

# The Nature of Existence

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## 3 Introduction

What follows will be a discussion of three subjects or questions:

1. What is the nature of physical existence?
2. What is the nature of nonphysical existence?
3. What is the nature of human knowledge?

To choose to discuss these questions is to imply that two more fundamental questions have already been answered. They are:

1. Is there an independent, objective physical reality that exists outside ourselves? Yes.
2. Is there a nonphysical reality, the cause of our observed behavior, that exists within each of us? Yes.

These two questions have been debated at great length by others. I will not debate these questions here.

The discussion of the three questions which follows is based on the following ideas about the nature of existence and human knowledge:

1. Reality (physical and nonphysical) is the ultimate measure and test of what is or is not true.
2. We have three ways to gain some knowledge of reality. They are observation, revelation and reason. (I do not mean “supernatural” revelation. We must use all three if we are to know some measure of the truth.)
3. Our human search for truth (knowledge of reality) is “circular” and may be endless.

The discussion of the first 3 questions which follows may appear to be “linear” as it is printed on sequential pages. But it is “circular” in that our knowledge of the nature of physical existence is dependent on the nature of human knowledge, which is dependent on the nature of nonphysical existence, which is dependent on the nature of physical existence and so on...

In the discussion which follows I will try to trace a thin thread of ideas through the broad fabric of our long human history. It will be a brief discussion, which means that I must skip over the lives and ideas of many thoughtful people.

### 3.1 *The Nature of Physical Existence*

#### 3.1.1 *En Arche (In Beginning)*

We have many beginnings.

We (you and I) each began this day in our lives when we awoke from sleep—when we again became conscious of our inner “self.” We each became conscious of our “self” for the first time in our mother’s womb. We could not see in that warm darkness, but we could hear our mother’s heartbeat and we began

to learn about the world.

In the first year of our lives we learned much about the world by listening to, watching, touching and chewing on the world about us. In the first few years of our lives we learned the language of the people who cared for us and we learned that “big people” were like us. We assumed that Mom and Dad were inner “selves” like we were.

It is through language—asking questions and listening to the answers of older people—that we learn what our culture believes about life and the world in which we live. It is through language (and the way we live) that we teach what we believe to our children. This process of learning and teaching that transmits the immortal spirit of a people from one generation to the next has been going on for thousands of centuries. But, like all things in time, this process had a beginning.

There are only two possible kinds of a beginning:

1. The beginning of our belief was a natural human event.
2. The beginning of our belief was not a natural human event. It was an extraordinary or supernatural event (a “revelation” from some supernatural authority).

Let us examine the first possibility—that the beginning of our belief was a natural human event.

I am aware of my inner “self.” Like others before me, I cannot deny that “I” exist. I assume (I cannot be certain) that you and all other humans are also “self.” We are human and we can and do make mistakes. A common mistake is to “judge other people by ourselves.” If we extend that mistake to the world about us, we can create the system of belief that we have named animism. Animism is the vision of existence in which everything about us (especially active things) has a conscious self or “spirit.” Animism is the mistake of assuming that all living things and the wind, the sea, the Earth, the Sun, the Moon and the stars are conscious “spirits.” Animism (the “many spirit” vision) is an old and primitive vision, but many of the people of the Earth still share this vision of existence.

We judge things in the world about us as important or unimportant and as good, bad, or indifferent. Once we make the mistake of populating the world about us with conscious “spirits” like ourselves, it is natural to pay special attention to the powerful spirits, both good and bad. It is also quite natural to promote these important spirits to the rank of demigod or god. This is the essence of the polytheistic (the “many gods”) vision of existence. The Hindu vision, with its rich array of gods and demigods, is the polytheistic vision in all its glory.

If a vision with multiple gods and demigods is not satisfying, there are, again, two possibilities:

1. You can reduce the number of gods to one.
2. You can reduce the number of gods to zero.

We have done both.

The final step in the development of our spiritual visions (which was taken 30 or 40 centuries ago) is the promotion of the most powerful god to the rank of “Almighty God” and the demotion of all the other gods and demigods to the rank of angelic spirits. This is usually accompanied by the promotion of the most powerful evil god or demigod to the rank of “Satan” (a spirit less powerful than “Almighty God”) and the demotion of the other malicious demigods to demons, devils and assorted evil spirits. This is the monotheistic (“one god”) vision. The Judeo-Christian-Islamic-Zoroastrian vision is such a vision.

If you reduce the number of “gods” to zero, you eliminate the “spirit world” and are left with a material

vision of existence. The material vision and the search for a material cause for physical existence was the beginning of what became the Hellenic vision and the beginning of what has become a 25 century search for truth.

