human invention, writing did not spring fully formed into the light of day. Clearly, spoken language developed a long time before written language. I think that extensive spoken language began a great deal earlier than many believe. Even chimps have language of sorts. By the time Lucy came along 3 million years later, I strongly suspect that language communication had advanced a good deal. By 1 to 2 million years ago – the time, generally, of those populations we refer to as *Homo Erectus* – our ancestors were consciously making highly sophisticated stone tools, and I strongly believe when they taught each other about it, they didn't just grunt – they talked. Assuming this is true, it means is that most pre-historic humans – certainly the cave artists who drew the beautiful animals throughout Europe – already had highly developed language, social skills, and ability to communicate with each other freely and extensively. Any other theory seems silly, to me, at least.

Finally, after eons, the pace of civilization accelerated. We will continue to try to reconstruct early experience. We will never succeed in filling in all the detail. The lands around the eastern Mediterranean saw developed cultures 3 to 5 thousand years B.C. Egypt built the great pyramids and the sphinx 3000 years before Christ. In Babylonia, the stele of Hammurabi was carved about 1700 BC, the oldest extant example we have of a recorded code of laws.

During the last few centuries of the second millennium BC, an easily mastered system of alphabetic writing was invented, which for the first time made it possible for humans, as part of their daily business, to commit the entire range of their spoken language to permanent and transmittable form. Few human advances have facilitated so much the stabilization and preservation of human culture. This function, which seems so natural to us, was anything but innate. It took long millennia for our ancestors to develop.

Mundus Mendax

Although the world is our source of information, it is not an easy read. It may in fact be quite deceptive. To understand how we developed intellectually, it is important to understand the difficulties we have had in coming of age. We have already discussed this; we summarize it here.

There was something intrinsically confusing about the way reality presented itself to our ancestors. As we were emerging from the mists of the long-distant past, our brains and minds by a certain time were fully formed. Anatomically and physiologically we were essentially the same as we are now.

Two factors, however, pertinent to our culturally developmental state, were 1) we had not carried with us an active memory of our emergence to date, and 2) we had no least hint of the complexity either of our own physiology, or of our ambient surroundings. As we stop to think about it, it could not have been otherwise, but these aspects of human development profoundly affected the history of human thought.

Human memory and oral tradition are in some respects surprisingly accurate, but in other ways quite feeble tools for transmitting a record of the past. Until we developed writing, there were serious limitations to our perception of time gone by, but writing was a relatively late development in human culture.

And, it took centuries of developing perspective and technology to begin to understand the physical and operational complexity of the universe.

The importance of these aspects of human experience is that serious skews in human knowledge and discovery entered the cultural stream. Specifically, since man carried with him no active memory of his emergent past, he tended to think that he came into existence pretty much as he was, and, moreover, that his appearance had occurred not too long prior to current time.

And, since he had no idea of his own complexity, nor that of the environment, he was inclined to fashion philosophical concepts of function rather than physiological and physical ones.

These factors radically and profoundly affected the ways in which as a race we have had to struggle out of the shadows into the light.

The Fertile Crescent

Although our racial emergence occurred in Africa, the dawning of western civilization occurred in Mesopotamia and the lands of the eastern Mediterranean coast. Between 10,000 and 2,000 years BCE, there was a marvelous flowering of society and culture which would establish the themes of humanity's characteristic development.

The Fertile Crescent, a term coined by the great archeologist and Egyptologist James Henry Breasted saw early development of aspects of human society which were of great import for all future time. This wide territory included in ancient times the Nile valley, the Levant, and the valleys of the Tigris and Euphrates.

It was here that men first came to live in complicated communities – cities – and here that agriculture in the western world was first developed. There was enough separation of geographical locations that independent centers of habitation and culture could develop, but sufficient closeness that trade and interaction were encouraged.

The city of Ur developed in Mesopotamia in an area where there had been settlements during Neolithic times, from at least 5000 years BCE onward. Settlements in Egypt along the Nile were equally ancient. The elements of our civilization were invented during this early period.

The first literate culture developed prior to 3000 years BCE, with the invention of cuneiform writing. This developed first with pictographs, with gradual progression towards a true alphabet. The cuneiform symbols were made by using a reed cut across to

impress designs into wet clay, which could be hardened by drying or being fired. The use of such a stylus created wedge-shaped forms, the characteristic elements of cuneiform. The Babylonians used a sexagesimal numeric system, with 60 as the numbering base. This has continued to influence our mathematics into current time. This is why we have 24 hours in our day and 12 months in a year. Also, why we have 360 degrees in a circle, and 60 minutes in an hour.

Egypt

Ancient Egypt continues to present us with many challenges and mysteries. The first of these is that its greatest architectural and structural achievements, the Sphinx and the Pyramids appear at the beginning of recorded history, not at a period of middle or late achievement. These masterpieces date from at least 3000 years BCE. They represent huge engineering and artistic challenges. It is impossible that such buildings could have been constructed by a primitive society. Yet we have essentially no idea about Egyptian history leading up to pyramid building.

Egypt presents us with 3000 years of culture which had, to be sure, its own internal history and its great political vicissitudes.

In the 18th century BCE, a pharaoh ruled in Egypt who was certainly off the norm by any possible standard. Amenhotep IV, who renamed himself Akhenaton, made huge changes in culture and government. He outlawed other gods, worshiping only the sun disk as a unitary deity. He built a new capital, Amarna. After his death, however, the country returned to previous customs, erasing name and likeness from public monuments. But, in spite of deviations like Akhenaton, many aspects of Egyptian culture were remarkably homogeneous for 3000 years, quite a time period when considering developed society.

Everyone is aware of the Egyptians' preoccupation with afterlife, and their attendant practice of mummification. From our point of view – quite different of course from theirs – the way they prepared mummies had some oddities about it. Understandably, they placed great importance in the surface appearance of the prepared bodies.

Of course, they had very limited understanding of physiology. Nonetheless, an aspect of the mummification process has long seemed to me to be a bit humorous, if not ironic. What they were interested in was a prolongation of consciousness. To achieve this, they wanted to preserve the body in as lifelike a state as possible. But, knowing that it would soon rot if left untouched, they turned the brain into slurry by inserting a sort of whip into the brain cavity through the nostrils and swishing it about, then withdrawing the mess. In their enthusiasm for maintaining consciousness, they destroyed to the extent possible its very organ! Not, of course, that it would have made a difference. Dead after all is dead. But, from the vantage point of our understanding of function, it still represents a bit of an oddity.

Classical Period

The mind of man, then, had been around for at least a million years, developing better ways of surviving, thinking about the world in which it found itself, and harboring whatever thoughts it could about the origin of things and his place in what would have been a sometimes confusing world.

The invention of writing, in its day, was equally as important as the digitization of information in our own time, and in many ways analogous to it. Here we are, twenty-five years, give or take, into the development of digitized information, and already, great expanses of our knowledge have been crunched into the 0's and 1's that make up the digital code.

Analogously, once writing was readily available, scores and hundreds of people, over brief time, set about to record what was known. Not in twenty-five years, but in a few hundred.

The changes that occurred in the Mediterranean basin during the 1000 years preceding the birth of Christ were immense. At the beginning of the period there was more promise than achievement. True, the Greek city states had had their beginnings. King Minos had ruled over his Cretan thalassocracy; the myths of the labyrinth, of Ariadne and Theseus and the Minotaur threw their shadows over Aegean lands. The Trojan wars had been fought. But, although these events had their origins in fact, nonetheless, they descended to later generations shrouded in myth rather than clearly founded in history.

Phoenician, Greek and Anatolian traders plied Mediterranean waters all the way to the Pillars of Hercules. Ship captains had learned to keep written accounts and to communicate by letter with their homelands and with other traders.

Yet by standards that would see the light of day within a few centuries, government, laws and literature were still quite primitive. Much needed to happen – but, what was important at the time and continues to be important for us today, happen it did!

Greek Thought

Once writing had been developed, the Greeks, an imaginative and communicative people, forthwith set about committing to the written word much of what seemed important to them. Greek thought in brief time developed a very wide spectrum of expression and investigation.

The first applications of this skill were practical, in the recording of business transactions and the pursuit of trade.

Apparently, the Greeks, in order to preserve their traditions, had for centuries been carrying around with them stories and practical lore in verse form, that being much easier to remember than simple prose.

The Greeks wrote down their poems, traditionally ascribing them to two major poets, Homer and Hesiod.

Homer's *Iliad* and *Odyssey* told of events in the Trojan War, which had assumed literally epic proportions in the mind of the Greeks. Hesiod left two highly significant poems, the *Theogony* and *Works and Days*. The first of these was a collection of fables and beliefs about the origin of the gods and the early history of the Greek peoples, the second a sort of farmer's almanac, telling of practical agricultural lore, when to plant and when to harvest.

Over the next four or five centuries, the Greek mind wandered far, reporting histories, writing literature, and formulating physical and philosophical theories about everything imaginable: physics, biology, political science, art, ethics and metaphysics.

This first huge and varied venture into formal theoretical as well as practical thinking is unparalleled in human history anywhere on the planet. While many Greek accounts and theories needed major revisions over the centuries, what is important is the fact that the

Greeks asked the questions, and created for all ages the major categories of human thinking.

The mind of this large brained animal had been let loose, so to speak, intellectually, into the realm of thought. Whether we think about politics, physics, or human thought itself, we are Greeks at heart.

Rome

Rome flowered while Greece was on the wane.

Legend had it that the city of Rome was founded in 753 BCE. This was the date from which Romans later calculated their calendar. AUC was the designation used by the Romans – *Ab Urbe Condita* – “from Rome’s founding” – much as we would say *Anno Domini* – “the year of our Lord,” or, as we modernize it, “the Common Era.”

This year coincides very well with archeological identification of early settlements on the Palatine Hill dating back to ca 750 BCE.

According to later tales, Rhea Silvia, a reluctant Vestal Virgin, bore twins, Romulus and Remus, who had been fathered by Mars, the God of War.

The twins were set adrift in the river Tiber, whence a she-wolf rescued them, and later suckled them, until they were taken in by a shepherd’s family. Grown to manhood, Romulus and Remus chose to found a city at a spot indicated to them by the omen of a flight of birds. Thus Rome began.

Early Rome was ruled, as usually happens, by strong men, who were later referred to as kings. Power was shared with the other leaders in the community, and in 510 kingship was abolished, and the Roman republic was founded – SPQR – Senatus Populusque Romanus – the Roman Senate and People - the trademark of Rome, even into the Empire.

Rome over the next centuries extended its power, bringing the other Italian tribes under its sway.

The greater challenge to Rome’s power came from Carthage, an old and powerful Phoenician colony which had come to dominate trade in Mediterranean lands. “Carthago delenda est” (Carthage must be destroyed) became the constant demand of Marcus Portius Cato – and in the Punic Wars (264-146 BCE) Rome tangled with and finally overcame her fractious rival.

The Republic gave way to Empire with Caesar’s death in 44.

For 500 years, the Roman Empire brought unity of government and bureaucratic stability to the entire Mediterranean basin. This was the genius of Rome – the ability to rule peoples and establish order under law.

Vergil, the outstanding poet of the Augustan age, in the Aeneid, recognized this explicitly – “**parcere subjectis et debellare superbos**” where Rome’s mission is foretold – “to spare those who have been subdued and overwhelm the proud.”

The Emperors were a very mixed lot: some cruel and rapacious, others more given to government and using power to maintain their position against rebellious underlings. But the Roman genius for organization overall made the empire flourish, establishing Rome for all time as the paradigm of successful governance. Very much as we earlier saw Cicero musing in the Somnium Scipionis.

The Romans created a very considerable literature, mostly capitalizing on the literary forms created earlier by the Greeks.

What we have undoubtedly is only a sampling of their productivity, but nonetheless it is quite extensive, enough to fill a small library. Roman philosophy was important, not so much in itself as serving as a conduit for Greek ideas to western Europe.

But, as we are all Greeks in our thinking, so as citizens we are Romans.

Classical Cultures

More than anyone else, the Greeks and the Romans created the classical world. They accomplished a great deal in a relatively short period of time.

Simplifying a good deal, the Greeks were outstanding in art, creativity, theoretical thinking, and literature. The Romans, who flourished a bit later than the Greeks, were great in engineering, organization, government, and law.

What allowed the Greco-Roman world to develop and spread over Mediterranean lands was, more than anything else, the invention of practical, alphabetic writing. Once things are written down, they become part of the patrimony of a people, in some ways more durable than stone. Stones may last for centuries. Writing is eternal, provided, of course, that not all copies are destroyed. Writing catalyzes thought. Ideas generate ideas, and if those ideas are caught in the written word, they will go on to generate other ideas. That is the way civilization, and education, work.

The Greeks asked all the great ideas: where do we come from, what are we made of, what are the ultimate constituent principles of the universe?

They asked these ideas, however, in an as yet primitive context. They continued to work with no idea of the age and extent of the universe, and very little idea concerning the mechanics of life or of nature. But they got the big questions asked, of cause, of life, and of the nature of things.

The Romans were on the whole a good deal more hard-headed. But they established an organized empire, under one banner of law, that spread from the British Isles on the west to Egypt and Mesopotamia on the east. Their buildings, the monumental representations of their organization, still stand where they have not been torn down. The Pont du Gard, in southern France, an aqueduct bringing water to the city of Nimes, is as fine a building as ever crafted by the mind and hand of man.

Foundations

The mind and body of man had been a long time coming, but was essentially established by 1,000,000 years ago. It evolved from the material world rather than having been inserted into it magically. But – from then on – it was much more a matter of culture than of the basic production of the organism.

By 5000 BC, agriculture and the development of cities were established throughout Mediterranean lands. Easily usable written language was invented around 1000 BC. This was rapidly followed by an intellectual explosion, with the development, particularly in Greece, of thought and literature of every imaginable type – imaginable, that is, in the current time frame.

Rome established an empire stretching from the British Isles in the west to the Ganges in the east. The knack of the Romans, certainly, was organization and government. Their technology was unmatched until well into the Renaissance and modern times. Cruelty and harshness were hallmarks of Roman rule. In the middle of the capital stood the Colosseum, truly a marvel of engineering and architecture, but also an apt symbol for Roman society. The Colosseum was the focus of urban entertainment, with spectacles and chariot races, but also gladiatorial games and, at times, religious persecution. Out of a stiff-necked and sometimes superstitious tribe at the eastern end of Mare Nostrum (Our Sea) came a way of thinking strikingly un-Roman, and un-Greek, too. These were the people of The Book, the Bible. Intuitively, these people were convinced that there was one all-powerful God who made the universe, and who had made of the Jews a Chosen People, and had given them a particular destiny.

Israel

The thought and belief of Israel came to play a role in the culture of the West disproportionate to their political importance. It was at best a second rate power at the eastern end of the Mediterranean, with a spotty political history. It never developed empire, and several times was subjugated. In 70 AD, its capital, Jerusalem, was destroyed by the Romans, sending Israel into relative obscurity until its rebirth in modern times. The Jews, however, were remarkable for their tenacity as a people, and their refusal to be abandon their tribal identity, in spite of facing oppression and persecution, against all odds. They were never truly homogeneous as a nation, being held together more by ideas and a sense of common history than by racial identity.

The Jews were preeminently people of the Book – the Bible – their tribal writings, which spread a wide literary spectrum from mythologies about the origin of the world itself, as well as of their own origin, extending into pure poetry, wisdom aphorisms and historical accounts. As far as writing goes, the Bible was old – its oldest portions dating not that much after the invention of the alphabet in which the Bible itself was written.

The Bible, of immense importance in the thought tradition of the race, was composed in the shadow of Mundus Mendax. Looked at in one way, it is perfectly correct to ask, “what would you expect, before history became objective and scientific method had been developed?” Of course. But you should recognize, too, the specific skews that the writings contain no least hint of the actual descent of the race, nor of the physical complexity of the phenomena being reported. That was extremely important relative to the effect of the Bible on the history of thought.

Overarchingly, the predominant content themes of the biblical writings were that man had been individually created into the world, that there was one spiritual God, who was responsible for creation itself, and that the Jews were a chosen people, favored by that same God, and destined for a particular role among the nations of the earth. These ideas, powerful in themselves and very specific in content, were not reasoned to as conclusions based on evidence, but held as a matter of self-evident conviction.

The Jews contributed to civilization the idea of monotheism, and also the conviction that the one and only God was actively involved in his world.

Not incidentally, the message of one young Jewish rabbi, Jesus, was taken up after his martyrdom by the Romans as the foundation for one of the world's greatest and most influential religions.

Augustine,

Augustine (354 – 430) focused the cultural streams of classical culture perhaps more than any other single person, although he was but one of legions of men and women whose life occurred during the waning years of the Roman Empire, after Christianity had already become the empire's official religion. As a young man, Augustine was trained in the grammar and dialectic of the schools of Rome's tradition. He sowed his measure of wild oats, as doubtless did many of his peers.

Augustine's mother, Monica, wasn't overjoyed at her son's life. Monica was a Christian, and her son was treading anything but Christian paths. When Augustine was about 30 years old, he fell under the influence of Ambrose, at that time bishop of Milan. He converted to Christianity, and for the remainder of a long life, he lamented what he saw as the profligacy of his youth, but, much more important for his fellow man, he devoted his very considerable energies to furthering the Christian cause, by serving as bishop to the North African city of Hippo, and studying and writing prolifically in exposition and defense of the Christian faith.

Though certainly not alone, Augustine did as much as anyone to enunciate the Christian position. He would in later times be recognized as the principal theologian of his age. He set the intellectual tone as well as the content of Christian theology for the Middle Ages, and continues to be a force in the church into current time.

Civitas Dei

Civitas means more than just "city." It means city, citizenship and polity. As a citizen of the Roman Empire, *civitas* for Augustine meant membership in the dominant civil organization. Rome, for an educated person of his age, *was* the body and philosophy of civil organization. Against this powerful entity, Augustine opposed what he thought in God's good time had supplanted it: *Civitas Dei*, the City of God, or, perhaps more powerfully, the Kingdom of God. *Civitas Dei*, then, was perhaps Augustine's principle politico-theological treatise.

Constantine, in the Edict of Milan, 313 AD, while not making Christianity the formal state religion, did grant it freedom, and equality with the other Roman religions. In *Civitas Dei*, Augustine argued that God's kingdom, a spiritual entity, superseded the political entity, and had a power and a status beyond that of any earthly structure or organization.

Pursuing the golden thread, what is evident in Augustine's thinking is that the Bible is accepted as a primary criterion for truth. This is not based on a particular rational argument, though it is not irrational. Trying to tease apart the reason for thinking this way, it seems that the order in the universe suggests there is an infinite God as the cause of things. It is accepted that God revealed himself in a particular way to the Jewish people, in history. And, that within the Jewish destiny, Jesus Christ was born, who was in fact the Son of God. The account of creation, and of our first parents, Adam and Eve, is

accepted as part of the revelation, and therefore true. Within that frame, the life, death and resurrection of Jesus are accepted as the mechanics for the redemption of man. The body of humans, then, falling under the system of revelation and redemption, is seen as being the City of God, the new restructuring of things. Noteworthy in the system is that this new spiritual polity is not exactly the structured Christian church, but something more basic than that, the redeemed family of man. In the providence of God, the temporal polity of the Roman empire came into existence, so that man could have a sense of order and organization. In the shadow of Rome, the kingdom of God arises, to go beyond the physical needs of man and to provide for his ultimate welfare and destiny. This formulation is important primarily because it becomes the intellectual foundational structure of developing Christianity. It goes beyond stating something about the personality of Jesus; it defines significance and content for the universe itself. There are two parts to Augustine's system: the first is an unelaborated metaphysical system about the reality of a creating, all-powerful spirit in the universe; the second is an acceptance of a system of stated fact, centering on the direct creation of Adam and Eve, their fall from grace, and the mechanics of human salvation in the saving life, death and resurrection of Jesus.

Feudal Europe

Following the decay of the Roman Empire, which never really ceased to exercise its political and ideational influence, Europe slipped into political disorganization and local rule. Rome had developed wonderful systems of communications to meet the needs of government and of commerce. The empire had been linked by well-built roads and network of highly developed sea routes throughout Mediterranean lands. By no means were the Romans a gentle people, but they were marvelous at organization and construction.

The institutions of the Empire, however, fell prey to incursions by Germanic tribes, and Rome's grandeur was to lose much of its luster. Its bureaucracy became diluted yet enlivened by the peoples who first overcame it, but then adopted – and adapted - many of its institutions.

Boethius was a Roman patrician and scholar during the period after the sack of Rome in 476. He was widely read in Greek and Roman literature, and himself wrote extensively, but he was an exception, and scholarship and intellectual pursuits generally withered. As did Rome's buildings, so did much of the machinery of her culture slip into decay and ruin.

Charlemagne strove to educate his people after his crowning in 800 as Holy Roman Empire, although he was himself largely illiterate. He brought Alcuin, an English monk and scholar to Aachen to head the palace school.

But throughout Europe during the five centuries after Rome's decline, there was little original thinking, and, at best, individuals or groups here and there showed some level of holding onto previous glories. It was not an age of academic, or scientific achievement. Local strongmen or nobles held onto as much land and population as they could. Society's structure was the will of local lords or barons, and systems of established law or well-organized courts were largely lacking. As roads and communications broke down, the systems of Roman bureaucracy in many places were but distant memories.

Productivity was mostly agricultural, and organization tended to center on farming and its supporting trades.

High Middle Ages

The years between 500 and 1000 CE, then, in Europe saw a relative decline of culture, a sort of interim period, between the grandeur of the Roman Empire and the emergence of medieval Europe. The political vision of the Roman Empire continued to hang in the background as an ideal of law and governance. But the efficacy of a centralized government went into a period of decay as more local tribes under local rulers and chieftains exerted power opportunistically on a more localized basis.

It was certainly not a time lacking in vigor and adventure, but the patterns of society which had existed for hundreds of years under Roman rule generally faded, with the mental and cultural energies of the people going into hibernation while waiting to see in what form artistic and intellectual creativity and energy would emerge. The product proved to be unbelievable rich and colorful, though it carried within it the seeds of its own undoing, to large extent, and what more than a little pain, struggle and bloodshed. Although Augustine's *Civitas Dei* was not consciously utilized as a direct blueprint for cultural development, it is nonetheless remarkable how profoundly and extensively its spiritual structure came to permeate Europe's mind and actions.

The basis of culture was military, but raw power was balanced by a vigorous spirituality. Within a few generations of Augustine's death, there was born in Italy a son of a noble family whose life and achievements was to have a profound influence on his culture. After finishing the studies suited for a young nobleman, Benedict of Nursia (480-543) left Rome for Monte Casino, where with others of like mind he put together the plan for Christian monasticism, which came to be a major structural element in European society and culture. This was definitely a novelty. Nothing like it had been seen in the hillsides of Greece or along Rome's highways.

The hanging strings of the classicism of Greece and Rome were tied together and woven into a new fabric, with the idealism and other-worldliness of Augustine's City of God as strong structuring elements. A new sort of society was structured, which brewed together several disparate elements into a heady mix.

The peoples who picked up Rome's traditions were first and foremost warlike Celtic and Germanic tribes who enjoyed nothing quite so much cracking a pate with an iron mace. Vigorous yes, fastidious no. Take some of this, some of that, and mix together to achieve the fractious stew of medieval Europe.

On the one hand, the barbarous lusts and customs of warlike tribes and their leaders. On the other, the impossibly spiritual, otherworldly, and idealistic Christian mythology, in a mindset that nonetheless had little appreciation of mankind's actual origins.

Little wonder what emerged would have limited durability, timewise – yet we live daily with the results and the elements of its creativity. We're a long way from Lascaux.

Monasticism

Lords and nobles had a lot to atone for, and, at the same time, important needs for handling personnel problems and land distribution. From the time of Benedict in the 6th century, when he left the city with a band of young idealists to set up physical as well as spiritual housekeeping at Monte Casino, to waves of untidy laicism throughout Europe

when the monasteries were attacked and frequently dismantled, these institutions became important elements in the medieval potpourri. During the centuries leading to the Protestant Reformation, the monasteries owned a significant proportion of European real estate. Perhaps a third or a fourth of European land was controlled by powerful abbots or ecclesiastical princes. The monasteries were marvelous places of refuge or exile. What better than to have a super-respectable place to send a fractious son or daughter to praise God and do penance for the family. “Hie thee to a monastery” was for some not an idle suggestion.

For centuries, to the extent that there was active scholarship in Europe, it thrived mostly within monastic precincts. Until cultural forces conflated to produce the Universities from the 12th century onward, literacy and cultivation of the written word were fostered mostly by monks, and to a significant but somewhat lesser extent by nuns.

Most of the ancient texts we have were preserved for us in monastic libraries and scriptoria. Not entirely so, for some manuscripts we have come to us through Constantinople and the muslim world. Some manuscripts have survived intact from the distant past by sheer good luck, as the early Christian writings at Nag Hamadi, but the body of classical literature, Greek and Roman, was preserved mostly in the monasteries. In France, some of the country’s greatest architectural treasures are preserved in the monastic buildings, although during reactionary times, such as the Revolution, many buildings were submitted to wholesale desecration and destruction. Even today, as we slide down the years of the 21st century, there is a sometimes loving, sometimes disdainful relationship in France, the “Eldest Daughter of the Church,” between her profound ecclesiastical traditions and her avowed laicism. Many of these tensions remain unresolved.

To the revolutionary mantra of “Liberte, Fraternite, Egalite” has been added a fourth, “Laicite.” That’s where it stands today.

Crusades

For two centuries, between 1095 and 1291, the nations and aristocracy of Europe engaged in a series of a dozen or thereabouts major military expeditions against the Muslims in the mid-East. These are some of the most complex and contradictory ventures that men ever became involved in, although we seem to be repeating part of the stupidity today. Man’s learning curve seems to be steep.

The overt and publicly sanctioned reasons for activating the tremendous energy demanded by the crusades were making it safe for Western pilgrims to journey to the Holy Land, and rescuing from the infidels the places which had been privileged to support the life events of Jesus Christ during his relatively short time on earth.

Although there were many failures and disasters connected with the crusades, the Latin Kingdom of Jerusalem did exist in one form or another for almost two centuries.

Perhaps it was odd that so much cruelty and so much havoc was set loose just to assure access to the localities where the Prince of Peace lived his years on the planet. But it didn’t seem strange either to the popes of the time or to such a man of prayer and mysticism as Saint Bernard of Clairvaux, who in his preaching strongly supported the second crusade. Battlefields sometimes ran deep in blood; populations at times were ruthlessly put to the sword.

A high level of dedication and idealism were mixed with supreme venality, greed and political scheming. More than once on the way to the crusades, armies under the cross stopped in European cities to slay populations of Jews. Now let's see, wasn't the Prince of Peace himself a Jew?

The crusades did open the European mind to other cultures, other skills, other patterns of trade, and, intellectually, to an extent, to the scholarly and spiritual culture of medieval Islam.

But, if we have difficulty comprehending the crusades and their many internal contradictions, it is, nonetheless, us.

Castles and Cathedrals

Do you know that “boulevard” and “bulwark” are the same word? That little bit of trivia can be used as shorthand for a significant elements in European history. The average European tourist has trouble realizing the extent to which the Europeans covered their land with quarried rock from the Dark Ages to the industrial revolution.

There were approximately three centuries – from about 1600 to 1900 – when many European cities and countries tried to modernize the landscape, and, moving in that direction, tore down many of their public buildings and fortifications. This was spotty in its expression, and by no means expressed everywhere the same. But, many European cities dismantled their city walls, since their defensive value became less significant with the development of explosive arms. Walls typically surrounded the inner city, and took up a significant amount of space. When they were gone, they left behind them broad expanses of open ground which ran around the city center. Aha! Marvelous places to build wide, commodious roads which would facilitate transport and communication, and make for pleasant strolls on Sunday afternoon. Behold boulevards!

Medieval and renaissance architects did not have structural steel available to them. They were limited to stone, wood, and a bit of lead sheathing to use in construction. Indeed, a small proportion of the buildings, city walls, and monastic precincts have survived from medieval times into the present – perhaps 5 percent, or even less – so that it is difficult for denizens of the 21st century to realize just how much masonry our medieval ancestors actually threw up in Europe. There were periods of time when for political or practical reasons communities worked hard at destroying as much as they could of what had been constructed during the middle age. Gratefully, now that we're past those aspects of cultural development, most Europeans have come to realize what a magnificent heritage they have in their relics of medieval times, and Europe, on the whole, is an interesting and artistically marvelous place to visit – if you don't happen already to be living there.

Universities

Early schools typically centered in monasteries or in the precincts of cathedral churches. Over time, in the different European countries, individual institutions had become well enough developed that they were independently recognized as universities: Bologna, 1088; Paris, 1150; Oxford, 1167; Salamanca, 1218; Toulouse, 1229. And those are but a few. Between the 11th and the 15th century, there were at least fifty universities founded throughout Europe. Many of these were founded by important bishops or popes. Some were founded by secular princes. But at the same time, from early on, there was a constant resistance by the universities to ecclesiastical authority. The ordinary

administrative structure of universities was self-governance, and in many instances this was held to quite dearly.

While the modern principle of academic freedom was nowhere near as specifically developed as it later became, it was also true that the universities many times displayed a fierce independence. And, although theology was accepted as the Queen of Sciences, it was at the universities that independent disciplines were fostered, including mathematics, medicine, law, and astronomy. It was out of the background of university society, not the ecclesiastic hierarchy, that the mentality of the great intellectual reformers and adventurers of the Renaissance would come, including thinkers like Copernicus, Kepler, Galileo and even Newton.

Christendom

Not everything thought and taught during the Middle Ages was untrue or intellectually destructive.

It was critically important that during the middle centuries our ancestors developed the machinery of scholarship and respect for learning. It was a military society, and the gentler pursuits of philosophy, poetry, astronomy and theology found their refuge within a framework of men-at-arms, war chargers, vast fortifications and a bloody battle now and then. But, in this complex environment, we founded the universities, gave honor to scholars, preserved the culture of long-gone classical times, preserved and developed codices of law, and slowly pushed forward mathematics and astronomy. These were far from being intellectually barren times.

But, for the reasons we have discussed, there were some pervasive skews in the mentality of the Middle Ages which resulted in some major distortions coexisting with marked progress and intellectual creativity.

Going into the Middle Ages, then, mankind was still operating under the force of the world's "dishonesty." The struggle towards the truth has been more arduous and indirect than it seems to have needed to be, seen in retrospect. But, coming out of classical times, man still had no real concept of his own antiquity or his own complexity. He was, therefore, programmed to live with certain misconceptions about himself and his place in the universe. But, man does what man must, and he forged ahead with the knowledge he had. History has been a repeating pattern of making fresh starts from where we were, not from where ideally it might have been good to have been.

Crook and Crosier

The place of the Church in medieval society – and, for our interests, in the intellectual and spiritual matrix of the age – was complex. Entering the service of the church was seen as a way to pursue truth and salvation. God was definitely at the head of the values hierarchy, and becoming a monk, a nun, a priest, or a member of ecclesiastical administration was seen as the highest of vocations. A personally holy man, gifted with natural qualities of character and personality, like Bernard of Clairvaux, was held in highest esteem, and in many ways supported and furthered the goals of civilization and humanizing a militaristic and avowedly power-driven culture. Saint Bernard doubtless made as strong a contribution as did any individual to the strength and creativity of the middle ages.

It is an unfortunate aspect of human society that even the most highly motivated forms of power become entrenched, and tend to preserve themselves not because of the purity of their origins, but because of the very structure they have created. Power intoxicates. The medieval church became an international force, unifying across all boundaries, and possessing great material wealth and power. The papacy was responsible for founding and supporting many of the great educational and scholarly institutions of the times. Frequently church authorities played crucial roles in calling to heel some of the excesses of an obstreperous nobility.

The medieval church was a stabilizing and civilizing force in medieval society. It would be impossible to imagine those centuries without it. The downside was that when during Renaissance times the juices of discovery and curiosity about cosmic realities began to churn – which, note, had themselves been fostered and encouraged by the church - the church, on balance, did not see clearly how to “go with the flow.”

Too, the medieval Christian church suffered from all the foibles and weaknesses of any human organization. To get it right, we need to see both sides: the huge contribution to civilization and cultural development, but, as well, the inhumanity and intolerance. It's where we once were.

The Coronation of the Virgin

In Avignon, in southern France, which during the 14th century was the home of the Catholic popes during their “exile” from Rome, stands a somewhat lesser, though still imposing, building, the Petit Palais, the official dwelling of the archbishop of Avignon. Among many of this building's treasures is a marvelous mural picture painted by Enguerrand Quarton which beautifully illustrates the medieval view of the world.

In this painting, the Virgin is seated on a throne in paradise between identical likenesses of God the Father and God the Son, who are placing a jeweled crown on her head, while a white dove, symbolizing the Holy Spirit, hovers over her. Nobles and churchmen are ranged on either side, while below, in miniature, is a panorama of the earth, with the crucified Christ symbolically rejoining God and man, while the men and women are pictured in various stages of struggle and achievement. That may sound a bit crowded, but the composition is uniquely successful and marvelously expressive. Perspective and composition are utilized to marvelous effect. Don't leave Avignon without seeing this. In this artistic masterpiece is portrayed this artist's vision of the Christian universe, which was, in fact, painted in response to a very detailed, yet free, contract which had been drawn up for the painter to fulfill.

Although Europe was frequently torn by religious and political strife, and this painting was created within a few generations of Martin Luther's pinning his theses to the church door at Wittenburg, signaling the Reformation, nonetheless, this artistic creation still expressed in great beauty and detail the way that archetypal thinking about Christianity pervaded the European consciousness. That, in brief, was the way things really were, as adhered to by prelate and people alike.

Medieval Metaphysics

When Notre Dame was a-building on the Ile de la Cite in Paris, a Dominican friar studied and taught at the Sorbonne, the heart of the University of Paris, which at that time was already a century old. The Sorbonne was several hefty stone's throws distant from Notre

Dame, across the Seine, on the left bank of the river, in what since the middle ages has been referred to as the Latin Quarter, in deference to the language once spoken there by students and masters.

The friar mentioned above, of course, was Thomas Aquinas, one of the most prodigious scholars of all time.

I am going to develop here what seems to me to be a core issue in Thomistic – and therefore medieval – thinking, not as a matter of historical curiosity, but because I believe it to be critical to the development of human consciousness, and of continuing import to the understanding of knowledge itself and of our cosmos.

There occurred a major shifting of intellectual gears in Western thought at the time of the Renaissance, and out of that huge movement has flowed the entire development of our empirical understanding of the universe, which has been remarkable indeed. However, as we learned to talk and think about the marvel of physics and physiology, we lost our ability to think clearly about metaphysics. And that was something Thomas knew how to do, quite well.

Being and Contingency

All real things exist. They are. We know very well what we mean when we ask whether something is real or not. Metaphysics is the science (knowledge – not to be confused with empirical science) of focusing on existence and its implications. In passing, we should note that some use with word with a different meaning – to refer to the mystical, the mysterious or the occult. That definitely is a horse of another color, and not to be confused with the intellectual understanding of being.

Existing basically is an act – not the specific act of an already constituted thing, such as an animal, or, for that matter, a physical element, but the basic act by which anything is real. The point is that anything real is doing something just by existing, and that most basic of acts needs to be understood in itself.

Any existing of which we are aware is a limited, specific way of being, whether it be an atom, a meson, a puppy dog, or even, I suppose, a cosmological string, just whatever that might be. However, we cannot find in any of the real existing things which we know a necessity for its existence. It either could or could not exist. Or, looked at another way, there could be either more or fewer of them. If one puppy dog is possible, two would be, or, for that matter, none. Particular existences, therefore, do not exist of themselves, and yet they exist.

Whatever is real must have an adequate cause. Note that this is an insight into reality, and not merely a matter of what is contained in the definition of words. It is not possible to conclude anything just from what words mean, for the meaning of words is extremely flexible.

Since the world we experience is real, there must be some instance or mode of being which is real in itself, that is, which is intrinsically necessary. If there is contingent existence, there must be non-contingent, or necessary existence.

Self-subsisting reality is necessary, and in fact, the basic reality in the universe. That is the core and essence of metaphysical insight.

God

This argumentation results in the conclusion that there must be self-subsisting existence in the universe, which, in fact, is what makes the visible universe real.

Note that we do not experience this existence in itself. What we experience are the existing things around us – and those modes of reality the existence of which turn out to underlie the macro entities we experience on the level of our perceptions. But we find metaphysically that self-subsisting existence is demanded.

Now – since that's the way the universe has to be – what Thomas did was to step outside of metaphysical speculation and into history. He said that all men in some sense have believed in a creative force in the world, and, having concluded that the ultimate reality is self-existing being, he pointed out that when humans have talked about god, this is what they were really referencing, whether they realized it or not.

So, that's what God is.

This is not necessarily the God of the Hebrews, the God of the Bible or the New Testament. It is a mode of being demanded by the visible universe.

Plato didn't dig deeply enough. The Ideas, the forms which made things be a particular way, still didn't entail their own existence. Aristotle's prime mover was still in the world of physical change – and that's not deep enough, either.

So, here's where we end up.

The god of rational understanding is self-subsisting Being.

The God of religious belief is this same being as operating in history and in human experience. Reason can't say whether that is right or wrong. However, historical Christianity makes that judgment.

Cosmos

The point is that from the emergence of Western man from 500,000 years onward until the year 1500 CE he developed a markedly homogeneous way of interpreting the world and experience – under the influence of two deceptive cultural streams: 1) he had not carried with him an active memory of the experience, and 2) he had little active realization of the complexity of the systems it took to support his functioning.

By the year 1500 AD, the world had come a long way from the Trojan War, much less from the cave painters of Lascaux.

The Crusades – circa 1200 – had whetted man's appetite for adventure and new discoveries. He was eager for new things. He was ready to question and push against the sides of the world as he knew it.

However, he had, right or wrong, developed a mind-set about his world and his universe. His ideas about the parameters of the game were not by any means neutral or unformed.

The summary world view of man in 1500 is what I refer to as Cosmos I – our first really formulated view of the universe.

It was generally believed that the earth was the center of the universe – as it seemed to be in ordinary experience. We seem to be “here,” and the rest of reality, represented by the sun, the moon and the stars seem to be “up there,” above us in the heavens. The heavenly bodies were thought to be carried around us fixed to concentric crystalline spheres.

The earth was thought to be of relatively recent creation, and probably to have come into existence pretty much as it seems to be, with mountains, lakes, valleys and plains. But

“recent,” I mean several thousand years, as opposed to the thousands of millions of years we now know to be the actual age of the earth.

It was generally believed that the Bible was the inspired word of God, and therefore a credible source of truth.

Importance

It is important to try to breathe life into the bones of history not so much for history in itself, but because we are the legatees of what has gone before. We can't understand ourselves without understanding our forebears.

The bones of the past are interesting to rummage through, like going through things in the family attic. Well and good. I hope there is a certain amount of historical interest in turning over these ideas. However, that is not our primary concern here.

Our quarry continues to be to understand ourselves and our universe. Beyond whatever historical interest there may be in considering the ideas of Boethius, Saint Bonaventure, or, for that matter, any other historical figure, the constructs of Cosmos I are important because of their continuing formative influence on our world today.

Ideas compete.

On the one hand, looking at some evidence, it may seem as though our society has gone completely materialistic and that we are drowning in gadgets, overstimulating entertainment and sex. At the same time, other evidence suggests that fundamentalist religion is enjoying an unparalleled resurgence, and that a blind faith in Biblical prediction is overwhelming important areas of public thinking and political practice.

The choice between rank materialism and a pervasive fundamentalism is not a very good one, but to an extent that is what we are presented with. Truth lies somewhere else, but we are in pursuit of it.

We are hurtling ahead through our future history at breakneck speed, and our convictions about things are important determinants of our decisions and the world we continue to craft.

The views of Cosmos I are important because of the influence they continue to exert on our thinking.

Elements of Cosmos I

The vision of Cosmos I did not simply fall off the tree, like a ripe apple. It had been worked on by men and women of first rate intelligence for hundreds of years.

Not that it had been without controversy; there had been plenty of that. But there had also been legions of adherents and enthusiastic scholars who had labored hard and long to support and expand the ideas and theories supporting the view.

The world view of Cosmos I was a very powerful set of theories and convictions, most of which were very dearly held by the theorists who developed them.

Cosmos I was full of answers, many of them very convincing in context, and in some respects very consoling.

It was strongly humanistic and value laden.

It found order, intelligence and purpose in the universe and in human life.

Summarizing, some of the major tenets of the mindset of Cosmos I are (as seen through the vision of European thinking):

- The physical world is finite in size – of unknown dimensions but generally comprehensible in terms of our daily experience.
- The Earth is at the center of the Cosmos, both physically, and also in terms of function and purpose.
- The Cosmos had existed for about 6000 years, and was created directly by God, pretty much the way it appeared in current time.
- The world had been created by an all-powerful God, to be the home of man.
- Man defiled original creation by disobeying God, and was thrown from Paradise for the Crime.
- God sent his Son, Jesus, to redeem the race, and reestablish man's relationship with his creator.
- Jesus died at the hands of the Romans, but physically rose again on the third day.
- The spiritual kingdom – the City of God – supplanted the Roman Empire, which was corrupt and imperfect.
- The physical universe could be understood by metaphysical principles, particularly as developed by Aristotle.
- Things would be allowed to run their course, until God decided to bring the current dispensation to an end.
- God would establish a New World, his everlasting Kingdom, in which all the redeemed would eternally share.

IV. Pollywogs to Spaceships

Rocks and Other Ancient Objects

It is only recently that we humans have had any realistic understanding of the age of things in the cosmos. As recently as the 17th century, estimations of the age of the world were made on the basis of relationships found in holy scripture and other documents. Bishop James Ussher (1581-1656), an eminent Irish scholar and vice-chancellor of Trinity College in Dublin, on the basis of a scholarly reading of the Bible, calculated the creation of the world to have occurred in 4004 BC. And that, or thereabouts, was generally believed to be the age of the earth throughout the 18th and in fact well into the 19th century.

It was only then that it was gradually realized that our common sense ideas of age and of time were woefully inadequate. The restrictions of *Mundus Mendax* had created a sort of mental straight-jacket from which we needed to find a way to extricate ourselves.

It is only within the last 150 years +/- that we have been developing any realistic sense of the age of the earth – and the backdrop for this is the fact that man, from the beginning, had not carried with him an historical memory of his own occurring development.

Clearly, this doesn't mean that everything man learned or new during these years was wrong or false. Man's achievements during the centuries had been significant, indeed amazing. What this does mean is that to the extent that his attitudes were affected by a sense of a young earth, there were limitations. But, progress is characterized by struggling against limitations. And one of the major faulty perspectives we have had to overcome is that of thinking that we – and Earth, our home – had been around only for a modest period of time.

Time Lines

Our home planet, Earth, has been circling the sun for 4,000,000,000 years – plus. That is an incomprehensibly long period of time, and it is only within the past 50 years that human society has become generally aware of that immense number. One thousand – times a thousand – times a thousand – times four. In our personal lives we are used to thinking in terms of years, or, as we go into adult life, of decades – 10's of years. In history class, we learn to think in terms of centuries: one century since the invention of the automobile, two centuries since the founding of our country – twenty centuries since the birth of Christ in ancient Judaea. But then – two million times that. How can we relate that to any sense of personal time? We really can't. We can only play with the numbers in our heads. But that's the scale we need to think on if we want to understand our planet's life history – and that, it proves, is our own family history, so we have reason to grapple with the ideas.

The earth was formed over eons from matter circling our sun in orbit between Venus and Mars. As Earth agglomerated, its gravity sucked in enough of the loose stardust in the neighborhood to form a planet, and the newly formed body began to set up housekeeping. It took half a billion years – or so – for the earth to cool to the place where life became a possibility. Life began slowly. It took a billion or so years for the first bacteria to form, followed by seemingly uneventful long millions of years for the first multi-cellular animals to figure out how to survive in a supporting but sometimes hostile environment. The tempo of life has gradually sped up. All the complicated life forms we would

recognize as plants and animals came into existence within the last 500, 000,000 years (half a billion, 10% roughly, of our planet's age).

Self-Organization

The reason it took so long for life to get started is that life is an immensely complex – although immensely clever – process, without which, it goes without saying, we wouldn't be around to worry about these things.

An individual living cell is typically tiny. A red blood cell, of which millions and millions course around in our bloodstream, carrying oxygen to all parts of our bodies, is about six microns across – meaning that we could line up about 5,000 of them across our thumbnail, assuming we had a really small tweezers, incredibly good eyesight, and a quite firm hand. But a typical cell in our body is an immensely complex chemical factory, with a complicated internal structure and an even more complicated set of biochemical operations. And we are made up of trillions of individual cells, structured into the organs and tissues that go to make up our bodies.

It took a great deal of trial and error, first, and then internal communication, for Mother Nature to figure out how to put together atoms and molecules so that they could function as self-duplicating units of really unbelievable complexity, but once living beings got the hang of it, the great adventure accelerated rapidly, and life on the planet exploded into all manner of living forms.

It is only quite recently, as civilization goes, that we have come to realize what we might want to refer to as the organicity of organicity. It is now quite clear that the grand symphony of life didn't "just happen," nor was created the way it is by God Almighty. That's not the story of what happened on our planet, either way. The question of God is one that we'll have to handle down the road, but that has to be saved for another chapter. Suffice it to say at this point that, although reality in some ways seems to be fairly crazy, for life to occur, it also requires immensely complicated patterns of organization.

We can't come to understand our universe all at once. It's a complicated place, and things have to be addressed in some sort of order. Right here and now, what interests us is the realization that life has formed itself over time, in a certain way, with a set of internal construction processes, and our realization of this is recent enough to be identified as brand new.

Since the eighteenth century of the common era, we have had glimpses of evolution. In the 19th century, Charles Darwin, the English naturalist, posited some bold structuring theories about biological evolution, and we have been embroidering on his speculation ever since.

Natural Selection and Other Bedtime Stories

Charles Darwin had a most fascinating life. He was an indefatigable worker, a close observer, a prolific writer, and a man of immense curiosity. Not a bad combination, if you are interested in productivity.

As a result of his pondering things he ran into as a young man while serving on his majesty's ship *Beagle*, he developed a strong conviction that species were not stable entities, but rather developed over time by a process of slow adaptation.

He formulated his ideas concerning biological change – and therefore evolution – into his theory of *natural selection*. Darwinian theory of evolution states, first, that in any

species, there is a certain incidence of variation that occurs among individuals, and that, second, those variations associated with greater reproductive success tend to be preserved in a species.

Natural Selection was a bold hypothesis because of its broad applicability, and it made a great deal of sense. Those variations which support more successful reproduction tend to determine what animals in a species come to change into. Of course, once you think of it! Brilliant!

Immediately, the implications of the Darwinian insight became evident, and generated a great deal of interest and revision of well entrenched ideas. Evolution through natural selection is still, a century and a half later, at the center of biological speculation and research. One fact, however, which should be realized up front is that it is not at all settled that the unique mechanism of evolutionary change is natural selection.

Evolution – the Fact

For most thoughtful people, there is little doubt but what the universe has been a developmental phenomenon, and that, once life appeared, it has been evolutionary. However, there has been, and continues to be, much ambiguity about what that means, and how it has worked. The mechanisms of evolution are immensely complex, and, in spite of Darwin, only partially understood.

Is evolution a matter of blind chance? Is there a place left for God in the universe? Does Darwin say it all? What are the internal operations of the evolutionary process?

Darwin stood at a very important place in the history of biological understanding and science. His thinking jolted society in a way that society seriously needed. And he opened the door to new avenues of biological insight and research. But to what extent was he correct? To what extent does natural selection explain evolutionary process?

There are many who are convinced that Darwin hit the nail on the head, and that natural selection is all that is needed to explain evolutionary process.

That, however, is very far from the truth of it. Darwinian evolution seems to work, all right. But, having said that, one is only part of the way there.

Dinosaurs

The first four-legged animal struggled out of the waters of the sea 350 million years ago. This is short-hand for saying that land forms descended from fish over long millions of years. Although we do not here attempt a detailed exposition of early evolutionary stages, we should forge ahead with some realization of the length and complexity of the story. It took a very long time and the operation of very complex processes to get even close to our own immediate ancestry.

Evolution is not a solitary phenomenon relying on one mechanism for it to occur. Different processes have been operative at different phases in the immensely complex matrix of life development and change on planet Earth.

The dinosaurs interest us because of their diversity and the great extravagance of their imaginativeness. Who can fail to wonder at the magnificence of *Tyrannosaurus Rex* or the weird dominance of the skies by pterodactyls? Dinosaurs were a widely diverse and highly successful family of animals which lived from 200,000,000 years ago until 65,000,000 years ago, when they suddenly disappeared from the planet.

The current thinking is that the most probable proximate cause for their demise was a huge meteor which struck the earth in the Gulf of Mexico, off the Yucatan peninsula, filling the atmosphere with clouds of dust and debris and changing the climate of the entire earth profoundly. The most recent thinking seems to be that our friends the birds, living animals we so highly prize, are actually the descendants of the dinosaurs – remnants of the massive dinosaur extinction.

How did the birds survive? It seems certain that their ancestors were alive at the time of the great cataclysm. We have fossil examples of forms which seem to be intermediate between land-bound dinosaurs and true birds, such as Archaeopteryx, but do we know the whole story? If they were around at the time of the great extinction, did their power of flight allow them to move to nesting places above clouds of noxious gases which settled into the valleys? We can only imagine. But the overall fact seems well established, that birds are directly descended from dinosaur antecedents.

Mammals

Our own ancestors seem also to have escaped the dinosaur extinction. The first mammals were probably small creatures sharing the last epoch of the dinosaurs, possibly running around, literally or figuratively, under the feet of dinosaurs in primeval forests. There was a little critter named Purgatorius alive around 65 millions of years ago, the time of the great dinosaur extinction. Purgatorius was rather rat-like in size and appearance.

The primates are a very ancient order of mammals going back millions of years. Exactly which extinct animals to include as primates is a difficult matter of classification, and is a concern which need not detain us here. Current day primates include monkeys, apes, lemurs – and, of interest to us, ourselves.

Perhaps our feelings are a bit tinged by self-interest, but the primates were of importance because above all it was from these animals that reflective intelligence would one day evolve.

Proconsul was a primate which lived around 25 million years ago. He was rather ape-like in general appearance, though more primitive. True apes date from about 12 million years ago. And, our direct ancestors split off from the apes about 6 million years ago. Some would have it that about that time a soul was infused into animals by the creator, even if the body did evolve. If by that is meant a distinct event, it seems unlikely and a misreading of the evidence. If the language is allegorical for a series of truly unique and wonderful events, I have no difficulty with it.

It seems highly probable that our spirit, our reflective intelligence, emerged as a very natural dimension of the evolutionary process. If that is so, there remain two problems of primary importance: 1) what would be the process by which that might have occurred (hint: it took a more wonderful and unique process than natural selection to explain it), and 2) would such a theory establish God's superfluity (hint: that would be nonsense)?

Hominids

Our closest biological relatives still living today are the chimpanzees, members of the family of great apes. It was about 6 million years ago that the hominid family separated from the chimps. We know a great deal by now about the line of hominid descent. Not by any means that our record of fossil remains is complete – far from it. The lines of descent are tantalizingly broken. Nature has destroyed far more than it has preserved.

And, the lines that we can identify do not seem to go together to make an uninterrupted chain. Not all the groups of hominids that we can identify are our direct ancestors. Rather, what we have are representatives of groups that existed parallel to each other. Nonetheless, we have enough remains from the distant past that we can create a good picture of what was going on, roughly, at different times, in the hominid family. Discoveries will continue to be made, so that we can fill in detail more faithfully, but it is more likely that we will come to understand the biological mechanisms of evolution than that we fill in completely the gallery of family portraits on our library wall. Many of the remains we have discovered may well be cousins rather than brothers. Yet, it seems clear that in the larger family of ancestors to homo sapiens (us) changes occurred which were hominid-specific, and shared by the larger group, although clearly not by the chimps and other great apes, which had been left behind in evolution's adventure.

Lucy

One unfortunate afternoon in northeast Africa, millions of years ago, a young adult female hominid fell prey to a fatal accident. Something happened to cause her skeletal remains to be largely preserved. Was she trying to pry a useful stone from an overhanging bank, only to have the bank collapse on her, burying her suddenly? Was she headed back to camp in the midst of a thunderstorm, only to be struck dead by lightning and then buried in a mud-flow? We could never know. What we do know is that something happened which occasioned the preservation and then fossilization of a large percentage of her bones.

We humans are members of a very interesting animal family. We are the star players in life's drama on the planet. Not that our history has been totally positive. Or that the outcome of current experience is guaranteed to be positive. But we are the dominant species, and our history is certainly the most interesting. In fact, we are the only species that can truly be said to have a history. History is not just surviving. It is choices, failures and successes. And it is having sequences of events written down.

Some of our history we can be proud of, some we can't. Nazi Germany was a human achievement. And unless we realize that our kind – we – can be capable of that kind of behavior, there will be some likelihood of repeating achievements of that type. But the Third Reich is part of our history.

But – Lucy.

Lucy's skeleton was found at Hadar in Ethiopia in 1974 by Donald Johanson and Tom Gray, two archeologists who were headed back to camp after a long, hot morning. Her remains comprised a skeleton 40% complete – enough to give an excellent idea of her bodily habitus, general appearance, and developmental stage in our evolutionary history. What marks Lucy above all is that her skeleton was, and is, the most complete surviving skeleton of any individual anywhere near approaching her antiquity.

Lucy stood about 44 inches tall, about the size of a modern 6 or 7 year old girl. If she walked in the room – she was bipedal – it would give us quite a start, for she would be like nothing we had ever seen. Clearly she would not be human, but she would not be ape, either. Her head would be forward-looking, and sitting on top of her spinal column rather than forward to it. She would definitely be quite unlike that 6 or 7 year old girl – but at the same time mildly suggestive of where evolution was headed. She would definitely be our little sister – or at least a distant cousin.

Lucy lived about 3 million years ago. The hominid line split from chimpanzees 6 million years ago, although in the animal kingdom, chimps are our closest living relatives. If we looked down at Lucy, we could be sure that her DNA was 98% like our own, as is true also of chimpanzees, and we would love to know just how it is that that small difference in DNA makes such a large difference in the phenotype of individuals. We don't but we're working on it.

Family

Lucy is family, but there's been a heap of development and living between her and us. The lines of descent are incomplete, but that doesn't mean that there's any question about relatedness. The entire hominid family is genetically very close, and the line of evolution is clearly visible. By now, we have several hundred fossil remains of our distant ancestors, and they make historical patterns that are not haphazard. The story is incomplete but not inconsistent. Simplifying somewhat, fossils can be grouped into about five lines. True, this is crude and might make a trained paleontologist cringe. It can, however, be helpful if you don't read into it more than is intended.

Australopithecus – 3,500,000 to 2,000,000 BCE

Homo Habilis – 2,000,000 to 1,500,000 BCE

Homo Erectus – 1,500,000 to 200,000 BCE

Neanderthals – 300,000 to 40,000 - BCE

Cro-Magnon 100,000 – to this afternoon

Lucy was an australopithecine, a little less than four feet tall, but bipedal, with a brain the size of a small grapefruit. *Homo habilis* lived, as did Lucy, in eastern Africa, somewhat larger than Lucy with a brain perhaps 450 cc in size.

Homo erectus classifies several groups of hominids. *Homo erectus* fanned out of Africa and throughout parts of Europe, across the Indian sub-continent, and into the Far East. *Homo erectus* were five feet or more tall, and, throughout their history, had brains 800 to 1000 + cc in size. *Homo erectus* developed culture, used fire, learned to make stone and other tools, and, in my opinion, as we shall see, by the end of their long history, had developed complicated language.

Note that it is not fully clear whether *homo erectus* was one of our linear ancestors. If he was not, we can be sure that analogous changes were occurring among the animals which were in our ancestral line.

The Neanderthals were in many ways very like modern man, but apparently different enough to constitute a distinct species. Their brains were as large as ours. They spread throughout much of Europe and the Near East, and may finally have gone into extinction at Gibraltar. Some aren't convinced of that, believing that they were absorbed into the family of Modern Man.

The defining skeletons of *Cro-Magnon* were discovered in a cave shelter in Les Eyzies in the Dordogne of southern France, in 1868, while a railroad was being built. What sets *Cro-Magnon* apart is that they are us.

That's our family. I'm sure there will be refinements and enrichments of the story, but there isn't a lot of doubt but what those classifications frame our biological context in the main, and will probably not budge a great deal from the parameters given.

A great deal of evolution occurred between Lucy and Cro-Magnon. Critical evolution, for that's where and when and how we became fully human.

Did God keep creating animals independently of each other which just happened to approach closer and closer to the human model? Among all the unlikely things we know of, that would be the least unlikely. Cross-sectionally, throughout the world as we know it today, nature is a rich and marvelous symphony. Longitudinally, over eons of evolution, nature is no less dynamic and rich.

Realization of Evolution – Darwin

Most of what we know about the descent of man has been discovered since Darwin's time. This is a bit of an historical oddity, but it's the case. Why? There are many complicated reasons, but some critical determinants have been set forth in *Mundus Mendax*.

These issues are still very active in society today. In fact, most of the time, for most people, the position comes down to a struggle between revelation and supposed science. Between, that is, Darwinian natural selection and the story in Genesis. That is a huge over-simplification which does huge violence to the richness and complexity of the phenomenology.

The overview is that the story from Lucy to us is not a sequence of magical happenings. It is a process and a system that makes internal sense, and of which we are developing a more and more satisfactory understanding.

Darwin added a great deal to our understanding, but Darwinism is too simplistic a process to account for the complexity of the actual phenomenology.

If we look at the biological sequence from Lucy to Cro-Magnon, it seems clearer than this light of day that an essential change occurred over this period of time, and that the core of the change was the brain-language complex. The brain went from 350 cc to 1350 cc – and Lucy learned how to talk.

Blind Faith

In an age which prides itself generally on requiring evidence before assent to truth, it is remarkable how blindly a simplistic Darwinism is accepted.

In a recent article in *Time* (October 9th, 2006), there is an interesting article on "How We Became Human." *Time* articles are scarcely the zenith of scientific thinking, but they are often interesting, and often reflect interesting advances and a sort of common-denominator scientific insight. Many interesting facts and observations are included in the article, which I think is worth reading. Here, I have only one thing to address from this article. The authors of the article, in the midst of an interesting discussion about genetic deletions or changes, tip their hand about an unreasoned acceptance of unvarnished Darwinism. They talk about changes that can occur in the genome. But then, "But sometimes, purely by chance, the change gives the new organism some sort of advantage that enables it to produce more offspring, thus perpetuating the change in another generation."

Chance mutations leading to reproductive success.

There is no evidence, anywhere I know of, that would support that this is a valid conclusion, or observation, to make. That to me is not good reporting. It is not good science. It is not even true!

One of the sweeping results that this kind of unthinking reductionism occasions is that it nudges the mind in the direction of not seeing important other dimensions. In this context, it discourages thinking about other perspectives on what objectively is an extremely complex process.

The Development of Language

As is true of many things in life's history on the planet, language did not appear suddenly, over a short period of time.

We humans split from chimpanzees about six million years ago, give or take. That process of course was gradual, but over generations two distinctly different lines became established. And when that happened, the hominid line set itself on a path of continuing progress. Chimps may have advanced somewhat, but it is clear that, comparatively speaking, their advances remained relatively primitive. Today's chimps are assuredly closer, developmentally, to prehistoric chimps than today's hominids – we – are to early hominids.

Chimps are highly social animals. They are able to communicate with each other in several different social areas. Much of their interaction is by movements of the body, shakes of the head, or grimaces of the face. But they communicate also by sounds. Chimpanzee language constitutes an entire area of animal research. To the extent that chimps use different sounds for different meanings, they use “words.” Relatively speaking, chimp language is a great deal less highly developed than language even of young human children. Please note that I am intentionally sidestepping here the question whether chimpanzee “words” are formally symbolic. That certainly could be critically important, but not so in this immediate context.

Although we cannot reconstruct its structure or its content, the likelihood is high that both early chimps and early hominids possessed primitive “language.” My argument here is not that our distant ancestors had anything like developed language. Their brains were much simpler. Their “language” was much simpler. My point, an important one, is that early hominids with very high probability used specific sounds to signify specific things. Lucy was anatomically far advanced from her distant chimpanzee cousins. Arguably, Lucy's language was far advanced from the language of chimps.

The question, to my way of thinking, is not whether early hominids had language, but rather how much language, and at what rate did more complicated language develop? I believe that language and brain developed together, and in mutual dependence on each other.

Growth of Brain, Culture, Language

What happened: the brain of an intelligent, but non-verbal animal advanced rapidly in size, organization and function. Man didn't develop his brain first, and then discover he could use it to support language. The brain-language complex developed together. Use of language contributed as much to the development of the brain as development of the brain contributed to the support of language. The use of language became autocatalytic. The talking brain was a unitary phenomenon, with two different aspects, one structural, the other functional.

Large-brained bipedal animals (humans, that is) have made their home in Europe for much of the last million years. Southern France was apparently a particularly attractive

place to live, hundreds of thousands of years ago, as indeed it is today. The Arago cave in the Tautavel valley is an excellent example. In 1971, the remains of an individual were found. Tautavel Man, as he was christened, stood over five feet tall, used tools, hunted, lived in social units (families) and had a brain about 1100 cc in capacity. He enjoyed life in the South of France about 450,000 years ago, and the country has been inhabited since. The pace of culture has accelerated logarithmically. Earlier steps took longer to make than more recent ones.

There are many educated and highly intelligent people I meet who feel that language was a fairly recent invention. I run into people who express doubt that early Cro-Magnons were able to talk. They lived just 35,000 to 60,000 years ago +/- . This would strangely enough entail that our ancestors first developed the organs and physiology of speech, and afterwards learned to use them for language! That seems to me to smack a little bit of the absurd.

That would mean that here is Tautavel Man (450,000 years ago), running around with his spear in hand, hunting elk and taking the kill home to his family, but not being able to talk about his adventures to his kids. Sorry, but that seems to me to be utter nonsense. There are still a few surviving knots of stone age people surviving in remote places on the earth today. Universally, they have highly complicated languages capable of expressing pretty much whatever comes into their minds. Throughout the long years of Homo Erectus, the hominid brain grew in size to capacities approaching our own, and as the brain grew, so did language.

Not Blind Chance

Darwinian theory would have it that there were chance genetic mutations resulting in phenotypal changes, and that the changes contributing to reproductive success were the ones which were then incorporated into the genome, and went on to survive in the population.

Certainly, changes were incorporated into the genome, and went on to guide the species. What is lacking, entirely, is any evidence to support the idea that such changes came about restrictively as the result of chance variation.

If in fact one wanted to assert definitively that the changes leading to genetic changes in the line of human descent were the result of chance variation, he would assume responsibility for a considerable burden of proof – and there is no such proof. The only basis for believing in chance variation as the source of changes in the species would be, in fact, a global, and non-scientific – in fact non-rational – belief in Darwinian theory as such. And that I do not find satisfactory at all. Blind faith in unvarnished Darwinism isn't any better than any other sort of blind faith.

The problem is this. If we look at the changes that we know – beyond any doubt – to have occurred in pre-human species, generation to generation, over a million years – what we see is that these changes are very complicated, highly specific, and vectored in one direction. They are anything but haphazard. And they are sequential.

To say that these phenomena occur as the result of chance variations seems to me to be positing something extremely unbelievable. It would be like winning the lottery every day. And that's too much to swallow.

Further, if we look at the other prong of pure Darwinism, that those variations carried forward are those which contribute to or are at least consistent with more successful

reproduction, it is not at all clear that language and increased intelligence in any way contributed to greater reproductive success.

We humans rather like ourselves, so it is psychologically understandable that we would believe that those like us would be more successful, but that's not evidence. That's just prejudice. Intelligence as such is not highly related to reproductive success. Mice and rabbits do quite well, thank you! To assert without some sort of biological evidence that the more intelligent of our early ancestors reproduced because of their intelligence in fact simply begs the question.

Rather than seeing chance and selective reproductivity as the “cause” of this process, we need to look for something internal to the phenomenology. The only thing that makes very good sense is that the changes which occurred occurred not by chance, but in response to experience.

This would be, of course, Lamarckian evolution, which certainly raises problems.

Non-Darwinian Darwin

The problem with Lamarckian inheritance is not lack of evidence that it occurs in nature, but that it frequently is difficult to demonstrate how it might occur.

Things are what they are, and the fact that anybody says anything is only an historical fact. That being said, most thinkers, even as they champion a literal interpretation of Darwinian, are rarely aware that - lo and behold! – Darwin himself at times came up markedly non-Darwinian. In one of Darwin's later works, *The Variation of Animals and Plants Under Domestication*, the great naturalist shows a clear and explicit recognition of Lamarckian variation:

“How, again, can we explain the inherited effects of the use or disuse of particular organs? The domesticated duck flies less and walks more than the wild duck, and its limb-bones have become diminished and increased in a corresponding manner in comparison with those of the wild duck. A horse is trained to certain paces, and the colt inherits similar consensual movements. The domesticated rabbit becomes tame from close confinement; the dog, intelligent from associating with man; the retriever is taught to fetch and carry; and these mental endowments and bodily powers are all inherited. Nothing in the whole circuit of physiology is more wonderful. How can the use or disuse of a particular limb or of the brain affect a small aggregate of reproductive cells, seated in a distant part of the body, in such a manner that the being developed from these cells inherits the characters of either one or both parents? Even an imperfect answer to this question would be satisfactory.” (Chapter 28)

Although Charles Darwin is best known for his thinking on natural selection, it is clear from this quotation that one stream in his biological theory was clearly Lamarckian, although he obviously yearned for a possible explanation how nature might accomplish this.

How Consciousness Developed

Consciousness is a brain-experience phenomenon. It occurs only in a living animal. It is not, therefore, a purely abstract or intellectual phenomenon. Human consciousness presupposed and built on the ability of many higher mammals to attach specific sounds to

specific situational stimuli. The hominid strove to expand this capacity: i.e., to add to its repertory of specific sound responses. This put new stresses on peripheral organs and brains alike to increase functional and structural capacity. This brought about modulation of oro-facial structures as well as specific proliferation (in the individual) of brain tissue. Lucy's brain (3.5 million years BCE) was around 350 cc in size. The nearly complete *Homo Habilis* skull found at Olduvai Gorge (1.8 million years BCE) was estimated to have a capacity of 800 cc. Tautavel Man's skull (400,000 years BCE) measured 1100 cc. These animals unquestionably had speech – the question is (and it is impossible to answer that as specifically as we would like) not *whether* but *what kind* of speech, and at what rate of development did it occur. Once started down the road to fluency, the oro-pharyngeal organs continued to modulate, the brain continued to grow and to create its neo-cortical folds, and speech became more and more distinct and broader in its application and expressiveness.

It seems unlikely to the level of impossibility to assume that these changes happened as a result of chance mutation: the direction was constant and the pace – evening out the bumps in a curve for which we do not have an abundance of reference points – was remarkably constant. That this happened as a result of chance mutations would at best be only a theoretical hypothesis – and it is necessary to provide a better one. Better in the sense of requiring a much less daring leap of faith.

The hypothesis here is that 1) the experience of expanding speech itself stimulated the brain to develop, and 2) this development was passed on, somehow, to ensuing generations. Well. That is the transmission of acquired characteristics.

Macro Explanation

There is not much question but that Darwinian evolution works – in some sense. There is also not much question, at least in my mind, but that Darwinian evolution is insufficient to explain all areas of evolution, and, here, particularly, to explain the evolution of brain, consciousness and language.

But, having set the scene, we are now in a position to paint a likely picture for our own evolution.

There are major problems in understanding how life got started in the first place, although there has been much interesting development in theories concerning life's early steps. Darwin's finches developed change and speciation that, 150 years ago, he thought could be explained by natural selection.

At best, natural selection is a 'macro' explanation: i.e., it explains, under certain circumstances, the conditions, or stimuli, for evolutionary process to occur. It is worthwhile pointing out that natural selection says nothing at all about the immensely complex underlying biological processes occurring to bring about the observable phenomena we witness in the macro world.

But it is rather like saying that college graduates are more successful than high school diplomats or, for that matter, high school dropouts. "Those chance mutations which contribute to reproductive success are passed to succeeding generations." Even if that in some sense is true, it gives no insight into the underlying processes which would have to occur to support it. Any more than linking college to success in any way explains the complex process of higher education.

Brain – Speech

Over the last century, but particularly over the last few decades, knowledge about brain structure and function has moved ahead by leaps and bounds. We have learned that using language activates very specific neurons and circuits in the brain.

The neurons and circuits which are involved in this activity are immensely complex. It is believed that there is a very high degree of specificity between the activation pattern in the brain and the state of consciousness that is occurring in the individual. The activation pattern of the brain in fact can be viewed as a living and highly reactive symbol of what the possessor of the brain is experiencing at the time. In fact, what makes human beings able to have such highly differentiated states of consciousness is the very high degree of brain development, as compared with their near relatives in the animal kingdom.

Most of this critical brain development manifests itself in the neocortex, which in man is much more highly developed than in any other animal. That, in fact, is what gives the human head its particular shape, with a much more highly developed superior vault, and a face that has receded and fits generally under the frontal part of the brain, as opposed to jutting out in front of it. As a generalization, and it is only that, the evolutionary “reason” for this extreme proliferation of neocortex is the specific sort of consciousness exhibited by man, with use of language and symbolization being the primary functional element.

Homo Erectus

The pattern of increase in brain size and function was apparently continuous from the split which occurred between chimps and human ancestors, at about 6 million years BCE. Lucy lived 3.4 million years BCE. *Homo Erectus* lived from 1.5 million years BCE to 500,000 years BCE, and spread widely into Europe and Asia. Although there are no points of clear demarcation, and change along the way was gradual, it is fair to say that it was during the long developmental years of *Homo Erectus* that man, and, in particular, the brain of man, became truly human.

These changes occurred in a relatively small population of animals. Although we have no reliable way to know accurately how many of these animals lived at any one time, it is safe to say that they numbered in the hundreds of thousands rather than in the millions. They seem never to have been truly numerous.

During this period of time, however, the average size of the brain increased from approximately 750 cc to 1100 cc, which means that it increased approximately by half. My proposition is that this increase in size – and number of neurons – was closely associated with, and, in fact caused by – the continued development of language. We do not clearly know whether this development was proportional over time, or whether there were periods of marked acceleration. The fossil record is not sufficiently complete to allow that observation. But, the generalization can be made that on the average, the change from generation to generation in the total population was significant.

Language, and brain size and function, developed in a pattern of interrelated causality. The brain developed as the animal increased its ability for symbolic communication. In fact, the brain developed *because* *Homo Erectus* was working at learning more and more how to talk.

Adam in the Garden

Quoting from the Bible doesn't prove much of anything, but I find it highly interesting that in Genesis, the writer has Adam naming the beasts and birds as one of his early tasks in the Garden:

“When the Lord God had formed out of the ground all the beasts of the field and the birds of the air, he brought them to the man to see what he would call them; for that which the man called each of them would be its name. The man named all the cattle, all the birds of the air and all the beasts of the field; but he found no helper like himself.” (Genesis 2, 19-20)

Now, do I think that the author of Genesis had a developed theory of brain evolution?

Not a chance. However, are biblical accounts sometimes sensitive allegorical representations of things in nature which have quite solid factual foundations?

Resoundingly, yes! Although in passing, the same thing can be said of other primitive literatures dealing with the early experience of the race. Are some of Hesiod's accounts in the Theogony sensitive allegories of things in nature with solid factual bases? You bet they are!

And, what about Adam and the animals?

My suggestion: Adam stands for developing humanity. Let's take it a step further, although I certainly wouldn't force the point. Adam stands for Homo Erectus – developing, but not fully developed Homo Sapiens. In naming the animals, Adam is stretching his brain, and its systems of symbolic representation. Adam is developing new brain patterns, and making his neurons increase and multiply (!) to support the function. Adam is man in the making, and the making is inherent in the experience of an animal-becoming-smart, of an animal inventing language and learning to talk!

Brain Growth from Stimulation

We know that the brain is far from complete in a new-born human baby.

The brain has to grow both in size and in organization. This is true both in the individual, and has been true in the race as well.

Strict Darwinian theory would say that the way the brain increased in size and function was because of chance mutations. Which seems to me to be nonsense. Brain increase is – and was – highly specific, and intrinsically related to highly specific content and function. The reason why the brain increases – did increase during evolutionary stages – is and was because it was put to use in highly specific ways. Brain increased in an evolutionary sense because man was trying to understand better – to develop comprehension and the language to support it.

The animal, at a given stage, had a degree of language and understanding. Faced with new experiences, the individual strained to understand better. That caused the neurons and their connections to proliferate so as to sustain the new function. The brain – over 1,000,000 years – in Homo Erectus slowly grew and reshaped its nuclei and tracts, not as a result of chance mutations, but in response to expanding experience.

The brain of man, which is highly specialized in architecture and function, evolved into its current form not as the result of chance mutations, but, rather, hammered out on the anvil of experience.

Autocatalysis

The “reason,” then, why the brain increased in size and function was internal to the biological system, rather than external, either in terms of chance or causation.

It took a long time – a very long time – for evolution to produce man’s closer ancestors. But once the hominds had their paw resolutely placed on the path to continued evolution, my contention is that the process went forward controlled by mechanisms within the complex communication systems of the genetic stream. The road to intelligence, then, became an autocatalytic process. What that means is that functions once achieved became the foundation and the vehicle by which further evolution occurred.

The success of certain evolutionary processes became the stimulus for further changes headed in the same direction.

More specifically, brain proliferation brought about by the stimulation of psychological effort allowed other, more advanced brain function to occur, which in turn brought about new patterns of proliferation of brain structure and function.

Looked at differently, curiosity and its pursuit became in itself both stimulus and vehicle for further brain development. Over time, the brain grew larger, and also a more effective implement for symbolic consciousness.

Although the brain of a human newborn needs experience, particularly social experience, in an atmosphere of linguistic communication, to start achieving its actual potential, it is also structured and programmed to start learning language – verbal language – at a very early age – within the first weeks after emerging from the womb.

Relative to the role played by the genome in the life and governance of the functioning animal, it can be said that we are still in the opening years of the twenty-first century – and are only beginning to understand the language of gene-talk. Starting with the discoveries of Watson and Crick at mid-century last, we have learned more and more about this wondrous system that nature developed, doubtless by evolutionary process, itself. We have identified many conditions where a phenotypal characteristic is regulated by a specific gene or gene sequence, and, on the whole we are convinced that the chief controlling element in the development and function of the individual is in fact the genome.

But, from our position here at the dawn of the third millennium, we recognize that there is still a great deal to learn about how the genetic communication systems work.

Internal communication machine

However this works out in detail, it is more and more clear that living organisms are complexly developed systems of internal communication – in addition to whatever communication living systems have developed with the outside world.

The communications systems of living organisms are not merely of one type. There are many levels of communication, nested within each other, and highly coordinated with each other.

If we draw the conclusion, as we have done, that the path to definitive evolution in man has been through proliferation of brain structure and function in response to experience, then we assume a burden to explain, or at least advance a reasonable hypothesis, how this clearly Lamarckian sort of evolution might occur. The problem, historically, is that it has not been at all clear what the mechanism for this phenomenon might be.

As we have seen, Darwin himself was convinced of Lamarckian evolution, in certain biological ranges – and he expresses an implicit wish that we might develop insight into the mechanism.

The highest level communication system in a higher organism is clearly its central nervous system – its brain, and the brain's connections with the rest of the body. Although this proves to be amazingly complex, most of the time it works with a quite high level of efficiency and accuracy.

Connected with the nervous system, and in some respects an extension of the nervous system, is the endocrine system, which is capable of exerting powerful change on the function of an organism, although it is less specific and mediated through biochemicals rather than directly through specific neurons.

Finally, on a molecular level, there are very many biological contexts where messaging is carried in highly specific molecules, which are produced in response either to genetic messages or to other biological functions.

Internal Process

The evidence, I believe, is clear, as we have advanced, that in the nervous system, structural and functional change occurs in response to experience – to new circumstances in which the individual finds itself, and even, as we have speculated, in response, ultimately, to the curiosity of the individual expressed in looking for new solutions.

But, if these changes are to become integrated into the inheritance of a line of descent, there has to be some system which works effectively to alter the gonadal genome.

The genome is, of course, reduplicated in every cell in the body, but unless there is communication between end organs and the genome in gonadal cells, experience-related structural changes could not be handed on to future generations.

What needs to happen is that information concerning, in this case, brain proliferation, needs to be carried back from the site of operation in the brain to the location of gonadal tissue either in ovary or testicle.

It seems to me quite likely that this is in fact what happens.

We now know, from embryological as well as other biological studies, that internal communication systems of the body are many, that they are closely related, and that they are capable of exquisitely precise information management.

Probably the clearest example of this is the immune system, which defends us from being invaded and destroyed by microorganisms from the outside. This has been an important part of our biology from the very beginning, and has achieved its capacity and success within the niche of biology where we have found our place to live.

In passing, it is remarkable to see how highly specific these systems are to the racial experience which has developed them.

The AIDS virus is an excellent current example.

Our immune defense systems have developed in the context of the infections which have been present in our environment. Even then, they are far from perfect. Consider smallpox. We never developed immune responses capable of adequately handling this virus. It was a great step forward when we developed an effective immunization technique against this organism. Now, the organism which causes smallpox has come close to being eliminated from existence on the planet. Still, without the overall capacity of our immune systems to protect us against invaders, none of us would last out the week.

But, so far, we have been defenseless against the AIDS virus, apparently this virus developed and found its natural home within certain monkeys, and was accidentally transmitted to humans. This provided an environment close enough to monkeys to allow the virus to propagate and thrive. But, our immune systems, never having been exposed to the new invader, have been essentially impotent in being able to combat it. We continue to work on finding an effective vaccine against it.

The only thing I want to draw from this in context is the exquisite sensitivity of our immune systems, and their highly precise ability to carry highly specific information.

Information systems of the body.

The internal communication systems of the body are many, highly complex, interrelated, and exquisitely effective in the transmission and application of information. On rare occasions they go wrong, and strange things result, but most of the time they function quite well, considering their complexity.

Prior to the development of modern biological and medical science, it was thought that functions inside the body occurred under the influence of metaphysical principles, the soul in particular. Ultimately, we learned that that was far too simplistic either to endure as a theory, or to explain with any specificity problems that might arise. A living thing is a maze of internal communications, in addition to those which relate it to the outside world.

The most obvious of the body's communication systems is the nervous system, which includes both the brain and the peripheral nervous system. Parts of this are dedicated to supporting communication with the world outside: the sensory and motor systems. These are functionally and structurally distinct from each other, although their components may be positionally quite close. What is slightly less well known, other than to specialists, is what is called the "trophic" effect of innervation. If the nerve supply to organs is compromised, it is frequently impossible for them to develop or function normally; muscles, frequently, will waste absent nervous stimulation.

Some systems of communication rely on fairly direct physical influence, and often these are only poorly understood. In embryonic development, for instance, the ways in which parts of organs develop may depend on things happening in spatial proximity. Gradients in physical characteristics as well as in biochemical composition may influence how adjoining components are going to be built. It is thought that this sort of influence is involved, for instance, in the formation of facial features. This sort of communication is thought to be involved in how it is that little Mary may end up have "just exactly Aunt Bessie's nose." The ability of the body to create family resemblances is amazing – the more so if you consider what it is that the body is actually doing. This portion of the body's internal communication system can obviously control information with great exactitude.

The involvement of complex molecules in internal communication is no less wonderful. This, primarily, is what is involved in the body's immune responses, already referred to. If foreign protein, from a microorganism, for instance, enters the body, the systems primarily within white blood cells go to work making antibodies, which are highly specific to the stimulating antigen, and can have the effect of forming complexes with the offending substance, which can then be segregated and destroyed. The specificity of this set of reactions can be in fact very high.

Those are but some of the more obviously identified and understood systems of the body's internal communication.

Aristotle, or for that matter Charles Darwin had little or no understanding of these issues. Most such knowledge awaited discovery in the latter decades of the twentieth century.

Imperfect Answer

As we have previously seen, Darwin wasn't always Darwinnian. "How can the use or disuse of a particular limb or of the brain affect a small aggregate of reproductive cells, seated in a distant part of the body, in such a manner that the being developed from these cells inherits the characters of either one or both parents? Even an imperfect answer to this question would be satisfactory."

Darwin here, in my opinion, was wondrously prescient – but then, he was a highly trained and highly focused, and highly intelligent, naturalist.

Darwin raised the issue, and it is up to us to try to work on the answer.

Among the known communication systems of the body, the most likely candidate for carrying out this function is the system of molecular informatics.

We know that the systems for communicating and expressing the balance between genetic information and its functional expression is mediated through molecular feedback systems.

The hypothesis advanced here is that changes coming about in the brain in response to specific experience and learning are carried back to the gonadal genome via information-bearing molecules, most likely carried in the protein fraction of the serum.

I know of no direct evidence that this is the case, but it seems to me to be a likely mechanism. It seems to me necessary that the brain evolved through experience, and not through chance mutation. It seems likely that the way this occurs is through information transport at the molecular level.

The hypothesis, then, is this. When our ancestors achieved a certain level of evolutionary development, they refined animal patterns of communication and started using "words" to communicate ideas. There followed a long period of development of the brain-language complex. Hominids were curious, and this led them to want to expand the system (Adam, at God's request, named the animals). The brain continued its development to meet the new functional requirements. These changes were picked up by molecular information carriers, by proteins or protein moieties. These proteins or moieties entered the protein fraction of the serum and were thus carried back to the gonads, where they affected the gonadal genome. Thus occurred the inheritance of acquired characteristics.

Newborn

When babies are born, assuming normal intrauterine development, the system of information management which has been provided to them through evolution is highly developed, but mostly in a fairly non-specific way. The brain still has a good deal of growing to do, but the major tracts, nuclei, and cell location have already been quite well established. The body has been very busy during gestation. There are already about 2,000,000,000 (according to current estimations) brain cells built and mostly functioning. The neocortex, with which we do a good deal of our conceptualizing, has differentiated both in terms of functional location, and also in the type and local as well as functional

relationships. Some operational instincts have already been set up, though in humans much less so than in other animals, even primates.

The human brain, even at birth, has been extensively pre-programmed for speech acquisition, but exhibits no innate words. The system is developing for what will turn out to be a very rapid process of speech learning. By the end of the first year, most human babies are utilizing inchoative language, and during the next few years after that, youngsters expand their verbal capacity by leaps and bounds. They are laying down their perception and use of grammar and vocabulary, although it will take many years of shaping and training before kids can really utilize a speech system well.

The philosophical idea of *Tabula Rasa* is a quite ancient philosophical concept that can be traced through medieval philosophy all the way back to Aristotle. This references a general concept that the mind of man start out at birth as a “clean slate,” with nothing written on it, and that we all have to learn about the world from our experience. As ideas go, this is not a bad one, but if taken too literally it does injustice to the marvel that evolution has turned us into.

Even though the brain contains very little if any inborn or automatic knowledge, it would be incorrect to assume or believe that it is equally adapted simply to having anything written on it, like, as is implied, a slate.

The brain, I believe, was developed specifically in the context of language, and as such is adapted to the complex activity of symbolic communication.

Here the analogy of a computer is not a bad one, though one always has to be careful using analogies not to draw unwarranted conclusions. But, that caveat having been extended, the analogy can help us to understand certain things.

A computer comes with a certain amount of memory – places where you can store pieces of digitized information. Larger computers are capable of storing more data. Data storage in the brain is certainly less rigid, less “cut and dried.” The brain is a living organ, and shares the advantages and disadvantages of living tissue. It is certainly more flexible than a computer, but less accurate in the retention of detail.

Each human brain is definitely more subject to learning and experience than is a computer, although certain computers through flexible programming can be said to “learn.” But, so far, at least, computers are machines that do not develop their own agendas and fulfill them. Futuristic thinkers may talk about computers deciding to live and think on their own. So far, at least, that is not much of a worry. At the end of the day, we can always pull the plug and go home to dinner. But certainly this bears watching.

Some people who think about these things have coined the term “wetware” to distinguish what happens between our ears. Not a bad term: it causes us to consider both the similarities and the differences.

Time Marches On

“But sometimes, purely by chance, the change gives the new organism some sort of advantage that enables it to produce more offspring, thus perpetuating the change in another generation.” Time, 2006.

We are here engaged in a multi-nuanced oxymoron.

This is not a statement flowing from a wealth of evidence. In fact, the opposite is true. What we need to understand in looking at the human animal is how the extreme development of the functioning neurosystem came about.

The statement above is Darwinnian principle, to be sure. The problem is that, as applied to man, it is taken on general 20th (and now 21st) century faith.

This faith is largely motivated by a purposeful rejection of a previous faith, to wit, that man had originated from the mind of an all-loving and all-powerful God, but it would be very hazardous to assert that the supplanting faith is any less malignant than its predecessor. In fact, if there were no way out of it that I had to embrace one or the other, I think I would as soon confide in the latter. However, such happens not to be the case. And being cornered into either one is not advantageous to one's general intellectual health

The biggest problem with the statement as given is that there is absolutely no evidence for it, and is almost certainly not true.

We do not have any evidence at all that chance mutations made it possible for developing humans to produce more offspring – and that that's how changes were perpetuated.

That's a string not even of hypotheses, but of unproven and unlikely assumptions.

Chance mutations, on the basis of available evidence, in higher animals are never advantageous. For all intents and purposes, as far as we know, they are always, or almost always, harmful, and in fact lethal. The changes that took place in evolving man were in effect constant, from generation to generation, involving the brain and associate substructures. Advances occurred against the current of chance, not because of it.

But, as we have seen, Darwin himself was cagey and intelligent enough not to get drawn into this snare. As we have previously seen, Darwin wasn't always Darwinnian. "... use or disuse ... of the brain affect a small aggregate of reproductive cells."

It makes no sense at all to accept Darwin blindly – and worse when the acceptance misapprehends Darwin in the first place.

Sorry – multi-nuanced oxymoron.

Humans

Evolution as a complex process seems beyond doubt to have been the way that humans came into existence on our planet. The problem is first, how to explain it, and second, as we expand our knowledge and understanding of the complicated processes of evolution, how do we work these into our other systems of knowledge and philosophical conviction?

What I suspect, as we walk down this road, is this. Natural selection may have occurred particularly in the earlier stages of animals leading up to and resulting in humans.

Although, a lot needs to be developed to found that well and make it really clear. By the time higher primates occurred, and probably much earlier than that, internal mechanisms responsive to experience (Lamarckian) mostly likely entered the functional matrix and became the most significant mechanisms in the development of brain structure and physiology. The brain occurred not by chance (winning the lottery every drawing), but because it was hammered on the anvil of experience.

To review, it seems to me that the clearest changes occurred during the million years and more of homo erectus. That would be true whether or not homo erectus should indeed be

considered as one species, and whether or not homo erectus was in the direct line of human ancestry.

Merging indistinguishably with the autocatalytic evolution of brain was yet another phenomenon – ultimately the controlling one – the development of cultural evolution, which, although it was certainly dependent on physiology for product, enjoyment and preservation, nonetheless was certainly not captured and transmitted in the gonadal genome at all. And therefore was neither produced by Darwinian (in the narrow sense) mechanisms, nor controlled by them.

Homo sapiens appears consistently in the fossil record at least 200,000 years ago – and may, in fact, have been much older than that. But, it is homo sapiens that developed culture and civilization, and there is no solid evidence to suggest that there is any physiological or structural difference between mankind today and earlier members of the homo sapiens line of descent. What has changed is culture, and culture is to very low extent carried in the gonadal genome. Genotypically and phenotypically, we are essentially unchanged from the Cromagnon hunters who chased down the mammoths and may in fact, have driven them to extinction, or from the Neolithic artists who limned the marvelous pictures at Lascaux and Pech Merle.

Cultural Genome

However it came about that the brain (face, hands) of man developed – and I hope the scenario we have presented is a reasonable one – it is indisputable but when we changed the game, considerably, as we began to accumulate culture. Out of the matrix of experience, we moved, very rapidly, as far as the cosmos is concerned, from believing the mood to be a god and traveling to it, from sculpting the neolithic Venus of Willendorf to the Pieta of Michelangelo.

And this was evolution of a different sort, indeed.

The steps taken in this well-near miraculous process were, in fact, what I developed in Cosmos I – the world of thought and culture from the beginnings up to the Renaissance. I accede and offer apologies to my brothers and sisters of other cultures. The story I have told is the story of man from a westerner's point of view – from one who lives in and has profited from, largely, the world of the Greeks, the Jews, the Romans, and later, the Europeans. If light is shed, it can be shared by all, but others would have to write the cultural evolution of India, China, and Japan, and of the varied tribes of Africa and elsewhere.

What happened is that man recorded his experiences outside his individual body, in pictures, buildings and other artistic and intellectual creations. The “genome” carrying this evolution was not carried in the genes at all, but externally.

And things advance meteorically once we invented writing, and, even more particularly once we invented true alphabets, which accomplished the remarkable achievement of being able to record for all time, independently of medium, the entire sweep of human thought and imagination.

V. Cosmos II

Outline

Underneath the Press of Events

Enlightenment

Industrialization

Technological Advance

Wars – World Wars – Tyranny

Sciences –

Atomic Age

Shifting View of Cosmos

Evolution

Metaphysics

Mind in the Universe

God

Last 500 Years

The last 500 years have been the most explosive period ever in terms of learning and discovery. Understanding of our physical universe has been in fact exponentially rapid – quantitatively, most of the great and important things that we know about our universe were in fact discovered during the twentieth century.

From a human point of view – which, after all, should be near and dear to us, humans that we are – we have done a rather wretched job of integrating this vast fund of knowledge into our spiritual awareness on the planet. In many ways, we are reeling from the intoxication brought about by this vast influx of knowledge into our civilization. But, in the midst of this superabundance of factual information, there are many very basic things about our universe that continue to escape us in terms of fact or significance.

Probably the most central and significant of these is the place of spirit in the universe. Here is the anomaly.

There seems to be some sort of intelligence or plan in the greater universe we inhabit. However, our own is the only spiritual awareness of which we have immediate experience.

How are we going to explain that?

We live in a causal universe, at least on some proximate scale. The reliability of science rests on the conviction that there are causal factors in back of the phenomena we perceive in our experience. Assuming the reality of the Big Bang – which seems to be

substantiated on several bases – what caused the Big Bang? That does not seem to be a non-sensical question. It would be odd indeed if there were causes for everything on a proximate scale, but nothing analogous in the universe in its entirety.

My prediction is this: our current century, the twenty-first, will be significant for our attempts to 1) complete our efforts to fill in the gaps in our empirical knowledge and 2) our effort to integrate our empirical knowledge with our spiritual adventure on the planet. One way of summarizing this is to ask: what is the place of spirit and consciousness in the universe?

The World in 1500

Europe was at the threshold of breaking out of its medieval past. The Black Death had become but an ugly and horrendous memory. The Crusades had happened. The nation states of Europe were stabilizing. Christopher Columbus had taken his tiny wooden ships across the Atlantic and back. Printing had been invented, and the ready and inexpensive availability of books caused an information explosion something like – analogously – the internet in our own time. The Protestant Reformation was about to explode, a major cultural upheaval still profoundly influencing thought and culture.

If we stop and dissect any phase in human development, we find that society and humankind have always been in turmoil. Things have always been changing, and the human experience is well-nigh infinitely rich.

We now know, as our ancestors did not suspect in 1500, that the human animal had evolved physically and psychologically. In the valley of the Dordogne, as elsewhere in Europe, there are hundreds, in fact thousands, of vestiges of prehistoric culture, some of them lying about on the surface of the ground, others hidden in caves. In 1500, Europeans, even the mostly highly educated and intellectually sensitive, were unaware of these artifacts, or of their own ancestors who produced them. The prevailing belief was that mankind had been created recently, as recounted in Genesis.

Men were exquisitely aware. It was certainly not humans were not sensitive to their surroundings and immensely curious. High value was placed, at least on the upper levels of society, on education and insight into the human condition, as it was understood.

What was not realized was man's evolution, first on the physiological level, and then culturally. Our Renaissance ancestors were unaware that their own unbounded curiosity was an expression of the upwards evolutionary pressure of a broader evolutionary process. Our own efforts here are another step in the process – but we are aware of it.

The Adventure of Discovery

One afternoon 3 million years and a bit more ago, Lucy sat down on a bank of the Rift valley, near Hadar in Ethiopia, cupped her jaw in her hand, and mused, "I wonder where all this evolution stuff is going to lead." Not likely that that happened literally, but, it's interesting to speculate about it. Would she have looked at all the experiences, good and bad, that would pour out of the cornucopia of the possible, and thought, "Oh, way too much hassle and suffering – I think I'd rather go extinct!" Or would she have said, alternatively, "My golly, what a great experience! Let's get on with the adventure." A bit fanciful, perhaps, but, allowing for a bit of imagination and poetic license, not too far off the mark.

Point is, the hominds were off on what would become an astounding, and ever-unfolding, adventure of discovery.

Granted, most of the time the individuals involved – over the eons – would be interested in more immediate objectives, like preparing dinner, procreating, waging war, carving statues, bludgeoning intruders, being an intruder, or knitting sweaters. It is only when the mind becomes reflective, and the mechanics of civilization and culture sufficiently advanced, that the processes of evolution would be understood and themselves made objects of understanding. But, that, too, would come in its time.

The hominid family would continue to develop, and in course of time spread out of Africa, into Europe and Asia, and eventually into the Americas.

Writing would dramatically spur the process. Aristotle would write his *Metaphysics*. Cicero would inveigh against Cataline. The Roman arenas would echo with the clangs and groans of gladiatorial shows. Jesus would develop his spiritual vision in Judea. Celtic tribes would have thrust into their hands the torch of adventure, and would lustily accept its challenges. Cities would flourish. Troubadours would carve their lutes and serenade their ladies. Dante would accompany Vergil on his journey through Hell. Man finally would be ready to advance the pace of discovery and set about to conquer his ignorance.

The universities were thriving. Mathematics was about to become an extensive and specialized language. Descartes would doubt about even his own existence, Newton would use the calipers of his mind to take the measure of the observable universe.

The Discovery of Time

It did not occur to thinkers until relatively recently that the age of the universe made any real difference, or that it was a knowable fact.

As our knowledge of the broad parameters of material reality became more and more complete, and more and more specific during the 20th century, it became clearer and clearer that not only could we determine the age of the universe by objectifiable means, but how we would answer this question would make a very large difference relative to many of the other questions which tweak our curiosity. We needed to discover time itself.

It is only quite recently that we humans developed an objectifiable, evidence-based, understanding of just how old this earth of ours is, on which walk around so confidently. In Galileo's time, if anyone thought about it, there would have been a couple of possible answers given to the question of the age of the earth, or, for that matter, of the universe. Many would have assumed that the cosmos was simply eternal – that things had always been the way they seem to us now. That seems to have been the way Aristotle and many of the ancients thought about it.

The majority of ordinary humans were too busy procreating or surviving to worry much about it. Too busy slaying barbarians, or being barbarians being slain by Romans. Christians generally accepted the biblical account of creation in Genesis. In 1650, Bishop Ussher produced an influential calculation of the age of the universe based on his attempt to assign time frames to events recounted in holy scripture, resulting in belief in a world that had been created in 4004 B.C.

During the 18th century, educated humans were developing a mindset that the world had fact-based explanations, and that our planet had been around for a truly long time. Naturalists significantly looked for consistent factual backgrounds. Belief in a 6000 year old universe gradually disintegrated – although, in fact, some would like to adhere to this even now.

Earth science got a foothold . Thinkers wanted to know about rocks, oceans and mountains. They wanted to know about their very own place in the sun: their planet.

In places where layers of the earth’s surface lay exposed, the evidence amassed that these layers had a history: that some were more recent than others, and that features of the earth long buried had been forced to the surface by natural process. As people became more and more familiar with earth strata and their content, they came to realize that earth’s flora and fauna have not always been as they appear on earth today, but that there have been several sequential periods of earth history, and that wave after wave of sometimes quite exotic beasts had populated Earth. We learned gradually to read the fossil record.

Since Darwin’s time in the middle of the 19th century, there has been a general acceptance that the biosphere has been evolutionary. The mechanisms of evolution are still not fully understood.

Modern techniques have elaborated an agreement that the age of our planet is approximately 4 ½ billion years, and of the universe itself approximately 14 billion years. These values continue to be made more precise, but the probability is not very high – we think – that the orders of magnitude will probably not be changed that much.

The Mesocosm

At the time we were developing familiarity with our ambient cosmos, we didn’t realize we were looking at things via a specialized observational bandwidth. We just thought we were looking at things the way they really were, and our job was to survive and figure out what that “really were” really meant. It is only much later, in fact only recently, that we have come to the realization that our sensory experiences are the function of a great many supporting sub-phenomena.

It seems that the material world is not made up of solid objects which exist as they seem to us, but rather of constituent atoms and molecules, which, if they are broken down far enough, consist of waves and force fields, which obey their own sorts of chemistry and physics.

We could look at our world as a “two meter” world, not in the sense that it is two meters in size, but that the way we see (touch, hear) it is suited for an animal, like ourselves, approximately two meters tall.

Certainly things act as though they are so much long and wide, with characteristic properties that we can ascribe to substances like wood, or metal, or dirt, and that’s the way we interact with them in the world of daily experience, but when we study these things more closely, and study “why” they react the way they do, these apparent substantial qualities break down, and are found to result from realities “lower down.”

This makes the philosophical ideas of early philosophers equally dissolve into lack of meaning.

When Plato was wondering about how the “forms” really existed, he wondered whether he should say that there needed to exist a form of “mud.” That context of questions and answers doesn’t make a lot of sense in the light of current realizations about the ultimate nature of matter. Likewise, Aristotle’s ideas of prime matter and substantial form don’t signify much in the light of current understanding, although it is still difficult to see how the basic qualities of sub-atomic particles are made to be the way they are.

But, if we are to understand our universe, it is necessary to realize that the world we know of houses, horses and handrails is a segment of reality, and that it is necessary to understand and use other scales of size and distance to comprehend our universe’s other aspects.

Revolution

We cannot guess what the Greeks would have been able to accomplish scientifically, had their culture continued. Unfortunately, they were overtaken by military and political history.

Aristarchus, of Samos (310-230 BC), and his group of geometer astronomers, utilizing principles of angle measurement and similar triangles, worked out several important values, including the size of the earth and the distance of the moon from the earth. It is remarkable how close they came. But that early flowering would not continue in unbroken continuance. Society was not sufficiently stable for that.

Greek scholarship waned, and the Romans took over, more interested in building roads and aqueducts than in abstractions without practical application. During the Middle Ages, scholars became more interested in theological niceties than in measuring much of anything, and cosmology lingered until into the Renaissance.

Astronomy and mathematics became established disciplines in the universities, and it was out of this background that the Renaissance assault on the heavens occurred. It is worth remembering that Galileo held the chair of mathematics at Pisa and later at Padua.

The Aristotelian and Ptolemaic theories of an earth-centered solar system were dealt a mortal blow when Galileo in 1610 published his observations on the moons of Jupiter. Galileo shattered the world of official cosmology. He did something else, equally significant in establishing the basis for modern science. It was through the lenses of his primitive telescope that he saw Jupiter’s moons. He introduced instrumentation as an essential tool of science, and established forever the principle of extending our senses to escape from our two-meter world – in Galileo’s case, into the larger cosmos. We rely heavily on mediated observations.

In 1687, Isaac Newton published the Principia Mathematica, a pivotal work on the operations of the cosmos, and history has erupted since then.

Macrocosm

Once we thought that the world (Planet Earth) was at the center of things, and for all intents and purposes the center of the universe.

Not only does it turn out that we are not at the center of things. It is also true that as places in the universe go, we are, in terms of real estate, about as insignificant as anything could possibly get.

The universe is unimaginably huge. The observable universe is about 10 billion light years in radius. Our galaxy, which itself is immense, is thought to be about 100,000 light years across. We know that light travels very, very fast, so the distance traveled by light in a year's time is immense.

Now, there's no possible way that we humans can relate these distances to anything in our experience.

Just our own solar system – the matter swinging majestically around our little local sun – is more than a light year across. And the closest neighboring star – Proxima Centauri – is 4.2 light years away.

We live, therefore, on a speck of dust circling around our local star, which exists in our local galaxy, the Milky Way, which is one of billions of galaxies separated by such immense distances that we could not visit any of them by any imaginable means. If we could travel at the speed of light, which we can't, it would take us millions to billions of years to get anywhere to speak of, so one conclusion is that the likelihood of our running into other humans "out there" is not a very promising one.

This certainly isn't the way that our ancestors imagined the universe from biblical times to the Renaissance, and I'm sure that even Galileo, 400 years ago, would be a bit surprised by where his bold thinking ultimately would take us.

However, looking from another perspective, it is nonetheless true that this highly cellularized bio-computer between our ears is by far the most complicated phenomenon we know of in this vast universe. Whatever we would might want to do with it, there are more possible activation states of this brain of ours than there are atoms in this unimaginably huge universe – so that we've got plenty of capacity to work with.

Our place as the physical center of the universe has been dislodged, but our place on the scales of relative organizational complexity seems quite solid, at least in the phenomenal universe of which we are aware – and that serves as one cornerstone in the edifice of our understanding of ourselves. Though in one sense we have emerged as cosmically insignificant, in another this colorful experience within our heads is unique – as far as we know – and exceeds in complexity and power anything we know of in this cosmos of ours.

Microcosm

We exist and work out our lives in this two-meter world of ours.

We know now that the extent of the larger cosmos is huge beyond any meaningful comprehension. We need large numbers and exponents even to express its immensity, and those lose any relationship to our daily experience.

We have equally torn away the curtain from the mystery of what it means to be small.

In 1534, Vesalius published *De Humani Corporis Fabrica*, a wonderful collection of his anatomical dissections, showing the body and its internal structure with a detail and beauty that was unprecedented. Since then, our knowledge of our bodies, and indeed of the entirety of the living world, has exploded.

Robert Hooke, an Englishman, in 1665, looked with an early microscope at a thin slice of cork, and identified what he named "cells," and study of the "world within" was off and running.

Things have got infinitesimally tiny. We have discovered that the world of living things – including ourselves - is made up of cells, which generally are microscopically small,

although some communicational neurons can have fibers which may be small in cross-section, but several feet in length.

Our bodies are made up of hundreds of billions of cells – we have held onto Hooke’s terminology - most of them being in their own right exceedingly complicated chemical factories. If we could expand them enough, we could wander about in them, getting lost in their internal complexity.

Cells are made up of molecules, collections of atoms, running from a few – a water molecule has two hydrogens and one oxygen – to many thousands in proteins, complex biological molecules which are constituent of both structure and function. Even at the atomic level, we’re not done. Atoms themselves are composed of sub-atomic particles: protons and neutrons, and, below that, of quarks, leptons, mesons, and other exotic entities.

Even as I write, mechanics are installing the Large Hadron Collider, at CERN in Switzerland, which, it is hoped, will be able to conduct experiments enlightening us about fairly ultimate qualities of matter. And, at the same time – now – at Cadarache in France, workers are busily employed constructing a nuclear fusion reactor which is anticipated to reproduce and harness the essential reactions of our Sun, which would perhaps drastically alter our capacities to create and utilize energy.

How much further can we go? That is not clear. Currently, theoreticians are struggling with questions of ultimates. I have sat in lecture halls watching scientists fill blackboard after blackboard with equations, developing string theory, which apparently is where it goes after you exhaust the world of atoms and sub-atoms, the world of physics and quantum physics.

Do I understand all that? Not on your tintype, to delve into the 19th century for a vanished figure of speech. However, we have to try to understand things about our universe whatever the micro- and macro- structure and mechanics. We need to lean on each other for understanding, and to share each others’ expertises. Being alive in the 21st century is riding the whirlwind.

Unanticipated Consequences

No one could have predicted how rapidly change would occur, or how very far human effort would take us. The configuration of the world at 2000 bears a very limited similarity to the world at 1500. Thinking in terms of systems, the reason this is true is that the rate of change – I hesitate to say progress – has been exponential rather than linear. The elements of change have themselves accelerated further change, resulting in increasingly brief periods between even newer discoveries.

And, as we have pushed back horizons, new vistas have provided new insights. It is not at all clear how we are going to digest all the data that have brought themselves into evidence.

Advances have been made for proximate reasons – but results have had much more far-reaching effects than anyone involved in the process could have known.

European autocracy has melted away, at least in its more obvious forms, before the social and intellectual pressures of democracy.

18th century Enlightenment strove to urge progress forward. The activist “philosophie” of Rousseau, Voltaire, Diderot, *et al.* was more socially focused than it was speculative, but its concern with education and the diffusion of knowledge had more far reaching effects

than even its proponents might have imagined. The internal pressures of French society clamored for political change, and change certainly happened. The blood running in Paris gutters cried out “change,” to be sure. Could it have been less violent? Technology was a by-product of physics and chemistry. It made possible the Industrial Revolution, which profoundly altered daily life, patterns of employment, commerce, the creation and concentration of wealth. The mixed blessings of urban living, labor struggle and a general elevation of living standards are present with us today. Colonialism developed, flourished, and ultimately receded, but not without having changed life’s patterns for a large percentage of humans on the planet. The unbelievable horrors of twentieth century totalitarianism should remain alive in our hearts, less we slip into the sad mistake of thinking that all “progress” is positive. World War II impelled forward our understanding and mastery of atomic science and, therefore, basic physical science. Mushroom clouds over Nagasaki and Hiroshima should be icons equally seared into our consciousness as the death camps of Dachau and Treblinka. The atom bomb brought WWII to a sudden end – and that was to be sure a good, but as we turn our mind’s attention to the sweep of galaxies in the depths of space, the practical side of our experience cannot be lost sight of.

The Third Millennium

Looking inward and outward, what is more than evident is that our views of reality have changed fast, and the universe, to say the very least, is a great deal different than we thought it was.

What isn’t at all clear is what we are going to do with these new perspectives. What seems certain is that we are going to have to live with this knowledge for a period of time before we might be able to predict how the future of human history will be affected. Clearly, slipping back into eras of earlier ignorance isn’t going to “cut the mustard,” as they say.

Our world presents with a huge range of problems. Within societies, wealth is poorly distributed. Education is seen as the ladder for personal success, but it is becoming more and more expensive. Capitalism, which has certainly been a powerful engine for development, seems to be producing, more and more, a kind of plutocracy, where the concerns of the individual may be more and more subordinated to the greed of a power elite.

Internationally, there continue to be wars and genocides. There is a struggle to see whether the human race is polluting our planet to a place where there are irretrievable changes in the environment which are occurring.

There is, in brief, a great deal of trouble and imbalance on the social surface of our planet. The well-being and perhaps the very existence of our race may in fact hang in the balance. In the light of this, it may seem irrelevant to be concerned about abstract issues of, for instance, the nature of symbolic representation, which emerges as a core problem when we consider human nature.

Many of the issues focused upon in these pages may seem to have no significant relevance for the individual or for the group. They may seem abstruse, with little application to ordinary life.

Not so.

What is in the balance is the spirit of humanity. We run the danger of slipping more and more into a governing materialism, where wealth and power are the only considerations allowed to rule the day.

Whether we like it or not, we are hammering out on the anvil of experience our convictions about values and about human nature itself. A strict social Darwinism might assert that survival of the fittest is, and should be, the determining mechanism in human existence.

The nature and value of the human spirit is both the target and also the mechanism by which the dynamics of evolving life on the planet will be powered. The issue is whether humanity itself is seen as having value. The question is whether rights of individuals and groups can and should make a greater difference than the size of bank accounts.

In modern life, the amassing of wealth and material resource is certainly important to achieve the goals of mankind, but the question is whether that should be the ultimate arbiter of process.

It makes a difference how as a race we are pushing forward the understanding of our spirituality.

Seemingly eggheaded concerns will, at the end of the day, determine outcome more than will riches.

Scientific Knowledge – Boundaries

The world of scientific knowledge has edges to it. First, there are those things which lie beyond the edges of discovery.

But, more fundamentally that that, scientific knowledge is intrinsically limited. There is a fundamental self-contradiction in an assertion to the contrary. Attempts at giving to science the sole head position at the table of life's feast are intrinsically doomed to failure. If we want to say that the only things we really know are things for which we have empirical, or scientific evidence, we run into difficulty. The problem is that that principle has no scientific evidence for it.

This implies that there is a wider backdrop of cognitive conviction that we trust which is substantiated on other grounds than scientific grounds.

If we are going to place trust in scientific discovery, there must be some knowledge about the universe which is the framework in which scientific knowledge exists.

Further, to make a general statement about what is true and what isn't, we must have some concept and conviction about what we mean by truth in the first place. This implies, again, a wider frame of knowledge and conviction than science itself.

Doubtless, science has been an incredibly effective tool for teaching us about the universe, but at the end of the day, we must have some sense of measure and criterion which in itself is not scientific.

The Evolution of Understanding

As we think our way through matters of what the universe is like, and what we mean by truth itself, it is critical to keep in mind – and in focus – that the only truth and the only mind of which we empirical evidence is this odd function which has occurred in the human race.

Our species has finally evolved over this last million years – over the last hundred thousand if we want to focus on *homo sapiens*. Culture has been the effort expended by this animal to understand itself and its environment.

Science is a thing that has happened to us as a phase in our dealing with reality. We emerged in an evolutionary way “because” of our cognitive superiority. This is not the same as saying that we selected for intelligence because of its reproductive superiority. Internal to the process of the developing hominid line, brain stimulation and brain utilization worked for the evolving animal. Hand in hand, development of the human neocortex occurred along with development of systems of thought.

The Greeks were crucial in the development of critical thinking, yet their ideas ultimately became snares for further development and discovery, and needed to be discarded or modified. Prior to Greek thinking, humans understood things in terms of stories and mythologies. The Greeks were unique in stripping away episodic accounts and looking for the causal factors in back or surface phenomenologies.

Plato decided that there must be “ideas” or “forms” which had a deeper reality than the reality of objects. Aristotle developed a universal theory of causes. Aristotle distinguished between material, formal, efficient and final causes.

These are “metaphysical” theories, because they go beyond the direct evidence of the senses. Metaphysical thinking was a highly important phase in the development of human thought, because it got the mind out of the world of anecdote and into the world of deeper reality.

Metaphysical theories of reality ultimately came to incorporate objectively false beliefs, and for that reason needed to be grown beyond.

For instance, metaphysical thinking encouraged the belief that animal function could be explained by the infusion of “soul” into prime matter, but in the long run that explanation won’t take you very far.

We came to realize that the evidence of the senses was critical for the development of certain kinds of understanding, and that gave rise to scientific investigation and scientific knowledge. However, it is necessary to realize that scientific knowledge is a type of knowledge within the larger matrix of human consciousness.

We have now had 500 years, approximately, of concentrated scientific investigation, with remarkable success. But what we are realizing now is that underlying empirical questions and answers are questions and answers which harken back to earlier thought styles of metaphysics.

Enamored of science, we try to squeeze all issues of knowledge into its methods. In learning how to do physics, which was critically important, we forgot how to do metaphysics, and that’s where we are today. Our scientific world cries out for metaphysical foundations, and we, generally speaking, don’t even have the verbal mechanics with which to recognize the problem.

We make the attempt here to state the metaphysical suppositions.

The Material World

There’s something seemingly contradictory about the material world. We give it a sort of preeminence in certain sorts of learning – we like material things, because they are “real” and we can get our hands on them.

But, there are real problems about matter being the “ultimate” reality, whatever that would mean. The material world is what we can touch (see, smell) and measure. It has mass, weight and a certain sort of solidity.

We have seen that the world is not as we perceive it, so that in some sense it is unreliable. Living in Middle World, we have become aware of the very small world below and the very large world above us. One of reality’s largest problems – actually, it is a family of problems – is what is there when empirically we have been pursuing evidence, but we get to a place where we run out of world. Down certain roads, we run out of matter, as we understand matter to be.

On the small end of things, we find that things are not material in our ordinary sense of that term. Light becomes very odd under some observational conditions. It can act both as particles and as waves, at the same time.

In human behavior itself, experience seems material. We experience what can be sensed, and what we can heft. But experience itself – is that material? It certainly has material aspects to it. When we get to where are thoughts are highly symbolic, is the symbolism itself material.

When we are drawn into contemplation of nature, and are overpowered with its beauty, organization and power, are those qualities material?

Our spirits seem to have evolved in the midst of a functioning material matrix. There are certainly material components to the development and function of spirit. There is a physical side to awareness. The physical side of meaning appears to be the pattern of neuronal activation which supports experience. In what sense is meaning material?

Going beyond, could you have meaning without a physical substrate? If so, what might that be like? Was there meaning in the universe before man evolved into its midst?

The only phenomenal spirit we know of is our own mentality. As we look into the exterior universe, and know more about its structure and dynamics, we are rightly amazed at the wonder of its structure and function. Although there are serious problems with an “argument from design,” it is natural enough to find a similarity between the world in which we live, and our own processes, when we are engaged in planning or constructing complex systems.

Whatever we do with it, there is a challenge in understanding such similarities between our minds and the greater outside universe.

Novel Thinking

Our modern understanding of the universe had roots in antiquity, to be sure, but the development of empirical knowledge began in earnest at the time of the Renaissance. Cosmology proved to be the leverage for bringing about major changes in our understanding of the universe.

We have pointed out the importance of certain key thinkers in the development of our understanding of the physical universe: Copernicus, Kepler, Galileo, and Newton, continuing into the huge discoveries of the twentieth century: Einstein, Hubble, and Hawking.

We have pointed out how, more than anything else, astronomy toppled the medieval idea that the earth was the center of the universe, and with it the belief that the Bible was an adequate norm for truths about the nature of man and of the physical world.

We also have pointed out that, although the philosophy of the Greeks was what introduced rigorous theoretical thinking into the stream of Western culture, still, Aristotelian ideas of causality (four causes: form, matter, efficiency and finality) ended up restricting research and understanding. We needed to understand reality not from the top down, but from the bottom up.

There is no doubt about the fact that empirical observation, reinforced with its handmaiden, mathematics, works. Its achievements have been magnificent.

Beyond Crusades and Castles

When we learned that the Earth was not the middle of the celestial system, and that the Church was not the final arbiter of truth, we in large part turned our backs on previous learning, scholarship and philosophy. Pity. There is such a thing as throwing out the baby with the bathwater.

The great shapers of the Renaissance restructuring of the knowledge endeavor were all products of the European university thinking. Many of them held academic chairs in teaching institutions. At times their new thinking happened only in the context of rejection of earlier theories and with considerable struggle against the vested interests of “experts.” That occurred with some regularity. We have watched Galileo confined to house arrest by the Inquisition. The birthing of empirical science was certainly not without its pangs and sometimes its mess to clean up.

But there were other ways in which the new discoveries of the age were a natural outgrowth of university experience. By the time the Renaissance built up its full head of steam, the universities were already hoary with age. Ivy had had plenty of time to clad their walls. And, university thinking was not all bad. After all, it was what prepared Kepler and other stargazers to step out with their speculations.

From the beginning of human experience until 1500 CE, we developed a particular mindset and understanding of the universe. What we came up with was a long country mile from what other, less cerebralized, hominids had in their heads. We summarized that in *Cosmos I*.

The 500 years from 1500 to 2000 BCE have been the most dynamic the world has ever seen.

What in the future are we going to turn our world into?

The Power of Observation, Measurement and Mathematics

It became more and more evident that observation, measurement and mathematics disclosed – and disclose – a physical universe undreamt of by even such power thinkers as Plato and Aristotle and Plato. They tried to think in terms of general principles of causality, but on a metaphysical level they thought in a top-down fashion. That had limited value. When Galileo (as a paradigm for empirical thinking) saw Jupiter’s moons and rolled balls down inclined planes to study and mathematicize laws of accelerated motion, the classical jig was up, and Newton, Maxwell, Bohr, Einstein, Hubble, and Hawking (as paradigms for empirical method) had a lot of homework to do. They did it. [When Galileo took on the Inquisition, he knew perfectly well what he was doing – yet he couldn’t have had the foggiest idea where his independence of mind would lead. He was knocking on a magical door, which, when opened, would lead to all manner of unimagined riches – and dangers.](#)

Again, we are using Galileo as a paradigm, rather than attributing an entire movement to him. Galileo was in the vanguard of an army that would conquer the mind and mores of the world. The paradox is that advances are made only by individuals, yet individuals exist and operate only in the larger social matrix of the group. Discoverers are highly independent, yet science is a highly social enterprise.

The high middle ages were behind, as were the crusades and the Black Death. Sea exploration was an active endeavor. Europe was in great religious turmoil. The nation states were in constant competition on many fronts.

In 1610 Galileo published an account of his observations of Jupiter's moons, arguing for the accuracy of Copernican theory. As compared, for instance, with Aquinas' *Summa Theologica*, written some four centuries earlier, Galileo's approach was a universe away, a paradigm of the Renaissance mind.

With Galileo, and his like, a genie had been let out of the bottle. The possibilities of scientific method were grasped by the mentality of Europe, and the intellectual atmosphere was ineluctably changed for all time. There would be no crowding of this powerful genie back within his narrow confines.

Commerce, Warfare, Curiosity

Science and its spinoffs would change the world. It would activate powerful engines in many different societal as well as geographic areas, which would hurtle mankind forward into uncharted waters. The motivations for change were very broad and widely varied. They sprang from many levels of society and many different areas of social function. By no means were they all altruistic or noble.

Since Roman times, at least, there had been constant struggle between princes and kings for military supremacy. The understanding of physical forces and practical chemistry brought by the Renaissance changed the face of warfare for all time to come. New technologies in metallurgy created a rapidly evolving arms industry, with us till today. Practical chemistry improved gunpowder.

The trebuchet during the high Middle Ages was a marvel of high mechanical technology, capable both of considerable destructiveness and also of striking reasonable fear into the hearts of beholders. But it was clumsy and difficult to manipulate when compared to the evolving cannon of Renaissance times.

Changes, too, came about as the potentialities of new commerce were increasingly realized. New products, and new methods of manufacture altered the patterns of commerce and trade. During the Middle Ages, spices from the East were of great commercial importance.

The invention of new dyes and of new methods of manufacturing fabrics changed patterns of trade as well as styles of clothing. New inks became important as printing produced a new flood of books and pamphlets, which encouraged and spread literacy and communication.

And, beyond, or beneath, the practical applications of discovery and technology, an even more important factor, in the long run, was raw curiosity. As men came to realize that nature would yield up her secrets if only tweaked the right way, naturalists, chemists, botanists, and physiologists studied and experimented not just because it aided warfare or trade, but because they enjoyed it.

The Beginning of Things

The medievalists thought that the world had been created as recounted in the Bible. Christian philosophers and theologians accepted the account as recounted in the biblical book of Genesis.

“In the beginning God created the heavens and the earth.”

There is no discussion about what happened “before” the beginning. God just started things off.

Note that there is no opportunity to query the author of Genesis about his philosophical assumptions, or whether his account was meant to be literal history. Those questions doubtless would have seemed odd to the writer. They make sense only from a more modern point of view.

Particularly as modern science developed over the last few centuries, the conviction has grown that the material universe did have a beginning. At the same time, scientific thinking seems to be silent as to whether there was any “before” relative to the primordial expansion from the beginning “singularity.” Or if not totally silent, at least quite tentative.

If we run the camera of time backwards, we arrive at a starting point when the universe as we know it began. At that point, there is a dark curtain beyond which we cannot penetrate.

The author of Genesis was not burdened or constrained with a need to function with intellectual rigor. He was writing at a time when that concept had not entered into the arena of human discourse.

But, what is interesting is that these words, at the beginning of our written patrimony, make a statement that in fact is pregnant with implications about science, philosophy and truth. And, as far as absolute findings or undisputed theory is concerned, it is not unchallenged whether or not we have made a great deal of progress. Those ideas are still pivotal.

The March of Scientific Discovery

Once humans got the hang of the discovery process, they learned rapidly. For centuries, man’s horizons had pretty much been the physical ones at the end of his line of sight. Or, when he learned to sail across the sea, to places that he visited or heard about from other travelers.

His observations, first, and then his mathematics started, especially at the time of the Renaissance, to carry his awareness out beyond the confines of planet Earth into the reaches of the Solar System, and ultimately into the starry voids beyond. This has happened with a truly amazing rapidity.

Two brief centuries ago, which would put us back, approximately, to the time of Benjamin Franklin, our empirical ideas about the universe and its makeup were still quite primitive. The 19th and 20th centuries saw scientific method wring one after another phenomenological out of the raw material of sensory experience.

Chemistry

Antoine-Laurent Lavoisier was a brilliant Frenchman living during the period of the Enlightenment. He attacked physical substances rather differently, from the viewpoint of

the elemental composition. He broke up water into its constituent gases, oxygen and hydrogen, and made great strides in defining what we might mean by elements. In so doing, his work was precursor to the development of the periodic table of elements.

He was an inventor and proponent of the metric system, used universally in scientific measurement. He was the central figure in a “chemical revolution” which enlivened 18th century Europe. Unfortunately for him personally, he was attacked as a member of the aristocracy at the time of the French Revolution, and fell victim to the guillotine. In an historical sense, the revolution was “necessary.” But it achieved unparalleled heights of inhumanity in the name of humanity’s pursuit.

During the 19th and 20th centuries, discoveries continued at a great rate.

Dimitri Mendeleev, a Siberian, in the middle of the 19th century revolutionized our knowledge of atoms, arranging all the known elements into a table based on their atomic weights and groupings of their properties. His updated table graces the wall of practically every science classroom in the world.

Chemistry has come to be a mainstay in the development of the technologies which make possible the modern world in which we live.

Physics

During the 19th century, in university systems, and later on the secondary levels, Physics came to be established as a distinct topic of study. Its focus of study came to be the properties of physical bodies. Topics studied were those qualities which seemed to pertain to all physical bodies.

In the 17th century, Newton wrote magnificently on physical science, establishing the general domain of physics, and setting up an understanding of mass, force and motion which remained essentially unchanged until Einstein stretched and deepened our way of looking at things in the twentieth century.

Newton stated his insights in 3 laws. 1st, every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it. 2nd, the acceleration of an object is proportional to the force applied. 3rd, for every action there is an equal and opposite reaction. Simple enough, these “laws” have immense implication and application. They describe the issues of mass, gravity, and motion, and, with their extensions, cover very much about the nature and actions of bodies. We have gone far beyond Newton, but, relative to the starting point of the observer, no more powerful insights have ever been enunciated. Which is the reason that Newton is often described as the most crucial scientific mind of all time.

Einstein assailed our understanding of time and space, stating that these are not absolute, but variable depending of the position of an observer in the space-time matrix. Einstein established the speed of light as an immutable constant, and identified the mutual conversion of mass and energy with his formulation $e=mc^2$.

Foundations of the Universe

It is sometimes said that Isaac Newton in the seventeenth century was the greatest scientific mind that ever existed. There is something odd about this. Science is a sequential social endeavor, and there are all sorts of difficulties, for instance, in trying to compare the relative importance of Newton and Einstein. They were different men living in different ages.

That having been said, it remains true that Newton made a huge contribution to our understanding of the universe – and laid the foundation for the work of all physicists, mathematicians and cosmologists yet to come.

Why was Newton so important? After all, there had been great thinkers before him. Eratosthenes was no slouch as he tried to calculate the earth's size. Copernicus and Kepler, closer to Newton in time, were great mathematicians and astronomers who contributed greatly to our understanding especially of the solar system.

Newton was so important because he was the first human being to create a viable theory of the characteristics of physical bodies and to work out a general mathematical language to describe their actions.

Newton was important because he was the first human to identify how matter works. And to build the mathematics to describe matter's basic actions.

All matter exerts an attractive force on all other matter. This is what we call gravity. The force of gravity is directly proportional to the mass of bodies and inversely proportional to the square of the distance between bodies. Bodies maintain their state of rest or motion. Change comes about only through the application of force. For every action there is an equal and opposite reaction.

So stated, these principles seem simple enough. And, it has turned out that there are problems with Newton's laws. Not in things close to us, but on very large scales. These laws do not intuitively explain the expansion of the universe, nor the way that light acts. However, these principles hold tightly enough to allow us to send rockets into space. They allow us to calculate the motions of bodies in the solar system with great accuracy. Newton's laws were the first formulation achieved by the mind of man for identifying and working with nature's most basic forces. That's why Newton is so important.

Fundamental Forces

The basic forces in the universe are not as easy to intuit as one would like. Identifying what constitutes the universe and what makes it work turns out to be a somewhat rarified endeavor, but it is one which has captured a great deal of theoretical study and speculation over the last two centuries. That is not to be wondered at, since all other forces in the physical universe are related to them, or derived from them.

The second force to be studied and mastered was that of electromagnetism. Electric current is produced when an electric charge move through an electric field. A changing magnetic field produces an electrical field. A changing electric field produces a magnetic field. Because of this interdependence of electricity and magnetism, it seems best to consider them as a single coherent entity, the electromagnetic field.

These relationships are discovered to underlie a great many physical phenomena. Unifying theory and the equations which express the unity were worked out in the nineteenth century by James Clerk Maxwell, a Scottish mathematician and theoretical physicist.

The early twentieth century saw the development of the theory of relativity by Albert Einstein. This rendered irrelevant ideas of absolute time and space, and dramatically altered the perspective on Newtonian concepts of gravity. Mass and energy came to be seen as interchangeable, and the unity of space-time added another dimension to those of tri-coordinate space.

The development of atomic physics by Neils Bohr, and others, identified the strong and weak atomic forces, which hold together nuclei of atoms and explain the phenomenon of radioactivity.

During the latter years of his life, Einstein struggled in vain to reduce the basic forces of the universe to unity. It seems that quest simply is unobtainable.

Study of forces on the level of atoms led to the development of quantum physics by Erwin Schroedinger and others. However, quantum physics and classical (large scale) physics seem simply to be incompatible in any empirical framework.

But – that seems to be the way the universe is. Frustrating, to say the least.

More recent attempts at achieving theoretical unity have produced elegant pure mathematical theory known as string theory. String theory postulates that on a very much smaller order of magnitude even than atoms and their particles there exist “vibrations” – strings – which somehow give rise to nature’s building blocks, and that’s the ultimately small in the material universe.

The reported difficulty with string theory is that it is impossible to demonstrate or disprove its tenets by any sort of experimentation. That in itself seems to take it out of the realm of science and place it more in the arena of philosophy. How these problems and theories will play out over the long haul remains to be seen, and perforce is left to wiser heads than mine.

Mining for Fact

Scientific discovery usually occurs as the result of specialized and focused study. For whatever reason, a researcher brings specialized attention to a narrowed and highly defined observational point. Extraneous data is excluded or neutralized to the extent possible. Scientific discovery tends to be a careful mining of individualized fact. And, individual bits of discovery may or may not contribute much to a general sense of territory.

Individual tiles of a jigsaw puzzle may or may not give much sense of the picture. It may be only after many tiles are placed together in correct position that we begin to see the picture.

After we are able to get together enough pieces of scientific detail, we may be able begin to see a landscape, and see how things fit together in unanticipated ways.

We learned about chemicals, the laws of matter, electricity, radio, and so forth – all the wondrous ways in the minutiae of the universe. Although there are still mysteries about things – string theory is not entirely satisfactory – nonetheless, the adventure of discovery has taken us very deeply into the interior of the structure and workings of the universe.

Study of particularity has taken us to the background of dispersed energy in the universe – the canvas on which all other stories are written.

We can then come back to the world of everyday by building with nature’s basic elements – from sub-atomic particles to atoms, from atoms to molecules, from molecules to the

substances we see around us, to the macro-structure of things, to the bodies of the cosmos, and to the vast reaches of space.

It is certainly not that we now “know it all,” but, Galileo, for instance, would surely have given his eye-teeth to be able to envision the universe as is now, at the beginning of the third millennium, available to us all.

Synergy

It is mysterious how and why things, as we ascend the ladder of organized reality, manifest qualities which are unanticipated from a lower point of view.

Things work together with a functional quality we refer to as synergy.

The whole is greater than the sum of its parts.

Sometimes the result of combining things is predictable. Sometimes it is not.

The way that atoms function is not totally predictable from a knowledge of how protons and neutrons function. The way that molecules function is not totally predictable from a knowledge of how atoms function. And yet we’re fairly sure that such things are determined and not simply haphazard.

The world of ordinary phenomena, our world of everyday, turns out to be composed of elements which have their own existence and function on lower levels. But what can occur on higher levels is only to a certain extent determined by the nature and function of lower level elements. Once things have been added together, new possibilities emerge which are unpredictable from an exhaustive knowledge of lower level phenomena.

Just how to understand this in terms of evolution is not altogether clear, by any means.

It seems strongly probable to us that given the appearance of matter, life ultimately will evolve. Therefore, the emergence of higher functional levels is somehow contained in the original reality.

This quality of things acting together to produce results that are not clearly identifiable in themselves is an instance of synergy. Synergy is common in nature. We share in it and depend on it at every turn.

Yet, it is an enduring mystery how it is that synergy really works.

Consider an instance from artifactual things. A castle is made up of rocks, cut and arranged in a certain way. It is a reasonable question to ask where is the design of the castle. Is it in the rocks? Well, the rocks are all that there is. So, it must be in some way. Yet it is not in any of the rocks “in themselves.”

All of nature seems to be this way. Mysterious.

Life – towards Mind and Understanding

Shifting into the world of life, and then of mind, things get a lot worse (a lot harder to explain). Yet, we can’t give up. This is what our search for understanding is all about. To oversimplify, mind – that operation occurring between our ears, and as we think about these things – seems somehow a product of natural phenomena leading up to it. Yet, it seems to be unpredictable from the functions of its sustaining, lower, elements.

Our minds cause things. There can’t be a great deal of doubt about that. I decide to balance my checkbook. Then I do it. A composer envisions a new piece of music. Then he writes it down and plays it. An audience applauds.

But, before mind can be a cause, it has to be the result of something. Our minds come from somewhere.

Clearly, our minds depend on the development of our brain. Our brain had a history in our mother's womb, and continued to have a history after our birth, a history which includes our grown up, going to school, and all the experiences we have had since the beginning of our lives.

We think in and with language. Language is a very clever and very efficient symbolic system built up from sounds and words.

Our mind is a marvelous example – perhaps the most striking example – of synergy, of things working together to produce unforeseen results.

We are coming closer to understanding the origin of mind and of man than we have ever been, though by no means have all the areas of mystery been dispelled.

A Tale of Two Cosmoi

By 1500 CE, Western man had developed a view of the universe which was complete, in many ways, and gave an account of human life and the universe in which man found himself. It proved, however to be inadequate, and man pressed on to develop an alternate view.

Cosmos II is complete, in many ways, and gives an account of human life and the universe in which man finds himself.

So, we can abandon our search and rest upon our laurels. Or, we can now expend our energies in satisfying our needs and enjoying ourselves, elaborating a calculus of maximized pleasure and minimized pain.

Right?

Wrong! In fact, couldn't be more wrong!

There are two major foci of concern:

- 1) The factual picture, though impressive, is still incomplete.
- 2) There is a major unresolved dissonance between Cosmos I and Cosmos II.

The architects of Cosmos I were not fools, nor were they ignorant. Having developed the techniques of science and the information they provide, we have a strong tendency to push all earlier knowledge to a back space on an insignificant shelf. We do that to our peril.

The essence of Cosmos I was that there is infinite mind in the universe, and that the story of the human race is the drama of man's discovering and uniting with that same infinite mind.

The essence of Cosmos II is that the universe we know had a beginning, and that we have evolved from that beginning – 14 billion years ago – by identifiable and comprehensible steps.

These two views of the world have not in any sense been reconciled.

Metaphysics – If God, Reaching it is Metaphysical

The general views of Cosmos I and Cosmos II have their own bases for validity, such as that may be, and they have never adequately been reconciled.

One idea would be that the world view of Cosmos I was simply wrong, or irrelevant, and that's why it cannot be reconciled with Cosmos II, which is correct. We'd have to consider that as a possibility. However, I don't think that's a good explanation.

The medievalists were convinced that the material world was not an explanation for itself, and that it depended on a transcendent cause external to it. In that, I think that they were correct.

Any intellectual position entails some sort of metaphysics, even though scientists don't like to think about that or attempt to deal with it.

We have a more or less clear understanding of what it means to exist. If we formalize knowledge of existence, and make a discipline of it, we are doing metaphysics. Cosmos I contained convictions that were metaphysical more than physical. We never showed that their beliefs were incorrect, or, for that matter, irrelevant. Rather, what happened is that we discovered that scientific method works, and we chased off in pursuit of the knowledge that it gives. That project, as we have seen, has been amazingly successful. We turned out backs, for the most part, on metaphysics, and, since then, haven't for the most part known what to do with it.

The mindset of Cosmos I was long on metaphysics, short on empirical fact.

The mindset of Cosmos II has been long on empirical fact, short on metaphysics.

That's an imbalance that we really need to do something about.

Quintessential Quandary

Plato, with good reason, wondered how it might be that things are the way they are. Ultimately, he concluded that there must be a world of independently existing principles – forms, he called them – in which the visible things around us must somehow participate.

There are Platonists alive today who basically live in the light of the same conclusion.

Cosmos II

Since scientific method was introduced during the Renaissance, we have learned incredible things about the universe we inhabit. We have not assimilated all this knowledge into the moral stream of our existence. There is at least a significant possibility that we may destroy ourselves or make our planet uninhabitable as a direct result of our being so "smart." That would be a strange outcome to our unparalleled advance in knowledge.

The outcome of our experience on the planet will to an extent be contingent on the choices we make. We will be better able to make good choices if we have a clear realization of the critical aspects of human experience.

An important piece in the project is understanding the scientific progress we have made.

The following are important discoveries we have made.

- *The Universe had a Beginning*
- *The Physical Universe is Immense*
- *An Evolutionary Universe*
- *There are Basic Forces in Nature*
- *Matter is Somehow The Source of Everything*
- *Matter and Spirit are Intimately Related*
- *Physical Evolution, then Cultural*
- *The Pace of Evolution has been Exponential*

VI. Mind

The Mystery of Mind

The reason mind is difficult to understand is that it defies the ordinary canons of scientific discovery and explanation, and we have become accustomed to believe that real understanding is scientific understanding.

Science deals with observation and measurement, or, if we get into mathematical science, with abstractions from what is measurable. Science has been a marvelous tool for learning about our universe. The insights of *Cosmos II* are largely the product of science and mathematics.

Mind isn't that way. "Ouch!" isn't measurable in a scientific way, although there may be many aspects of an "ouch" situation which are measurable. But we are all easily aware of what an ouch situation is, and what is happening if we hear someone cry out in pain. Mind is experience, and as such is an exceedingly complex matrix. But, that shouldn't deter us from clarifying what we mean by mind, or its sister concept, consciousness.

And, it should be clear, if we are going to understand life, or the universe, it certainly would be a good idea to get some basic ideas about our own selves clear.

To understand mind, it is necessary to understand certain things about knowledge itself. In an informal way, we all understand a lot about knowledge. We know what it means to have knowledge about a subject. We know the difference between having a little knowledge and a lot of knowledge about a subject. We know without much fear of doubt that knowledge is something in the mind and not in the refrigerator, or, for that matter, our left toe.

How to explain the mind

Although we think in and through our minds, it may seem difficult to understand consciousness and relate it to the rest of our knowledge. Clearly, man is the cleverest of animals, but he has always been and continues to be something of a mystery to himself. This has been a problem for man since the beginning of time, and a great deal of ink has been spilt on trying to solve it.

The truth of the matter is that it is not really not that difficult to understand mind and consciousness, assuming you approach the problem correctly, but it is very easy to get off on the wrong foot, and, if that happens, you may never get things straightened out. If you begin your journey in a swamp, you may never get your feet on stable ground, and may in fact end up drowning in a bottomless pool of intellectual muck. Which is not so good an idea.

Sensation

Suppose there is an island in the middle of a lake, and, further, that there is a causeway linking the island to the mainland. Traffic is busy going back and forth along the causeway, supporting commerce and communication. But then, someone decides that he wants to study the life of the island "just in itself," without outside contamination. So, he tears down the causeway. He goes here and there, taking measurements and collecting facts. If he tries to structure a theory of the island's life without its connection to the world in which it found itself, he finds that his theories are incomplete, and that he can

never truly make sense out of the project. What he wants to do is to understand the island exhaustively, but he wants to exclude its relationships to the mainland.

What he has set up is an impossible set of conditions for his work. The causeway is what links the island to the reality in which it is situated, and if he destroys that, he will make understanding the island impossible.

Understanding the mind, and consciousness, is similar. The mind's basic link to reality is sensation. The mind does not exist in disembodied fashion, somewhere here or there but unconnected to sensory experience.

Sensory experience is the causeway linking the mind to the universe. Stated differently, mind as we know it is the intelligent life of an animal, and if we try to understand it and mental process in themselves, our premise is false to begin with, and we are doomed to failure.

How do I know that? It's not a fact, in the way a scientific observation is. It's not a mathematical fact in a system of mathematical abstractions. It's based on turning my attention on the fact that I see that I am a certain kind of animal, and I know a fair amount about animals.

Philosophy

We all understand a lot about knowledge in an informal way. If we try to make that formal, we are doing philosophy. Philosophy doesn't come with the best reputation in the world, because over the centuries philosophers have claimed a lot of fairly outrageous or even stupid things. Or, certain philosophical treatments seem so abstruse as to be of no practical use to anybody.

Certain philosophical arguments may in fact become fairly abstruse. But, bear with us, please. Mathematics has proved to be a very useful tool. Without it we couldn't build a TV set or send a shuttle into space. It is generally useful for the layman to understand enough about mathematics that he / she is able to have a general grasp of how a mathematical argument goes. But, at the same time, a mathematician can't go very far into his subject without becoming obscure to the layman. A page full of equations leaves most of us scratching our heads, but it may be stock in trade to the professional.

That can serve as a fair analogy for how philosophy goes. Though there are some differences.

There is no such thing as a purely scientific approach to reality. That's because science functions as a type of knowledge in a larger framework. Anyone who claims the contrary trips himself up before he records his first scientific fact.

"Science is the only real knowledge." Well, if that's true – if that statement is real knowledge – then it would have to be a scientific fact. But, clearly, it is not.

"Tell me whether there are any rational reasons to believe in God, but don't give me any of this philosophy stuff."

That is a non-sensical prescription. If you're talking about rational reasons, you're talking about philosophy. If you are a theist – one who is convinced in the reality of God – there are only two possibilities. Either you accept God's existence as a matter of unreasoned faith – which is certainly not an unreasonable position, although it's one that doesn't stand the test of time or conversation very well – or you have reasoned to God on the basis of philosophical process.

Let's take that a little further. The vast majority of mankind believe in the existence of God – or of some sort of higher being. However, the majority of mankind certainly does not have a philosophically elaborated infrastructure for their belief.

So, where does that leave us?

Our interest here is elucidating consciousness, which is often seen as an irreducible mystery.

I don't think it needs to be either a mystery, or irreducible. But, if we're going to explain it, we have to be ready for some non-scientific statements, for though aspects of consciousness can assuredly be made the object of scientific investigation, a knowledge of consciousness in itself is not strictly scientific knowledge. That doesn't mean it isn't real knowledge.

But, enough of talking about it. Let's pursue it, and see if we can shed the essential light we're interested in.

Modernity

The modern mind invented scientific method.

Rene Descartes was a major contributor to the formation of modern mentality. The philosophy he was exposed to during his school days at La Fleche seemed sterile and full of arbitrary definition to him. Mathematics seemed to him much clearer and more certain to him than the Aristotelian analyses of hylomorphism (form and matter), so he embraced universal doubt, and ended up finding certitude in his own existence, because, at least, he was aware of his own thinking. However, to structure a certain system, he tore down the causeway of sensory experience. Having done so, he could never find his way back to reality.

David Hume, the English empiricist, decided that the only thing he could rely on was empirical data, but not on any invisible causal linkage between observations. If he kicked a stone, he could see his foot move and stone go flying, but he could not see any link between the two, so all he could say is that this followed that, not that this was caused by that.

Immanuel Kant decided that mind and mental process needed to be studied in themselves to establish a true understanding of mental function. He found the basis for our understanding of causality not in our conceptualization of an actual physical universe, but in the intrinsic nature of the mind.

The analysis of language in the twentieth century became a method which it was hoped would clarify thinking and establish the possible limits of language and mental process. Central to this project was the idea that the meaning of a word is the way it is used in language ... that if one developed a sense for usage he could understand the proper significance of possible language, and purify thinking of meaningless abstractions. Phenomenology, generally, takes the point of view that what the mind knows are the contents of experience, and that we can understand thought and experience by studying mental process and product. This, unfortunately, has resulted in the development of highly specialized language referring to the internality of psychology, but not necessarily elucidating much about our knowledge of ourselves or our universe. Phenomenologists, in my experience, can talk to each other, because they have developed a certain sort of shared code, but ordinary intelligent people may wonder what in heaven they are talking about. It's not simply that they are talking a technical language. Any specialist to an

extent does that. Rather, their language is internally generated, in the sense that they are building abstractions on their own abstractions, which seems to me to have little relevance to anyone other than themselves.

Descartes' Big Mistake

Rene Descartes (1596-1650) was a child of modern thinking. He has also been one of the major architects of the modern mind. Therefore, parent as well as child. Even though he was seriously wrong on very basic issues, his influence was sweeping, because of the vitality of his thought and important work that he did in physics, optics, and, particularly, mathematics. Few other individuals had as profound influence in shaping modern thought. For that reason, it's worth understanding some important things about him.

Descartes, being unhappy with the sterile philosophy he learned at school, felt it necessary to strike out on his own to develop a certain system of knowing. He decided to imagine a worst-case scenario. If he could figure his way out of that one, everything else would be simple by comparison.

Descartes decided, then, to start at a position of universal doubt. He would then, one by one, add foundation stones as he could accumulate them, creating a basis for knowing, and then adding to it only things of which he was certain.

His basis of knowledge was to be found in his central dictum, "I think, therefore I am." Even if the universe were created by an evil genie, whose aim was to deceive, Descartes could be certain of his own existence, because of the immediacy of his own experience in thought. He then decided that the norm for accepting ideas to be added to his system was that they be "clear and distinct." This, for a budding mathematician, was not a bad idea. In opting for clear and distinct ideas, Descartes was laying the groundwork for rationalism, a philosophical movement of great import which held, generally, that truth is to be found in the nature of our concepts and their relationship to each other. Truth, for the rationalist, is the internal validity of thought itself.

The connection between sensation and thought was not at all self-evident. It was not, at all, a clear and distinct idea. That troubled Descartes a good deal, and the solution he worked out was not one we would easily accept. The problem was: how could Descartes possibly know that the relationship between our sensory experience and our mental experience had any validity at all?

There seems to be an ongoing stream of sensory experience, and, likewise, there seems to be an ongoing experience of thought. How could they be joined, if the only things we could really know are the things occurring in our mind? After thinking about it, Descartes decided that there must be a good God in the world, and that, contrary to his initial supposition of a malignant genie, God could not be involved in intrinsic deception. Therefore, God must, in a somewhat miraculous fashion, keep up a congruence between the mental and the physical. Sense and thought are linked because God links them! And the place where Descartes decided that spirit and sense were linked was rather odd: the pineal gland.

Not at all a cool move. If you understand where Descartes was beginning and where he headed, you can understand why he made the intellectual moves he did, but in the last analysis, his basic explanations are not good ones.

Biocus as Starting Point

The world of mind and consciousness is unlimited. Although an individual thinker always needs to be thinking about something, there is no practical end of the things we can understand or think about. This engenders uncertainty. If we are going to think about things in an orderly fashion, we have to start somewhere, otherwise we can get lost in the traces of confusion.

The best place to start, and to be able to return to as a reference is the biological locus of mind. Starting, we do so without apology and without justification. If we want to come back later and explain inside our “system,” we can do so. But, our basic contact with reality is unreasoned, so that’s the way we should start.

When we pop out of mom’s womb into the somewhat challenging light of day, we are already conscious, to a very high level. But our consciousness in that phase of our existence is poorly organized. We do not initially have a very well defined sense of who we are or what is going on around us.

The human brain has evolved over centuries to function using symbolic communication – language. At birth, the brain is continuing to develop. But it is from the beginning hardwired for verbal communication. The human neocortex, by comparison with any other animal, is selectively developed, and grows both in size and complexity far beyond any other animal. That is what, beyond everything else, gives size and shape to the human head, with a forehead and an enlarged cranial vault, and a relatively small face tucked in and under the brain’s frontal cortex. Although there is enough developmental variation that individual skull configuration does not correlate very well with individual function, it is still not entirely without basis that we refer to certain mental attitudes as “lowbrow.”

The human infant starts showing response to language very early in life, and through the second year, most human are very busy building passive and active vocabulary. As we grow, we add more and more linguistic function, and more and more ability to reason, understand and communicate.

This is the biological locus for language and for mind. Mind may go on to function with a high degree of sensory independence, but its basic ties to reality are not abstract or spiritual. They are animal and rooted in sensory experience, and if we lose hold of that basic causeway to reality and truth, we are liable to think in weird ways and build shaky theories.

Consciousness is intellectualized animality – and that’s an essential (and distinctly non-Cartesian) truth!

Sensory World

Basic to our experience is our sensing of the world around us – and, of ourselves in that complex. Animals existed before humans. Humans in fact evolved into a context of animal consciousness.

All matter is somehow dynamic and reactive. Push on a molecule and it reacts by pushing back at you. It doesn’t “like” having its sphere of influence infringed on. That’s the way it is, and it doesn’t take choice for the molecule to make that happen. Molecules are determined to be that way.

Molecules didn’t just remain that way. They did for a long time. It seems to have taken quite a while – millions of years – for nature to have tried out enough options to get the

process of life started. Still, given the environmental conditions for life, life will appear. This is mysterious, in the sense that we do not understand it, entirely.

We discovered in the late 1970's that life has formed – apparently a previously unknown evolutionary ecosystem – at deep sea vents at tectonic plate spreads. The energy source for these biosystems is the internal energy of the earth itself, ultimately arising from the radioactivity of the planet. Life could develop here. Life did develop here. The deep forces of the universe are such that the basic building blocks of nature will form self-replicating aggregates if given the opportunity. We seem convinced of that as a general principle, though there remains a good deal more work to be done to develop a full understanding of the implications of that.

Organisms developed internal communication systems of increasing complexity as they became more differentiated and more capable of organized response.

Abandon Hope, All Ye Who Enter Here

Our quarry, at this point, is to elucidate consciousness. A set of corollaries to this concern is the understanding of how thought has evolved. One of the basic problems we humans face in working out a basic understanding of ourselves and our world is that we are alive and functioning way downstream from the beginning of the story of our universe. Lots happened before we showed up to wonder about it. Our organized bodies evolved first – and evolution afterwards has been more in the area of cultural development than of continuing evolution of our bodies. We became bipedal. We became large-brained. We developed culture. Writing helped a great deal. We have since gone through 3000 years of cultural development – first, Cosmos I; then, Cosmos II – now, the present.

Descartes, for reasons that can be understood, made, notwithstanding, a huge mistake. He abandoned contact with the sensory world. He wanted something that was more reliable than mere sensation: he wanted something that was certain – he wanted clear and distinct ideas as the basic building blocks of his system.

It won't work. You can't get there from here.

Our contact with the sensory world is basic, and primary. If you once, for philosophical or other reasons, give up sensory contact with the material world, there is no way to re-establish it.

Descartes was discouraged with the sterile philosophy he learned at the Jesuit college at La Fleche. It was only mathematics which appealed to him, because of its clarity and internal consistency. It is easy, in retrospect, to understand why Descartes turned to rationalism, but, considering where science since has taken us, it would be hard to imagine someone making the Cartesian mistake today.

The idea of parallel worlds of thought and sensation magically joined together at the pineal gland would seem ridiculous today.

Evolutionary Phenomenon

Humankind happened on earth, at a particular place and time. As we have seen, it was during the life space of *Homo Erectus* that primates became fully human. This occurred between 1.5 MYA and .5 MYA, roughly. *Homo Erectus* strove to create words and understanding, and by so doing stimulated brain growth. Generation to generation, this growth in the brain – language complex was transmitted to the reproductive genome.

And here it is that I part company from strict Darwinists, nevermore to see natural selection, in a restricted fashion, as the forming process in evolution.

Narrowly understood Darwinian theory would posit that change mutations which contribute to reproductive success are preserved in the species, and in fact guide the stream of evolutionary development.

There is, in fact, very weak evidence that, on the level of higher animals, chance mutations have improved the species. That is much more a philosophical hypothesis than a matter of physiological evidence. Additionally, the link between growth in the brain language complex and reproductive success is also hypothetical. Reproductively, mice and rabbits do quite well.

What seems to me to be much more likely is that in a Lamarckian fashion (although he didn't have a explanation for how that might work) is that stimulated growth brought about by experience was signaled to the genetic genome by the internal communication systems of the body.

Contribution of Evolution

There is a very intimate union between brain function and mind function. In itself, of course, this is scarcely news. Brain science and experimental psychology strongly support the relationship between brain and mind. It is hard, in fact, to see how anyone acquainted at all with neuroscience today could feel that it might be otherwise.

What is not exactly common doctrine today, however, is the intimate specific evolutionary relationship between the development of us humans from high class apes into fully intelligent and large brained animals, with that phase of evolution being much more closely involved with linguistic stimulus than with natural selection in a Darwinian sense.

To review, the core of this idea is that striving to use language to cope with the challenges of life – and later for its own attractiveness – stimulated brain development. And that that brain development, generation to generation, was signaled back to the reproductive genome via molecular informatics, or other of the body's internal communication systems..

The idea that the brain increased in size and function first, by some sort of natural selection, and only later “discovered” somehow or other that it could be used for spoken language seems just silly to me.

During the years of Homo Erectus – roughly between 1.5 million years ago and 0.5 million years ago, language was already highly developed. Chimps have a kind of language. Lucy – at 3.5 million years ago – had a larger brain and a larger language capacity. Over the million years or so of the dominance of Homo Erectus, what happened, I am convinced, is that individuals strove to understand things more, and to invent a wider vocabulary with which to signal and convey that understanding. In the individual, this led to proliferation of brain connections and indeed to proliferation of brain cells. By this very act the brain increased in size and complexity – and that this increase was incorporated into the genome of the animal.

Origin – Primate Communication

Animals communicate. Primates communicated, and developed “natural language.” Sounds, roughly specific to circumstances and situations. Lucy discovered she could

shape sounds more specifically, and created the ability to form words. Note that I say this somewhat figuratively. “Lucy” here stands for our primate ancestors. It would be silly to say that “Lucy,” the Australopithecus, had a developed verbal language. My point is, rather that it would be equally silly not to try to understand what her position may have been along the language spectrum.

Language can best be understood as an extension of animals’ ability to communicate by natural sounds. Long, long before animals with internal lungs had come anywhere close to developing true language, they had developed musculature to close off the respiratory tree from the alimentary canal. This happened so that you wouldn’t drown when slaking your thirst. This musculature developed in hominids into vocal cords – as they used command of a column of expelled air to form specific sounds, on their way to becoming words.

Our ancestors separated from apes 6 million years ago. Lucy stood half way between that split and us. The pace of evolution has been exponentially rapid, as our ancestors developed civilization, written language, spiritual culture and now modern culture with a solid empirical base.

Chimps have a fairly wide repertory of specific sounds to signify specific situations. They can be taught simple language, well beyond what they developed through their own ingenuity. We do not know what Lucy could chat about – or, in actuality, whether. But we do know that she had already undergone considerable evolutionary change. She had several humanoid anatomical features, including bipedality, an opposable thumb, a relatively smaller and receding face, and a developing brain, although we cannot recreate its exact structure. The full advance towards humanity came mostly during the million-plus years of Homo Erectus.

Our ancestors took the capacity for specific sounds which evolution had given them, and – oh! so slowly – learned how to create much greater specificity by making slides and stops of many sorts at the beginning and ends of small sound packets, and by modulating the continuous sounds in the middle of those same sound packets. That’s what made consonants and vowels. Some languages developed other ways of adding specificity to the sound stream, such as using systems of clicks or tonal modulation, bringing about finally the veritable symphony of languages displayed by extant humans.

Brain – Language Complex

There was no time or phase in the process when meaning was introduced; it was there from the beginning, whenever you might want to create a check point. What happened is not that meaning was introduced at a point, but rather that meaning became, over eons, more artificial, more abstract, and infinitely richer. There is meaning in a chimpanzee’s territorial cry, but clearly a great deal more in the vocables of an article on international politics or on a technical aspect of atomic physics.

The language system in man is extremely complicated – well-nigh infinitely so in its elaboration – but luckily we don’t need to know all about the detail to be able to use it, or, at least to a certain degree, to be able to understand it.

The entire human body may be drawn into the language matrix, as when the head is nodded to signify assent, or a finger is drawn across the throat to signify either putting someone to the sword, or, less drastically, to cut off someone’s time or course of action.

But, more restrictedly, the core of speech is to large degree contained in the head, comprising in particular the brain and the structures of the mouth and throat, along with the complicated neuronal networks and cables it takes to achieve the necessary communication.

Viewed in that way, the speech core exists in what is a quite small anatomical geography, mostly within the skull, but with the end organs of speech nearby, all of it being within an approximately six inch span and weighing in the aggregate scarcely a pound or two. But, within this physically tiny universe of organization, there exists the most highly differentiated and by far the most complicated system of systems of which we have any knowledge.

The hominid brain expanded its neocortex to accommodate linguistic usage. Concomitantly, linguistic usage continued to stimulate neocortical expansion.

Language

Take a date – say 1,000,000 years BCE. That’s 2,000,000 years and more since Lucy. Humans had preserved very little in terms of cultural artifacts or stable places of habitation. They were many a country mile away from inventing writing, or even leaving pictures behind to suggest ideas to their descendants. But they were by this time making stone tools, or at least taking stones from their environment and improving on their utility by shaping them beyond what nature had done on mountainside or stream bed.

Envision a small group of humans sitting around the campfire. One of them makes a modulated sound, and another hands her a stone he has been working on. We can never know just what the communication was like at that point. But, as a shorthand, let’s imagine she grunts out “stone!” (or some other formulated sound). And the activity occurs.

Some highly intelligent thinkers believe that language started only with what we can identify as *homo sapiens*.

To me, this seems silly. To think that there were animals, our ancestors, at 1,000,000 years in the past, who used stones as tools, built fires, hunted megafauna, and lived in social groups – but didn’t talk to each other about it – just doesn’t make a lot of sense.

Brain Function

The theory of evolution so stated has highly theoretical aspects, more based on philosophical convictions than on empirical data. Not so current neuroscience. It is highly involved with and dependent upon advances in neuroimaging and laboratory investigation.

We are at a point in the development of neuroscience where we can measure brain activation more and more directly and more and more satisfactorily. Our knowledge grows by leaps and bounds both about the way individual neurons are structured and work, and also about the way that neurons work in concert with each other in the nuclei and tracts of the central nervous system – the brain.

Current research points more and more at the ways that information is coded in neurons and neural tracts.

There are serious limitations to research that we can do on the intact and functioning brain. There are certain phenomena you can’t measure without destroying the neuron you are interested in studying. Then, there are certain things you are convinced are

happening, but the measuring instrumentation is not precise enough in its measurements to tell you exactly what is occurring.

But, there is a growing conviction that for every aspect of neural functioning, even of conscious experience, there is a highly specific pattern of brain activation to express that specificity in function.

Core of Knowledge – Sensory, not Intellectual

Mind as we know it is intellectual consciousness, mediated by the development of our brains, with their powerful ability for symbolic language.

All reality is reactive on some level. In living forms, reactivity is found in the integrated responses which are specific to complicated communicational systems.

The systems proper to animal reactivity become more complicated in infrastructure, but less complicated and more generalized in content as we ascend life's ladder. But sensory experience is more fundamental than intellectual experience, and intellectual experience is built on it. Sensory experience is direct, and not the result of reasoning. There isn't much to explain about it. For instance, the experience of pain is very real, and we know what it is. But pain doesn't have much at all to do with ideas. You can't break it down into conceptual components, because it doesn't have conceptual components. Our capacity to experience pain has nothing to do with ideas we might or might not have about it.

It is a non-sensical request to have an explanation of blue. Blue, like all basic sensory components, doesn't have, but also doesn't need, an explanation. The experience is a sensory given, a datum.

If you have never experienced "blue," all the explanation in the world will not help you to recreate the experience. If you have experienced blue, any explanation is pointless.. Note that this isn't the same as saying that we cannot give an explanation of the physiological substrates of pain, or blue. Neuroscience gives us very detailed understanding of what it is that is happening physiologically, at the level of the central nervous system as well as at the level of the end organ, to allow us to have the sensory experience, but the vast range of physiological components to pain, or blue, is not the same as the experience.

And, our basic contact with reality is sensory, not intellectual.

Added to Sensory Knowledge – Via Cortical Development

Although we can't *prove* it, common sense, as well as more specialized reflection, strongly suggests that our perception of pain is pretty much the same as what occurs in other highly developed animals such as horses, cats or dogs.

Animals learned to react in highly specific ways – ultimately by attaching particular sounds to particular sensory input complexes. Monkeys, for instance, attach specific sounds to specific sights.

Our pre-human ancestors learned how to refine animal noises and attach more specific sounds to them. One can imagine an erect animal, humanoid, holding an object in its hand, showing it to her mate, and stretching her capacity to communicate about it. By comparison, this would not be that much different from watching a small child looking quizzically at a parent and searching for a word to use to describe a new kind of toy that it had found.

This very act challenges the brain to lay down new connections, and even to generate new neurons. It is important to realize that none of this happens in an isolated way. The operation is a complex operation, with many structural and functional components. The lips purse in a specific way; the vocal cords tense just so; the diaphragm tightens and relaxes; the intercostal muscles contract; the brain use already developed connections and activates new ones; brain networks “light up”; new interneuronal activations are established; new adjustments are made to protein structure; proprioceptive feedback occurs, extending the feelings and awareness of the animal as a whole; ancillary muscles of communication are activated; feelings are elicited; the communicational and social matrix is extended between two animals; language and understanding expand; the animal is becoming more human.

All of those steps occurred, otherwise later evidence of developed language would have been impossible.

Why Man?

It becomes clearer and clearer that something very similar to what is described here occurred.

What is more complicated, and more mysterious, is why these same things didn’t happen in other animals.

It is certainly related in a general way to why it is that the forward evolutionary highway stayed open and available to hominids, while it was foreclosed in other animals.

Generalized, it seems clear that open-ended biological phenomena cluster together. But, how and why this happens is mysterious.

The opposable thumb seems to be part of the open-ended complex. An animal with the powerful paw of the panther, with its marvelously sheathed talons, is not going to learn how to talk. It has opted to fill a niche in the animal kingdom, and is satisfied with doing a very good job on that particular branch.

Knowledge - Consciousness

We can understand any particular modality of sense – sight, for instance – in terms of its physiological components. Form, color and light exist in the external world. These aspects of the external world get represented through the eye, projected onto the retina. The retina is highly innervated, and the impressions of form, color and light are very specifically represented in the brain – and are integrated into the common sense of the animal.

Would the animal be unaware of the character of sight? Not likely. A dog, or an eagle, can see things in great detail and is aware of them. That is the prime paradigm for consciousness. We can understand all that – but we also have to accept it in our own experience and identify it there. That is what it is to be conscious of something, and that is the basis of all our consciousness and knowledge. On the one hand, that is highly complex. On the other, that, in a sense, is all there is to it. Whether it’s sight, or some analog of that in the other senses, sensation is in some way a primary given, and that is the basis of human consciousness.

What we have added, through the complex process of evolution, to basic sensation is the symbolism of language and reflection.

If we start inside the mind, as some have done to their confusion, consciousness, this bright light of intellectual awareness, seems mysterious and inexplicable. If, on the other hand, we start from the vantage point of considering consciousness in the full richness of its biological context, it seems to be complicated – yes – but very much less mysterious or hard to explain.

Brain States

The neo-cortex in the human is much more highly developed than in other animals. A pattern of brain activation in a human can be much more complex than in “lower” life forms. It can “contain” a set of sensory images held in memory, as well as a “word” which represents some underlying reality. A human infant is born already with a physical predisposition for language.

An activation pattern in a human can represent either a sensed “thing” in the environment, or it can operate on its own products and utilize pre-established elements as substrate, to which new words (and new activation patterns) can be attached.

Here is an important part that has to be understood (recognized). As such it is not specifically a measurable entity. The activation pattern, which is a brain state, is a biological phenomenon, and is in and of itself part of awareness. It is directly an element in consciousness. In a sense, it has two “sides.” One side is the complex brain state. The other side is its being a part of awareness, or consciousness. As such, signification is involved. And signification is not a direct sense datum.

The human construct includes an activation pattern (a specific brain activation pattern, which can be only partially measured), a “word” (an arbitrary sign assigned within the system), a “meaning” (capable, basically, of any degree of abstraction or complexity), and an experiential status (the conscious component). These elements do not exist separate or distinct from each other as physical parts, but as part of the complex nature of human consciousness. They are aspects of a living unity, and not things different in themselves.

Content and Syntax

As the system grew, its ability to signify things developed in richness and complexity, so that the animal became able to talk about everything in its experience.

As we can see now, looking back on the history of human thought, man’s ability to find understanding in the reality around him is rich and apparently infinitely variable.

As the system grew in complexity, information developed into its own systems, which could then be studied and talked about in itself. It developed internal rules and categories.

Words develop meanings in themselves, and it becomes possible to study the internal relationships between ideas. The relationships between ideas can in fact become infinitely complex, as we try to define the implications between areas of our thinking. It is in our thinking that the world first presents itself to us – and we present ourselves to ourselves.

The Mind

The basis of mind is the matrix of sensation. It is not a good idea to start anywhere else. If either this

Philosophy

If we want to be able to talk about which things are true, and which are not, there is no way to get around the need for creating theories of thought and of ideas. This has got us historically into all sorts of trouble, and, in fact, continues to do so.

Descartes made all sorts of problems for us by setting up the problems of dualism. He decided to start from a position of universal doubt – the problem is, if you start there, you can never get back. The reality is that the basis for knowledge is our sensory perception.

However, as humans develop concepts and invent the words to stand as symbols for them, the process moves away from the primary sensory data from which ideas were formed in the first place.

Concepts originally arose from the process of using words to name things in the world in which man found himself. Once concepts are formed, however, and once we have invented words to symbolize them, the elements of thought and of consciousness themselves can become the subject matter of further abstraction and symbolization.

Defining Consciousness

If we want a definition of consciousness, which is more important for information purposes and communication than it is for discovery, we could define consciousness as a matrix of experiences in which we have awareness of the self and the environment.

It will never be possible to give a precise definition of consciousness because consciousness is anything but precise.

Stated somewhat otherwise, we could say that consciousness in humans is the sensory awareness present in all higher animals to which symbolic experience and expression has been added through evolutionary process. But, the basic canvas on which our experience is drawn is sensation, not intelligence.

Early in life, we teach to our kids the I – you distinction. We teach kids their name, and we encourage them to establish a sense of identity and integrity of experience. We grow up being able to say, “I want that.”

Consciousness –

So, having come this far, how can we summarize our understanding of consciousness?

We can say that consciousness is intellectualized sensation. The problem is that we cannot have an intellectually internalized understanding of sensation. We can recognize sensation. We can understand it in the sense of understanding its physiological components.

Mind in a human is not a fixed commodity. It is a highly individualized product, brought about through education and experience. There are analogs in the minds of each of us, and that’s how and why we communicate, but mind is a highly individualized commodity. That’s how culture and civilization have grown.

If we need a generalization, we can say that mind, or consciousness, is symbolized sensation.

VII. Human Adventure

Metaphysics

Although they lost perspective about it, medieval thinkers had important insights into metaphysics. Even their good ideas were tangled in with convictions about revelation and church authority, making it difficult to tease things apart. There may be a place for revelation, or perhaps not. There certainly is a place for basic intellectual insights into existence and contingency in the universe. But, however judgment needs to come down on that issue, these things are certainly not the same.

There is a thread of powerful metaphysical insights that ran through medieval university thought, and it is largely a thread that fell out of our grasp as we flexed the muscles of empirical observation and mathematical understanding.

Does God exist?

It is not a good idea to start out asking whether God exists, because that question carries with it too much baggage. The problem, succinctly put, is “whose god?” or “what god?” In western society, in general, when we ask the question “does God exist?”, we most commonly mean “does the Biblical God exist?” Is the personal God of Abraham and Jacob a reality? Is the God with whom Adam walked in the garden a real person? When we’re talking about our rational understanding of the world we inhabit, those are risky ideas, and not good places to start. The reason for that is that those questions arose initially in the context of a pre-rational understanding of the human situation, and, perforce, they are steeped in metaphor and poetic expression.

A better point of departure would be asking what can we know about the ultimate nature of the universe, or what is the ultimate nature of reality. And those are not historical questions, nor are they empirical questions in the sense of asking what are the ultimate packets of energy, or the number of stars in the heavens. Such questions are metaphysical questions, and, as such, they are beyond the realm of science. Of empirical science, that is, science in the ordinary acceptance of the term.

Science and Metaphysics

Since the dawn of modern empiricism, there have been numerous attempts to solve metaphysical problems according to scientific methods. Or, put another way, there have been numerous attempts to crowd metaphysics into science. The problem is, it won’t fit. What does causality mean? is a metaphysical question, not a scientific one, yet we all understand what the question means, and we can recognize that it is important.

The most basic questions about our knowledge, and about the universe, are metaphysical questions, and outside of empirical science. There is no way to test them, and no way to measure them, yet they are of critical importance for understanding our universe – or, for that matter, any possible universe.

Contingency

In itself, our world could either exist, or not. That is to say, there is nothing that we can identify in our knowledge that says the world has to exist.

Anselm – The concept of God

Aquinas –

God and Science

Our world – one of many possible worlds

A Long Way from Lascaux

We are a long way from the wall paintings at Lascaux – and, therefore, from all the other thousands of stone age relics that are scattered below and above ground throughout Europe, and, for that matter, many other parts of our world.

Lively Planet is one version of mankind's story since those wonderful early years 20,000 years ago, approximately. It is far from being a political or military account of our adventures. *Lively Planet* is a version of the human story which emphasizes aspects of the human adventure which have to do with the expansion of knowledge, the adventure of discovery, and the expansion of the human spirit.

By comparison with other major cosmic phenomena, changes on *Lively Planet* have occurred with staggering rapidity.

Changes have occurred in our attitudes towards ourselves and our culture.

We have struggled mightily to get our heads out of provincialism into the cosmos.

We have had to overcome heroic obstacles to self-understanding. We have been becoming comfortable with the ideas of evolution on our planet, in the race, and in the cosmos.

The processes are more and more understood by which first biological, then evolutionary culture has occurred.

We have startling new insights into the nature and significance of mind in the universe.

In spite of progress, the material and social inequalities in the family of man are huge and shameful.

Appearance of Mind – Cosmically Quick

Charles Dickens makes it clear at the beginning of *A Christmas Carol* that unless you realize that Marley is dead, there is nothing marvelous about the story which is about to unfold.

Somewhat similarly, unless you realize how recent in Earth's history the appearance of human consciousness has been, and how rapidly it has developed as a phenomenon, much of what comes after will not appear too startling. We are creatures of habit, and there is nothing that seems more natural to us than our own awareness, and, to get things in any kind of fair perspective, we need to be conscious first of all how really unusual we human are, and secondly, how truly wondrous are the mechanisms and means by which our ancestors, and more lately we ourselves, have marched out of the mists of times past. This has been a huge change in the universe, and, moreover, it has occurred with incredible celerity. Not only has it been unbelievably rapid. Its pace also has accelerated exponentially, as though our minds from that point of view, were bodies in freefall through space.

It is fairly easy for an intelligent human to learn a lot, just given the opportunity for a little education and exposure to life's adventures. It is nowhere near as easy to develop a humane perspective on the broad job of being human. *Lively Planet* is an attempt to present such a perspective. It is my job to make the attempt; it is your job to decide how successful it is.

Understanding as a Platform for Next Steps

We go forward on the basis of our understanding of things. Clearly, this understanding varies a great deal from individual to individual, and from one time to another. But, "now" is always the port from which we sail. It could not be otherwise. You always have to start out on the next leg of the journey from where you are, not from where you would like to be.

What we understand about our surroundings and ourselves necessarily is the platform from which we set out to take our next steps. The demands of life, of circumstances and survival necessarily place limitations of our range of options. If you are sharing an ice floe with a polar bear, and he starts developing a hungry look in his eyes, there is precious little margin for discussing choices and options. You do what you must, and the devil take the hindmost.

Origins

We need to understand and accept that we are swimming in a river of experience that is wide and long, a veritable flood of data and beliefs.

If you try to trace a physical river to its source, you get to a place where you can no longer see a dominant channel, and where little streamlets run off through marshes and up quiet valleys. The river ultimately loses its identity.

It's not that much different when we deal with our rich and bounteous river of human experience. We sprang from animal beginnings – from the line of primates, which goes back millions of years. But as we trace our ancient history and our inheritance, we lose our identity and get lost in the marshes and quiet valleys of prehistory. By the time we can identify individuals and even specific groups of individuals, we are dealing with the fossil record and with the wellsprings of biology on the planet.

Would that we could have a complete record of our descent! Each individual in the line of ancestral experience. What he or she looked like and knew, what was his or her experience, what was his or her folly as well as his or her wisdom. What belief systems controlled their spirits, and how their strivings controlled their belief systems. How language was formed, and how language formed experience.

If we had this record, it would be a lot harder to hold onto some highly cherished misconceptions. Unfortunately, memory tends to be shorts. We know only the latter stretches of this marvelous story and we know them only incompletely.

Religion – Philosophy - Science

We cannot, unhappily, reconstruct the thought processes of the cave painters at Lascaux. It is only when we had invented writing that we could leave anything like a mental record of things. Only then could we know the minds of our ancestors.

Ordinary life, politics and war have always gone on, one way or another. Our first efforts at reducing things to intellectual order involved religion and philosophy in particular. We

wanted to identify and appease the major forces in the universe surrounding us, and we wanted to understand the make-up and function of things according to their most general causes. In the West, after Rome's greatness, we solidified things greatly in the Christian church. Certainly, there were advantages to this, and the intellectual culture that developed contained a great deal of psychological and objective truth. It also created a platform of general acceptance from which we could launch further important intellectual as well as practical projects. It gave a vehicle which could channel and carry the energies and interests of thinkers and does for several hundreds of years. Minds and lives that were dedicated to furtherance of the general project. This resulted in important national literatures, in the development and preservation of law, and in the building up of highly differentiated and highly successful cultures. Its concept of truth, however, became the property and precinct of a particular class, or even caste. And that has always been dangerous.

The educational processes of the Church and the universities encouraged the processes of the mind. That grew within the matrix, and eventually the urge was irresistible to shed the exoskeleton, very much as happens in lobsters. It was impossible to do this in an orderly fashion.

People developed a vested interest in what they believed to be truth – and they did not easily let go.

The Empirical World

As the Middle Ages drew to a close and the Renaissance bloomed fully in Europe, civilized man found himself with a very mixed bag of intellectual phenomena, which he didn't understand at all well in themselves, and with their implications. What happened was a clash of ideas the results of which we still very much live with today.

There was a considerable appreciation of the literature and philosophy of the classical world – the world of Greece and Rome. A personal, all-powerful God was thought to have created the world, and, within the world, the human race in particular. The Old and New Testaments of the Bible were held to be infallible truth, and the drama of sin and salvation as personified in Jesus Christ was taken to be a literal truth. To explain the physical world, the assumptions of the "ancients" were taken quite literally, but at the same time, the evidence of the senses and of experience pressed quite heavily on the established system.

Things were headed to an unavoidable catastrophe, and the catastrophe occurred. The Protestant Reformation challenged the autocracy of the Church. Wars of Religion ensued, with endless gallons of blood spilled in a hopeless tangle of belief and of national interest.

Out of this far-reaching maelstrom, natural science continued to leap ahead, with Newton, Bohr, Einstein, Hawking and countless others meeting and conquering horizon after horizon.

Closing on Exhaustive Understanding

How much longer will the empirical horizons of the world continue to recede?

That, of course, is something we cannot know. Humans in earlier times have thought that just about everything was known that could be known – only to realize that they were barking up the wrong tree, and that entire other domains of understanding were possible.

There is a good deal of unity to the current explosion of knowledge that we have been in for the last 500 years. As we have learned more about physical science, it has become clearer and clearer that things in areas which previously seemed to be separate phenomenologies are in fact closely related.

Throughout the 2nd half of the twentieth century, theoreticians have been striving to complete at least part of the scientific challenge via the development of the GUT, the Grand Unified Theory.

It is not altogether clear how close to achieving that we really are. Nor is it clear just what kind of difference it would make if we succeed in the attempt.

All to the good? Hardly.

The grand collision between theories occurred. Chaos reigned. Heads rolled and blood flowed. Have we worked out how to fit the puzzle of different ideologies together? We have not.

Questions, Questions, Questions

Our ancestors built, over centuries, a magnificent spiritual edifice, which, however, proved to be inadequate, not because its scope was not large enough – its stretches of grandeur were more than enough to challenge and satisfy the human spirit – but because it became more and more evident that its empirical foundations were lodged on sand rather than on bedrock.

We responded to this anomaly by taking time out to investigate the deep physical truths of the universe, and this venture has been astoundingly successful.

And, what we discovered, to our combined dismay and satisfaction, is that the world – the universe – is far different than we had thought it to be.

This has left us with a problem, which, in a nutshell, is this: we clearly have been unwilling to abandon our spiritual view of the universe, but not seeing, either, how to integrate it with the “modern” view of the world as being composed entirely of matter, with us in it as an evolutionary derivative.

During the first big phase in our history, we believed that the universe depended on infinite spirit. The second big phase has filled in much detail concerning how the universe is, on the basis of empirical evidence.

The universe seems to demand infinite wisdom, to create the plan we find in the universe about us. The universe seems to demand infinite power to make the world real.

And now –

It has been an eventful ride, as we have been passengers on this rotund and eventful adventuring planet. We cannot help but wonder what will be the outcome of all this activity.

There are many humans alive who believe that an overseeing deity controls events on earth, and that he will allow human affairs to run their course until at his good will he decides to bring things to a halt – after which he will make his judgments about the world to come, and will institute the kingdom that he had planned from all eternity.

Probably this is not the way the universe works. The history of our planet so far has been the history of mind evolving, and it does not seem likely that this is going to stop. Mind first evolved biologically, and since man first became man has been evolving culturally. Why would we think this will not continue?

If you have stayed with me through the course of ideas in this book, you will realize that at the end of the day, I am a theist. I hold that there is a God in the universe – that this universe demands infinite mind as its ultimate source. However, rather than seeing God as terrestrial and cosmic Chairman of the Board, the universe to date presents itself as having been an evolutionary adventure, and it seems most likely that God works in and through natural process – so that evolution is in reality the presence of God in the universe that he (she, it) has created.

Is God omnipotent in the sense that he could have created us in a more perfect state so that we would not have had to go through all the stress and pain we have engendered and endured in our efforts towards the light? There is no possible way that the human mind could answer that. The best we can do is to play the cards the way they are dealt – and a dimension of human responsibility is figuring that out as best we can.

The Burden of Intelligence

It is easy to be totally occupied with the flow of everyday, the flood of ideas and impressions that the world around us continually announces.

It fact, that is the normal state of affairs for the majority of mankind. Why bother with anything else? Well, man is a curious animal, and he – or some of his exemplars – has never been satisfied with the symphony, or cacophony, of ambient events. Whether an individual be scientist, philosopher, priest, nurse, gardener, or other specialist of some sort, it is an inborn tendency of humans to want to deepen knowledge about the world around us and about ourselves.

“*Pas anthropos physei tou gnonai oregetai.*” Each man by nature yearns to know, courtesy of Aristotle, at the beginning of his *Metaphysics*.

There may be many times when knowing is a luxury. The primary utility of intelligence is adaptation: to see how to make a better hand ax, or how to lay up stores for the winter ahead. But, life is more than subsistent, too. We want to see the larger picture.

Man starts out with his mind a *tabula rasa*, an empty record. Children start to learn rapidly, but it takes many years for the progeny of man to achieve their full individuality. Humans are driven by power, and tend to be a bellicose and cantankerous lot; our kind has spent huge effort in hacking each other to death, either to protect hearth and home or to pursue aggrandizement. As has been pointed out, it is hard to remember that the purpose of the day is to drain the swamp when you are up to your ass in alligators.

There are, however, research laboratories, universities, think tanks, seminars and now the internet, to encourage man to search or to slake his thirst for knowledge. We are, in short, a curious lot.

Our planet is a lively one. It started out noisy with volcanic eruptions but quiet with life. After four billion years of watching the seas form and the lands emerge, life began to evolve. One day far down the road we found ourselves running around, and we have been trying to explain the experience ever since.

For simplicity's sake, we have divided the learning experience into two huge phases. This is to some extent doing history with a meataxe, but it is not without its purpose.

Cosmos 1

Cosmos 1, was the world view that western man developed from the eons of prehistory to Greece and Rome, and through medieval history to the Renaissance.

Cosmos 1 achieved its apogee during the high Middle Ages, when the Church and its scholarship were intellectually dominant. The enjoyable thing about traveling through Europe is digging beneath the surface of the beaches and the casinos to get at the culture of those hundreds of years from when Roman culture had run its course, through the full flowering of medieval culture. According to a certain perspective, the official view of life may seem somewhat odd, contrary as it was to the appearances of every day. But, nonetheless, of great importance, for it continues to exert a powerful influence in society as a whole, and, beyond that, it raises many profound questions about what is finally true, and what isn't.

Man, according to the view, was suddenly placed into the world, and originally destined to be taken, after a period of trial, to a different level of existence, where there would be no death, and where he would be endlessly happy with the God who created it all. This same God revealed the essential of the story to the human race in the book of the Israelites, known as the Bible. The Bible was an ultimate authority for Truth. Man fell from grace, introducing sin, suffering a death into the world. God sent his son – Jesus Christ – into the world to heal nature's wound and to reconcile man with his creator. This established a new dispensation, under which the race would struggle and prove itself for a period of time, after which the Son of Man would return to judge the world and to reestablish a world order rather similar to what God had intended in the first place. This view of the universe was short on empirical foundation, long on metaphysical speculation and belief in God's revelation. But, whatever else is true of it, it is also what generated and actualized the frame of mind which kindled the Renaissance and brought us, over a few centuries' time to DNA and space travel.

Cosmos 2

The jig was up when Copernicus, Kepler and Galileo began to realize, in depth, that the dance of the planets in the heavens didn't match a geocentric and humanocentric plan of the universe – and the projects of science were off and running.

A quite different picture of man and the universe emerged. One that, turning things topsy-turvy, was long on facts and short on (successful) metaphysics.

The world didn't start 6000 years ago. The story, as it turns out, given in the Bible was the mythic account of the Hebrew people, fine for psychological purposes, perhaps, but off-track factually.

The earth is an infinitesimally tiny bit of stardust, swinging around one of many billions of stars in the Milky Way, itself but one galaxy among other billions, making its way to no particular place, and in fact without a particular position. Man was not scooped from the dust of the earth – except figuratively, by the hand of the Creator, who then blew the spirit of life into his nostrils.

Higher life forms arose half a billion years ago through the processes of evolution. Primates appeared 50,000,000 years ago. The ancestors of man diverged from the ancestors of chimpanzees 7 or 8 million years ago. Lucy walked on two feet 3+ million years ago. Cro-Magnon appeared 40,000 years ago. Culture came along, as did not ability to externalize thought in writing about 2,000 years ago. The reflections and stories of Cosmos 1 and 2 are quite young, in terms of racial, much less cosmic, history. The phenomenal world of "things" fades into the infinitesimal on the one hand, and expands into the vast cosmos on the other.

Cosmos 2 is factually a great deal more reliable than Cosmos 1 ever thought of being. Note that we didn't get here very long ago at all. Cosmos 1 was factually weak, metaphysically strong. Cosmos 2 the opposite.

Come a Long Way

We have come a long country mile from where things were at the beginning of time. The past is settled. It has been a wild ride, and certainly not all positive. There is a deal of sadness and suffering on the face of our planet. If you were to descend into the midst of the extermination camp at Treblinka during the height of its operation, or into the settlement areas of Darfur in current time, and be on the receiving end of human inhumanity, it would not be easy to convince you of the loveliness or grandeur of the human condition. Thoreau opined that "Most men lead lives of quiet desperation and go to the grave with the song still in them." There is sadness enough, and overflowing, in the existence of many of mankind's children. If, indeed, we had to validate the evolutionary experience on the basis of net gain for mankind, it is hard to know if we would be able to justify the expenditure.

Yet, on the other hand, human nature is sturdy, and not easy, overall, to discourage. Life in some sense starts anew with each newborn tiny human, and there is a surprising resilience in the race. In spite of all manner of difficulty, there is a spark within the breast of man that wonders what tomorrow will bring, and expects that it will somehow be possible to find solace for life's past unhappiness.

The future is limited to an extent by what has already occurred, but it still contains many degrees of freedom, and humans, after all the difficulties they may have encountered, are most of the time still willing to roll the dice.

By willing, we cannot change things. Reality has a certain obduracy to it. There are many aspects of health and fortune that are immutable by their very composition. We may yearn for friends or loved ones who have passed away, and any degree of prayer or entreaty will not bring them back. In many respects, we are at the whim of intransigent reality. At the same time, the human will is an odd commodity. Within certain limits, it will have its way. Although the past becomes set in stone, the future may be malleable. And even where main force and awkwardness cannot carry the day, there is another sense in which the ever unfolding present is influenced by the weight of seemingly insignificant small choice. As the twig is inclined, so the tree is bent. In some sense, we are at least partial masters of our destiny.

It matters how we feel about things, and what kind of decisions we make. Humans have always been an odd mixture of idealism and apparent animal self-interest. The world ahead is yet to come, and we have only a poor sense of its limitations or potentialities.

What Is the Universe Capable Of?

Not that long ago, we thought that the world came into its current state via several series of more or less magical events.

Equally unsatisfactory – and equally false – is a reductionist materialism which asserts that the world is made up of atoms, and that's all there is to it.

We know that atoms themselves are made up of sub-particles, and there is question now whether "strings" make up ultimate reality. One thing we know, clearly, is that the

universe is vastly more complicated than we thought it to be a few centuries ago, at, for instance, the time of Galileo.

Phenomenal spirituality – by which I mean what we can experience somehow existing beyond or outside the ordinary constraints of matter – is exemplified only in our own consciousness. Consciousness, via evolutionary process, somehow derives from possibilities inherent in matter and its capacities for sustaining complex development and information embodiment. If our analysis is correct, spirit – as we find it in ourselves – is not superimposed on matter, but continuous with it through definable process. In the phenomenology of spirit, the underlying material world becomes somehow reflexive on itself, though on a plane totally atypical for matter outside of life process.

Where we are is surprising

We have developed our idea of what is unusual from accepted ways of seeing things – and evolving experience has continuously expanded horizons beyond our craziest expectations. A few short generations ago, no one would have been able to foretell that we would have been traveling to space and cracking apart the very building blocks of nature. Or, that we could come to understand our own evolution, and the processes by which that has occurred.

The theory I have advanced here is, in part, not scientifically provable. However, an aspect of the epistemological aspect of it is that the entirety of knowledge is not scientific. Science is a particular way of knowing the universe, not the total span of knowledge.

The Name of the Game

The knowledge venture is *adaptation* and *truth*. The game, then, is to figure out what things are like and to maximize life's possibilities. When we look around us, we find that what this comes down to is the evolution of mind and the humanization of our lives and our surroundings.

We find, of course, that though this formula sounds simple enough, it is fraught with complexity and hazard, and is anything but easy to achieve. Nonetheless, this is what discovery has always been about, and it continues to be the venture today.

What has become more and more evident is that mind and spirituality have been evolutionary and emergent from the backdrop of matter – and that this has occurred over a relatively brief period of time, and, indeed, with an accelerated pace. And that not only has this occurred, but, with increasing significance, that it has come about by definable and comprehensible steps.

Paradise Lost

Here's the problem. It turns out that the world is both less and more than we would have dreamt ... than we would have it to be.

Once upon a time, we took it literally that the world was spoiled by original sin, that the world was redeemed and set aright by Jesus, and that the world would be renewed at the time of the second coming.

It turns out that this way of looking at the world has turned out to have had more than just a few small difficulties with it.

It may well be that this period was more a phase in the evolution of mind and of culture than a literal statement of fact.

We have looked at this before. These ideas, as they appear here, are in part a repetition. In *Cosmos I*, we expected a moral solution to the state of affairs in the universe. We thought that, relying on the redemptive force of Jesus' life we could, with him, in effect pray the world into salvation.

In *Cosmos 2*, we expect an empirical solution of the state of affairs in the universe, but we don't have the foggiest idea how it is going to turn out. Looking ahead, we know that the universe, physically, will burn out, eventually, and turn cold. That's a long way down the cosmic road, but we don't know even then that that's

During modern times, we have come to see mind and spirit as a developmental product of nature itself, rather than a whimsical addition to natural occurrence.

Hints from History

It is only 20,000 years ago – a short enough history as far as the cosmos is concerned – that our ancestors amused themselves by blowing outlines of their hands on the walls of the caves at Lascaux, along with their sensitive portrayals of the animals they saw in the world around them.

It is only 5,000 years ago that the Egyptians, in fashion still unknown to us, managed to build the pyramids and carve the Sphinx.

It is only 500 years ago that we started in a realistic way to lay the foundations for mathematical and observations understanding of the universe.

If we look at that record with any sort of objectivity, we have to be struck by the fact that not only do things change rapidly for our species, but, even more importantly, the very rate of change has become exponentially rapid. It is rather like trying to stand on a steep downslope of sand that seems to roll faster and faster under our feet even as we try to stand firm and get out bearings.

Plato, Aristotle and their buddies started asking how the world went.

During the centuries of the medieval experiment, humans became convinced that human spirituality was all that mattered, and that one day this visible world would be swept away, and a new heaven and a new earth would come into being where man would live forever.

The Span of Time,

Time has been long and the detail of human experience is extensive.

It is possible, however, to make some large generalizations about what has been going on on our planet.

Christianity brought spirituality into a world that man but superficially understood. It saw the spirit of man as having been grafted onto a pre-existing universe in a magical fashion: God formed the dust of the earth into human form and then breathed life into it. The adventure of man was then seen as the moral relationship between man and his creator, an epic of sin and redemption. The framework was developed into a rich and extensive tapestry of historical and philosophical ideas. The biggest problem with the story was that it contained very little real knowledge about the true origin of man or of how the universe really operates. A cosmology was developed which had a sort of moral

cohesiveness, but exhibited only a shallow understanding of what the world was made of, or how it worked.

At the time of the Renaissance in Europe, humans started in an observationally based way to deal in hard-headed fashion with systems of unshakable fact. When Galileo viewed the moons of Jupiter with his primitive telescope, the medieval intellectual world was doomed. The heavens were not as believed, and horizon after horizon fell to the pressure of human curiosity. 400 years – a very short time in the natural history of the universe, or, for that matter, of human existence – saw man’s consciousness reach to the farthest stretches of an immense cosmos, on the one hand, and to the infinitesimally small world of atoms and quarks, on the other.

Our understanding of the universe brought us an immense degree of control over nature itself, but that control was overshadowed by the terror of the mushroom cloud. The forces of the universe, which knowledge unlocked, could be ultimately and pervasively destructive.

Taking its cue from the phenomenon of western discovery, the rest of the world rushed to join in a globalization of consciousness the like of which had never been seen.

Shared Understanding

What is emerging is a body of shared understanding and intelligence. And, what is characteristic of this, more and more, is a reliance on evidence, and less and less on dogma and a particular claim to some sort of special or privileged knowledge.

Knowledge and discovery are shared ventures, and incremental in nature.

At times in our history there has been value in seeing knowledge as a privileged activity. This sort of attitude has had some value for our race in preserving knowledge and wisdom that otherwise might have been lost, but that sort of rubric has become less and less applicable as science and discovery has matured, and matters of knowledge and conviction have had to stand, more and more, on their own two feet.

Universe – Hotbed of Activity

The locus of this activity which has produced ourselves, and which we are more and more coming to understand, has been nowhere other than right here, on this lively planet of ours, the cosmic home of ours.

We are still attempting to define our place in the universe. Our perspective on this has shifted as we have continued to learn more and more.

We had thought that we were a special creation, that some omnipotent power had grafted human consciousness onto a previously existing material universe – that the race of man was a separate and somewhat magical experience.

What we have discovered is that the process of spiritual emergence is in fact continuous with the processes of the material universe.

A bit of universe recapitulating the entire framing phenomenon

Thought – relying on an innate quality of matter to symbolize, on the one hand, and, on the other, nature’s ability to evolve extremely flexible systems to exploit that capacity. The function “between our ears” recapitulates and summarizes the entire structure and function of the universe over the period of its existence – 13 billions of years. The universe has gone through the process of its evolution unconsciously, as far as we can

tell, and then the result of the process of evolution – as we have seen – makes the entire process conscious and reflective.

Consciousness thereby focuses on the structure and detail in a much more exhaustive way, and, at the same time, we have been able to understand and focus the application of energy, so that there is very little that we could not move, develop or change, if we put our mind to it. That raises the question of what we might really do with the potentialities of existence.

Work of the Universe – Evolution of Mind

How the World Evolved Mind

Religion – Built on Intuitions – of Ultimate Power & Wisdom

Had to Overcome What It Created

Science – Religion

Here's the rub.

Folks who pride themselves on being “hard” thinkers like to feel that science has figured out what is really true about the universe, and everything else is opinion or hogwash.

Pity! That really doesn't cover the available data.

Hard science as a yardstick for truth doesn't really fly. If I take the position that the only real truth is scientific truth, then my position becomes a house of cards and collapses on itself.

The position “the only real truth is scientific truth” is certainly not a scientific truth. It is not measurable or observable with the senses. It is an epistemological theory, and not a very good one at that.

The position of Cosmos 1 was empirically unsustainable. It is not an adequate theory for the appearance of the human race to say that God scooped together the dust of the earth into human form, and the breathed life into its nostrils. As a factual account, it is more than clear that that didn't happen.

However, if we broaden the consideration a bit and say that some external force God created the universe and then somehow revealed himself in that universe, it is not clear at all that that – whatever those words might mean – didn't happen. The problem of the origin of design – the whatness of things – is a very real problem, although clearly not a scientific one in an ordinary sense of the term.

The question of God is not a scientific question – never has been, never will be. We are never going to wake up, pull away the curtain, and find a magician tinkering away the elements and causes, and realize “well, there is a God after all.” It seems fairly clear that that is not the way it works.

As a race, we are not totally willing to give up the idea of God – of metaphysics – however naughtily some of us may wail and stamp our feet.

Stated otherwise, there's some truth in Cosmos 1, and some truth in Cosmos 2 – but they aren't the same kind of truth.

Stephen Gould, the brilliant biologist and evolutionary theorist, saw this, but came up with a really bad solution: that science and religion are Non-Overlapping Magisteria (NOMA), and that's all there is to it.

That's a truly bad thought, from a very good mind.

We should look at the claims of religion in a new light. Religion has claimed some things which, on the basis of ordinary experience, might rightly be judged to be outrageous. As we have advanced in our knowledge of how the universe works, we should not dismiss religious claims as simply irrelevant or clearly mistaken

We have a nagging feeling that religion was about something, and we are not quite willing to lose it. At the beginning of the feeling that religion was about something, and we are not quite willing to lose it. At the beginning of the 3rd millennium of the Current Era, we have mounted a serious and wide-reaching project – Science and Religion.

In a broad, general way, there are two dimensions to knowledge: 1) what things are, and 2) that they are (nor not, as may be).

Empirical science deal with what things are, although that turns out to be anything but a simple matter. Science may also deal with *whether* things are in the sense of whether or not, under certain conditions, they do or do not produce observable results. Science, however, does not, and cannot, deal with what existence is in itself, or what may be its implications.

Cosmos 1 did deal, very seriously, with the matter of existence.

Existence and its signification are not physical, but metaphysical problems.

Whether God exists, and what he (or it) may be like, are not physical or empirical questions. They are metaphysical issues. This is frequently mistakenly understood. For instance, some thinkers claim that if God is real, we will ultimately need to find some scientific way of proving that. Or, the converse of that, that unless science can demonstrate God, he does not exist. That is a categorical mistake.

Cartesius Revisited

Rene Descartes thought he could reasonably start his system with a primary assumption of universal doubt. That didn't work out very well, because if you abandon the reality of sensory knowledge, you can never get back to reality. He needed to assume that a just God kept the world of events running in concert with the world of psychological happenings. He had to make a huge assumption which in principal would invalidate the entire proposition of universal doubt. Too bad, but he went on to make a lot of other discoveries which for anybody should grant him redemption.

But, we're considerably downstream from Descartes, so let's consider a third millennium analog of universal doubt.

There is no compelling reason to believe that our universe is the only possible one, after all. Other universes may exist in parallel with ours. But, it is our universe in which our intelligence and way of knowing evolved, as a result of which our concepts about the universe are in some sense proper to this universe – to our home environment. If that is so, it is meaningful to ask whether any insights into reality are in a sense absolute and universe-independent? Are there any meta-insights which are independent of circumstances, and would be true in any universe?

I think there are, but I also think it is hazardous to try to tie these down dogmatically. Meaning and signification are in our instance contained in the neuro-symbolic system operating in our brains. Some of these representations may be sufficiently independent of the stimuli which excite them in the first place that they would be true of any environment.

Metaphysical Truths

Those independent truths would seem to have to do with reality itself – what it means to exist, the self-identify of being, and ultimate causality in the universe. Existence seems to be an absolute of sorts. For finite existence to occur, there must be something which exists in itself – and this is what humans in all ages have referred to as God

What Mind Can Do

Understanding Its Own Evolution

And the Universe Which Produced It

? Replicated Consciousness on Another Substrate

VIII. Threshold

State of Knowledge – Approaching Exhaustive

Contradiction

Man's homeland was a foreign county. He (she) appeared on life's scene under an inauspicious cloud.

The human adventure is a marvelous story. It is full of promise and threat, of satisfaction and pain, of glory and shame.

This cleverest of animals appeared with higher adaptive capacities and greater intelligence than any of the other animals, yet only a very imperfect comprehension of its own condition. That was unmeasured eons ago.

His intelligence made him yearn for truth. His dominance caused him to lust for power. His sense of fair play drove him to seek for justice. His fragility forced him to live always at hazard. And, in the end, his mortality would silence him forever. This mix of contradictions presaged an existence marked with struggle.

“Cursed be the ground because of you; in toil shall you eat of it all the days of your life. Thorns and thistles shall it bring forth to you, and you shall eat the plants of the field. In the sweat of your brow you shall eat bread, till you return to the ground, since out of it you were taken. For dust you are and unto dust you shall return.” Genesis

The author of Genesis lived at a time when the Jews were struggling for tribal survival, and civilization was still dawning. He was aware of the glory of which humans were capable. He also knew the internal contradiction of the human condition. But, at the very beginning of things, man knew that his path would be long and difficult.

Born to Discovery – Against Challenges

Where man flowered was his home, the nest in which he saw the light of day. Nothing was more familiar to him than the site of his appearance, yet it was for him a foreign county. Man was born a stranger in his own homeland.

This innate alienation of man has been a driving force within the troubled history of our race.

It was curiosity that impelled Pandora to raise the lid on the magic casket. The trouble falling out of that transgression has been legend.

The sin of Adam and Eve in the garden was not a surrender to the passions of the body. Much more significantly, it was a yearning for understanding that led nascent mankind to fall out of favor with the creator. God forbade man to disobey, and foretold its consequences. “From every tree of the garden you may eat, but from the tree of the knowledge of good and evil you must not eat. For the day you eat of it, you must die.” Genesis.

Yet that dangerous curiosity has driven us forward, whether we liked it or not. Early mythology foreshadowed the heavy price that we would pay for our thirst to be like God or like the gods. It has been a destiny we have pursued with energy and enthusiasm, but not without conflict.

We can use the knowledge we have accumulated to continue to develop the earth for the betterment of mankind. There is, however, still a possibility that it can be the root of our

destruction. Pandora's dilemma and the curse on Adam continue to cast shadows on the human endeavor, and the outcome is still in the balance.

Homework

Discovery of our universe, then, is the homework that nature has given us to complete. It has been a long and difficult assignment.

The phenomenal universe seems to be finite. The process of learning about it advances at breakneck speed. This makes me wonder what sort of future we have ahead of us. Could we have another century like the 20th? During the last century, we saw the birth of Einsteinian relativity, quantum physics, black holes, and string theory. These seem to be thumping hard on the basic substance of material reality.

There is certainly no evidence that we are slowing down in the discovery process. Still, what would another similar century have to offer, and where would it take us?

Two opposing thoughts.

First, predictions about an end to discovery have always been wrong – very wrong. We have always turned a corner and found another perspective on reality, one that we did not even suspect.

Second, the material world seems in some sense to be finite.

How are we to balance these two thoughts, or get them into perspective?

We are certainly not at the end of the discovery process. The question is asked not to imply that we are, but to try to gauge the import of our current posture.

A Likely Story

Perspectives

Pieces are falling into patterns that have never been available to us before. We have within our grasp an account of the material universe and of the place of consciousness within it that is remarkably complete and stunning in the depth of its insights. Whether or not it is correct in its details will have to stand the test of time.

Striving for an understanding of the universe and our place in it is natural to us human beings. By nature, we wish to know.

The technical search for understanding began with the Greeks. (All right – beyond that, with the Persians, the Chinese, and the peoples of ancient India.) Their efforts had to be restructured and redirected, time and again. The movement towards the truth was not direct, and it was not simple. The point is, however, that it seems to have been working. Over the centuries, we have got someplace.

Plato knew he was grappling mentally with something real, but he also knew his efforts weren't quite right.

In the *Timaeus*, Plato speculates about the foundations of reality. Mind, he knew nothing of protons or electrons, on the one hand, nor of galaxies and dark energy on the other. But, he decided to give what seemed to him a "likely account." In brief, he speculated that there needed to be some sort of ideal form in back of the phenomena of reality, and that some hypernatural – poorly defined – artificer used the form to fashion visible reality – which he referred to as the Demiurge.

Plato knew there were weaknesses in his likely account, but he had to start somewhere. Part of the mystery has been answered. Part of it remains.

The basic forces of nature

Isaac Newton will always hold a critical place in the history of the development of the human mind and of our understanding of the universe. He was at the fountainhead of our direct assault on the basic forces in the physical universe, defining the nature of mass, inertia, acceleration, and apparent mutual attraction of all bodies. Einstein explained how space and time are relative to observation, and how the mass of bodies distorts the space time matrix.

James Clerk Maxwell, a nineteenth century Scottish physicist, working with the phenomena of magnetism and electricity at Cambridge University, formulated formulae describing those phenomena, and also speculated that light consists of undulations in the same medium that supports the same phenomena of electricity and magnetism.

Einstein's efforts to extend his theories to explain the workings of the atomic world and radioactivity were doomed to failure.

Neils Bohr broke new ground with his model of the planetary atom, work later built on by Erwin Schroedinger and others, resulting in the evolution of quantum mechanics.

Together these men reduced nature's most fundamental forces to mathematical and empirical understanding. All other physical qualities and findings are related to the insights developed by these men and their coworkers.

String Theory?

The last word has not been written on the unification of these basic forces in the physical universe. It is of course tempting to feel that the basic physical forces in the universe are related to each other in some way that the human mind can comprehend. It seems quite unsatisfactory to have to conclude that the basic forces of nature cannot be related to each other, and that the only way to understand them is within their separate contexts of experimentation and understanding.

Currently, at this phase in the development of twenty-first century theory, these different areas may be unified in an underlying reality, that of "strings." Strings consist of incomprehensibly tiny packets of energy which create nature's building blocks by vibrating in different ways. This set of ideas seems to go far in unifying basic theories about the universe's most basic phenomena. Its basic problem is that it is pure theory, with no way of ascertaining empirically its correctness. And in that sense, it is unscientific, and more similar to a philosophy. But, almost certainly, the last word has not been said on the subject.

Evolution – to emergence

Whatever the material world is like at its most fundamental, it has relied on its most basic values and qualities to organize itself together into living units, which we refer to as animals, plants (and their intermediate forms).

To accomplish this, life forms developed physical boundaries to control unified environments, and internal communication systems to maintain their integrity and control their vital processes.

Since Darwin, we have known that life on earth has been an evolutionary phenomenon (some had suspected this before). It turns out that the development of higher life forms has been forged on the anvil of experience, and not simply a matter of hazard. This apparently occurs through utilization of internal communications.

Among primates, man's ancestors probably stimulated their brains while striving to increase their symbolic ability – through speaking – and, generation to generation, it is likely that this increase in brain structure and function was communicated to the reproductive genome through internal communication.

Relation between matter and spirit

The key to matter and spirit was – and is – symbolic communication. Communication units – words – were added to repertoires of animal sounds. These symbols were represented in the brain by activation patterns. As symbolic systems developed, words, and their accompanying ideas, came to stand for more and more generalized ideas – and, in the aggregate, “spiritual” functioning developed. Man seemed to be performing purely spiritual acts, although that was only partially true. The generalization is what we generally mean by “spiritual,” but the brain is using activation patterns in its neurons, tracts and nuclei.

“Spirit,” then, is related to matter through functioning in the material substrate of brain activation.

This is the only “spiritual” function in the universe that we know of directly in our experience.

This does not answer the further question of whether this is the only example of spirit in the world – in the universe. That would have to be answered via other investigations.

The nature of consciousness

Consciousness is what we know in our own instance – in our own minds. There is an historical issue how to explain consciousness. What is there that makes real this strange, reflective capacity that seems to create the “ghost in the machine” – this odd experience we have of ego and of personality.

The problem in understanding consciousness is that understanding strives to pin down the general aspect of something – that's what, generally, we mean by understanding.

The larger galactic – intergalactic universe

During the twentieth century – that recently – we became aware that our galaxy, the Milky Way, is not the only galaxy that exists. Far from it. There are billions of other galaxies – no one knows how many – far out there. The space between galaxies is immense thousands a millions of light years.

The current theory is that the matter we see and can contact directly is only a part of the actual matter in the universe. And, at that, only a small part. It is thought that we can perceive only about 5 % of the actual matter in the universe. The remainder – by far the greater percentage – is called “dark matter,” or, actually “dark matter” and “dark energy.” These are states of being demanded by the macro mechanics of intergalactic space, but the nature of their composition is not understood with any degree of certitude.

Wonderworldh

Wondrous Mechanics

Humans have been working diligently to discover and define the mechanics according to which things in the universe function. Although there is chance in the universe which

expresses itself at certain levels, the universe as a whole is anything but haphazard. The values which define how things operate are in fact very finely tuned.

In the 17th century, Newton for the first time formulated the basic principles of mass, inertia, gravity and motion. In the nineteenth century, Maxwell formulated the basic relationships between magnetism and electricity, and speculated that these phenomena were actually variants on the same wave spectrum as light. Newton's universe was marvelously extended in the twentieth century by Einstein's insights into the relativity of observations, and into the basic relationships between light, time and space. The phenomena of radioactivity and of atomic structure and function were developed through Neils Bohr's theory of the planetary atom, and in the development of quantum physics by Schroedinger and others.

These names are important, but they are also a tiny part of the story. Legions of scientists and mathematicians have labored to develop areas, and the body of understanding has become standard fare in our laboratories and universities.

Attempts to unify these areas of understanding have been only partially successful.

That's where we are during the early years of the twentieth century.

Currently string theory is the focus of attention. Generally, it states that to understand the different phenomena of physics, it is necessary to posit that the ultimate physical reality is infinitesimally tiny packets of vibrating energy which underlie the observable phenomena of waves and basic particles. The problem with string theory is that it does not seem to be testable – which is contrary to the basic nature of science.

Where do we go from here?

Design In the World

It turns out that there is a very high order of design in the universe – that which defined, apparently, by the laws of Newton, Maxwell, Einstein, Bohr, Schrodinger et al.

In an elegant little book, *Just Six Numbers*, Martin Rees, an English astronomer, identifies six values in nature which seem to him to be of prime significance.

- N , a very large number, the strength of the forces holding atoms together, divided by the force of gravity between them.
- ϵ , whose value is 0.007, representing how firmly atomic nuclei bind together and how all the atoms were made.
- Ω , the amount of material in our universe, which tells us the relative importance of gravity and expansion energy in the universe.
- Λ , cosmic “antigravity,” which controls the expansion of our universe.
- Q , the ratio of two fundamental energies, about 1/100,000 in value.
- D , equal to 3, the number of spatial dimensions in our universe.

There are other ways of identifying design in our universe, but Rees is a good example. The point is that many things have to be “just so,” or nothing would work or could exist. Had Plato known this, he most likely would have said these values were ideal forms.

Detail

Clearly, there isn't a great deal that most of us can do with nature's basic values on a day to day basis. We do not need them to bake our bread. However, there is nothing that we do that is not supported and underlain by the basics.

And, there are critical areas of research and function where nature's basic forces do come into play. Basic research involves itself heavily with ultimate forces. Development of the Atom Bomb and atomic physics in general worked and works directly with the basics. Theoretical and applied physics are involved with nature's basic qualities.

Quantitatively, however, most of us most of the time work more on the periphery of things, even when engaged in highly technical activities.

Technology has overtaken function in most areas of human activities. True, we still measure and cut boards, and our houses still are built of bricks and stones, but chemistry, electronics, telecommunications and computing have drastically changed almost every area of human endeavor. In that sense, we have come a long way, over a few hundred years, from when we struggled on a daily basis with the brute forces of nature and the beasts of the forest and the jungle.

I can sit in my den writing these pages on my laptop, with which I can also google the universe and have to hand reference capacities which a few short years ago were equaled only by the capacities of the world's great libraries. A long way from Lascaux.

Metaphysics

The Limits of Science

We are rightfully enamored of scientific and technical knowledge. These have transformed our lives and our world. We waited around a long time for the scientific revolution to happen. Galileo and Newton would have given a great deal to have been able to know what now is included in a good high school general science course. And even more to have been able to assist at the installation of the Large Hadron Collider at CERN, which is occurring even as these pages are written. Empirically, our thumb is on the pulse of the universe, and we have within our grasp abilities to control the universe's fundamental forces. That coincides with the fact that we are melting the polar ice caps and possibly polluting ourselves into extinction. The blessings are not unmixed.

Science, truly, is wonderful. It is a giant only half aroused. We need to understand its capacities, both for good and evil. If we do not control the world, it will control us. Our basic contact with reality is not scientific, and, however great scientific knowledge is, it cannot establish the matrix of knowledge itself. Scientific knowledge is a subset – a marvelous one – within a larger framework. We need to understand that framework. The proof for this is simple, and close to hand. If we make the statement, “all true knowledge is scientific,” that is not a scientific statement, nor is there any scientific evidence for it. It is, rather, saying that among our different types of knowledge, we accord a certain preeminence to scientific knowledge.

Reality

Our most basic knowledge is not scientific. Without getting into the problems Descartes had, we can point out that we know what we mean when we say, “I exist.” But we have no scientific evidence for that. We know what we mean when we ask, “Do numbers exist in themselves?” Not that that's an easy question to answer. Nor is it immediately evident just what exactly we mean by the numbers question. But the question is meaningful. It is not nonsense. “Is all existence material?” is a real question, and a meaningful one. Such questions are metaphysical. Now, there are good ways to talk about reality, and there are

bad ones. The good ones are ones that give insight and are consistent with experience, and for that matter with themselves.

In these pages many, if not most, of the statements I have made are conclusory, rather than evidentiary. That's because this is a summary essay, rather than an account of primary evidence. My statements here about metaphysics are similar. I am not going to give all the reasons here for metaphysical positions, any more than I am going to give in detail and explain Maxwell's equations about electromagnetism, or Einstein's ideas about relativity, for that matter.

Most Basic

The most basic reality of anything real is its existence. Existence does not mean any particular kind of existence. It means existence wherever it occurs.

Existence is a simple concept. There is no pulling it apart, or getting more basic than it. Therefore it cannot strictly speaking be analyzed. It can be pointed to, and understood, but not dissected. Yet reality is the basis for understanding the reality of anything. If something is real, we can understand it.

Reality is an analogous concept. Things can exist in different ways. An idea in my head exists differently than a hat on my head.

Things act according to their nature – what they are.

Particular things around us are contingent. That is, they could in themselves either exist or not exist. The things we know in experience are limited ways of existing, not existence in itself.

If all things were contingent, then nothing would exist, because there would be no necessity for anything. For existence to happen, there must be some mode of existence which is existence in itself, which exists necessarily.

The existence of contingent things around us entails the existence of something which exists necessarily, in itself.

Historically – what people have referred to as God

Self-existing existence must be real, otherwise everything would be contingent, and nothing would exist.

Self-existing reality must cause the existence of contingent things, but be causally external to them. Self-existing reality must be reality itself and unlimited.

Self-existing, unlimited being must be the source of all being in the universe.

All nations in some sense have realized that the visible universe emanates from some ultimate reality, but have tended to picture that ultimate reality in an anthropomorphic way. Most early cultures have in imagination made the uncaused cause into a person or persons. This is entirely understandable as a thing to do. Humans have a tendency to anthropomorphize all sorts of things in the external world.

Most nations have sensed a self-causing cause in back of the phenomenology of the visible world. This self-causing cause is what men in all ages have referred to as God.

Science – Religion – Reviewing History

Reality

There is a universe. I am not about to assume a position of universal doubt, as did Descartes. He was at a particular place in history where, coming off the Ages of Faith, so to speak, he felt obliged to question everything, so as to make a clean beginning and establish new, but certain, ways of thinking.

He decided that he needed to start with his own existence, which he could not doubt. “I think, therefore I am.” Well, that’s certainly true, but if that is the keep of your castle, if that is the center of your system, you cannot reason out from there to a system which understands and validates the external world.

We are animals, living in bodies. Our basic knowledge is sensory knowledge of the world around of us, and of our own bodies. We cannot prove that, but we need to accept it without proof. I see and touch and feel. If once I yield that and look for some other touchstone of truth, I can never find my way back.

But, sensory knowledge is fallible. We can be fooled by our sensations. Indeed we can. And if we are unhappy with that, that is too bad. That is the foundation and starting point of our knowledge. Our minds developed along with the development of our brains inside the sensory matrix. “Clear and distinct ideas” won’t save us from the basic fallibility of our knowledge.

Value without Fact, Fact Without Value

The Ages of Faith in Europe were a time when the shreds of the Roman Empire needed to be saved, and the spiritual message of Christianity needed to be developed and preserved. The achievements of those cultural dynamos were stupendous, although the barbarism of the times stands as an internal contradiction of history. But, looking back on those times, we have to admire that our ancestors developed a keen sense of human value. That is written all over the cathedrals, literature and art of the times.

However, we have to be forced to the conclusion that the factual basis of the mindset of the times rested on shaky foundations. Prior to the explosion of scientific thinking, humans had what looks to us now like an impoverished understanding of their universe. Trying to get our minds around this fact is not a simple activity. In fact, it requires a good deal of mental sinew and subtlety.

We have, over the last half millennium acquired great factual depth. Not only do we know about “things” around us in great detail. We also have plunged to the depths of the universe, teasing out the fundamental forces of nature and the constant values which make the universe function as it does.

What all this means in itself and for humans beings is by no means as clear. We know a great deal about everything, but we are very uncertain about values. This is its own sort of oddity. Reduced to simplicity, once we had value without fact. Now, turning it on its head, we have fact without value.

Integration

It would be convenient if we could take a statue, a castle, a halberd or two, mix it together with a space vehicle, a copy of Time, a radio and a laptop computer, and come

up with a suitable composite that we could identify as a roadmap through the countryside of the human drama. Unfortunately, it doesn't work that way.

Ideas compete with ideas, and understanding the universe is a multi-faceted, multi-leveled venture. Integrating the different systems of thought that the mind has developed is a daunting challenge, and yet, even if the concept of multiverses is objectively true, still reality, however complex, is one in the sense that whatever exists is real, and we need to try to understand it.

The challenge is made a good deal steeper by the very speed with which things have developed.

We are only a few short generations separated from standing with Galileo on a hilltop peering at Jupiter's moons through his primitive telescope, but how very far we have come since that time. At times we get confused by the very complexity of the processes we have developed. At times we get our feet entangled in the very lines and cables we are using to clamber up the knowledge mountain. The mind is complex, but we should not become so sophisticated that we cannot recognize simplicity when we see it. If there is a straightforward path before us, we should not insist on clambering through pitfalls and brambles simply because we are aware they are there. Sometimes things appear to be simple just because they are. When that is the case, we should recognize it and accept it gleefully.

Convergence

Journeys and Sidetrips

We have so far been on a cosmic journey of great proportions. The "center" of the universe "exploded" a long time ago – 14 billion years, +/- . And, at a great distance, too – billions of light years away. We have either been hurtling wildly through space, or swinging in stately fashion around the black hole at the center of our home galaxy, depending on the way you want to look at it.

Our consciousness has evolved on our lively wee planet, and we are trying to get the story of this straight.

There have been local ventures a plenty to attract our attention, whether it might be the struggle of our supporting clan to establish authority in our sheltering valley, or a political striving to grasp and manipulate the reins of power in our nation state.

These local adventures are necessary, for it is out of them that the larger fabric of our racial experience is woven, and if the human experience founders on the planet it will be because we failed at the challenge of controlling local rivalries.

But there is a sense, too, in which our local adventures are side trips, too. There will still be the question whether the venture of expanding consciousness on the planet "made it" or not.

What will be the ultimate outcome of our journey through space and time from the singularity from which we sprang, so long ago and so far away? Will the vitality of planet Earth finally succeed or be snuffed out ingloriously? It is a real problem, and it will make a difference, even if there were no one left to appreciate that difference. Life matters.

Dark Side

The Historical Record – Mixed

The history of man on the planet has been very mixed. Humans frequently act inhumanely.

Seeds of Doom

Democracy

Agenda

Continue to Explore the Mystery

We do not understand the entire universe yet – but we have come a long way.

There are two questions: 1) what would an exhaustive knowledge of the universe be? and 2) what would we do with it if we had it?

These questions do not have intuitive answers by any means. In fact, it is not clear that they have any real answer, intuitive or otherwise.

Absolute

The following is what I consider an interesting speculation.

If I understand string theory correctly – which is by no means assured – the ultimate physical backdrop of the universe is a fabric of very small energy vibrations which cannot be measured directly, but act in such a way as to form the basic particles which make up the material world we experience.

If I understand metaphysics correctly – which I think has a greater assurance level – the ultimate metaphysical backdrop of the universe is non-physical absolute being, existence itself, which cannot be sensed or measured directly in itself, but imparts reality to everything which exists.

Now, if those are not unfair characterizations, I find it interesting that, although these two theories from widely divergent viewpoints cannot be superimposed on each other, still, they have some intriguing similarities.

Both theories say that the material things which surround us are not ultimate reality, and, that, furthermore, there is something intrinsically deceptive about them.

They are the only reality we know directly, but, on the basis of either theory, are derived somewhat from a more basic reality, which alone exists in itself.

The basic difference: the metaphysical backdrop, existence in itself, is what nations have referred to as God; the physical backdrop, not God, which would be a meaningless concept in the framework of thought.

Would we want to say that the basic universe of strings is somehow “willed” by the backdrop of self-existing being, that limitless being is the absolute source of reality, which steps itself down to the physical world via tiny parcels of physical energy which have the capacity to create the physical world we experience?

I don't know. But that is tempting to consider.

More than Materialism

If that is the way the universe hangs together, and that may come closer to anything else that we could formulate, at least from current vantage point, then the world is far from being “just” a materialistic manifestation. In fact, quite the contrary. We will assume this is the way the world really is.

The universe at base, then, is spiritual.

Matter and spirit are, however, intricately related.

Self-subsisting being is the most basic reality in the universe, the source of finite, observable existence. This also is what people throughout the ages have referred to as God.

God is mind in the universe in a supereminent way.

Phenomenal mind, on the other hand, is what we find in ourselves. We are the only known instance of symbolizing, reflective consciousness – or mind in an experiential sense. Evolution has produced phenomenal mind via the emergence of the linguistic brain – through internal systems of biological communication.

The universe is material in the sense that phenomenal mind has evolved from the background of matter. But, matter was never simply inert “stuff” in the first place. It is of concern to us whether mind, as we know it – as we are it – has emerged anywhere else in the universe. But, even if it has, it is questionable whether we would ever be able to know about it or communicate with it. We are apparently limited by the speed of light. Material though the universe is, in the sense identified, the visible universe nonetheless depends for its origin and existence on self-subsisting being.

The state of affairs, then, seems to have to be that the universe is spiritual in origin, and in its most highly developed and highly organized instance.

Work on the Ethics of Humanity

As we have developed through evolution, and as we have developed our knowledge of the universe, our power to increase our control of nature has advanced by leaps and bounds. We can use the electromagnetic spectrum to communicate and to transmit energy. We can alter life’s most fundamental mechanisms. We can tap into the basic energy of the universe either to further the goals of the human spirit, or, for that matter, to destroy life as we know it.

The outcome of these processes is not determinate at this time. There is nothing to guarantee that humane values will win out in the long run.

Physics is the engine of control of nature. But ethics is the hand at the tiller of human destiny.

How the struggle between these works out will determine the fate of intelligence on the planet. In theory, everyone would say that intelligence should win, and that humanism should control the destructive tendencies of mankind, but how this works itself out remains in the balance.

Mind in the Universe

At core, the universe is intelligent, in the sense of being finely tuned for the appearance of galaxies and our solar system, and, within that, for the development of phenomenal mind.

Self-subsisting being is supereminently intelligent in the sense of generating being as it expresses itself, but not in the sense that we can in any way plumb a discursive process of thought in the universe external to us.

We do not find a wise old man on a throne in the clouds pulling strings to make the universe function. We do, however, conclude to infinite mind, which we can know only through its effect in creation itself.

They are questions about the meaning of reality itself, not about a particular sort of reality.