It should be noted that the origins of the animistic visions and to some extent, the origins of the Hindu vision are lost in time. They could be natural or “revealed” visions or a mixture of the two. This is not the case with the Judaic, Christian and Islamic visions. All three claim Abraham as their father. All three claim the “God of Abraham” as the supernatural source of the “revelations” which have shaped their monotheistic vision. And all three cultures, the Jewish, the Christian and the Islamic are, through an irony of history, the intellectual heirs of the Hellenic vision.

### 3.1.2 The Hellenic (Greek) Vision

Those who study our distant past tell us that a Thales who lived in the Ionian city of Miletus around 685 BC was the man who began the search for the one physical cause of all physical existence. He is said to have believed that the “basic being” (*ousia*) of all things persists through all kinds of change and that this fundamental or first-principal (*arche*) is water. When you consider that all life and growth is critically dependent on water; his guess was a good one.

We are told that Anaximander (who, we believe, was a pupil and companion of Thales), believed that “*apeiron*” (the unlimited or indefinite) is the *first-principle* of things that are. We have concluded from small fragments of what he said that he believed that all things arise from and vanish into this existence which can exhibit all physical properties.

Anaximenes, the last of the Milesian thinkers we know of, is said to have believed that air was the first-principle of existence. Since breath and air is critical to life and was thought to be the “soul” of a person, this too is a reasonable guess. It was, perhaps, a more limited idea than that of Anaximander.

Heraclitus lived in the city of Ephesus (up the coast from Miletus) around 500 BC. We have over 100 fragments of what Heraclitus wrote. Here is some of what he said about the nature of physical existence:

“... it is wise to acknowledge that all things are one.”

“Everything flows and nothing abides; everything gives way and nothing stays fixed.”

“... all things come to pass through the compulsion of strife.”

“There is exchange of all things for fire and of fire for all things, ...”

Heraclitus made a point of writing in a symbolic and obscure manner. So these few lines that imply a oneness constantly changing through strife and fire may not be an accurate reflection of what he taught.

A note for later discussion: From the fragments we have of what Heraclitus wrote and from later testimony we have a very early example of an intellectual arrogance that has been with us for centuries. I believe that this arrogance has been a recurring curse on our search for the truth of existence.

Parmenides lived in the city of Elea. Sometime around 470 BC he wrote a poem. In the part of that poem entitled “The Way of Truth” Parmenides expresses a fundamental idea. These phrases are the essence of it:

“... being is.”

“... It Is and cannot not-be.”

“And it is without beginning or end, ...”

His words have been restated as: “What Is, is. What is not, is not.”

From this principle you can reason that being, the essence of existence, the first-principle of existence is unchanging. For to change is to change from what you are into what you are not. For “being” to change is for “being” to become “not-being.”

This reasoning can be taken a step further:

- The first-principle of physical existence is unchanging.
- The physical world about us is continually changing.
- Therefore, the first-principle of physical existence cannot be physical.

This reasoning essentially stopped the Greek search for the one physical cause of physical existence. It started the transformation of the Hellenic vision and it started what has become a 2400 year search for the unchanging first-principle of existence.

A note for later discussion: Parmenides also wrote “... coming-to-be and perishing, being and not-being, change of place and variegated shades of color—these are nothing more than names.” Which is to say that all sensory perception is an illusion. I believe that our adoption of this primitive view of sensory perception turned our search for the truth of physical existence into a “blind alley” that was 20 centuries long.

Those who followed Parmenides (Most notably the pluralists and the atomists) struggled to explain the relationship between the one, unchanging first-principle and the many changing realities of our daily experience. But the next step in the transformation of the Hellenic vision was not to solve the problem, but instead to transform the problem posed by Parmenides.

This was done by a man named Protagoras. Protagoras was the first of the sophists (the wisdom experts). Protagoras is quoted as stating:

“Man is the measure of all things

- of things that are, that they are.
- of things that are not, that they are not.”

This subjective view of reality, and other views of the sophists, was challenged by Socrates. Socrates lost his life for his efforts, but Socrates’ views prevailed. It was Socrates, his pupil, Plato, and Plato’s pupil, Aristotle, who completed the transformation of the Hellenic vision of physical existence. These three men solved the problem posed by Parmenides and transformed the primitive material vision of Thales into a vision of changing matter and unchanging form.

Socrates did not write anything that we have any record of, but Plato, Aristotle and their students created an extensive written record of what these brilliant men believed and taught about the nature of physical existence. In the later years of his life Plato summarized his ideas about the nature of physical existence in a short book entitled “Timaeus.” Early in that book Plato asks the question:

“What is that which always is and has no becoming, and what is that which is always becoming and never is?”

“That which is apprehended by intelligence and reason is always in the same state, but that which is conceived by opinion with the help of sensation and without reason is always in

the process of becoming and perishing and never really is.”

What is the unchanging first-principle, the essential essence of existence? Plato taught that it is the forms of things, the ideals of action, the universal ideas or archetypes of existence. He taught that the physical world we see about us is a more or less poor copy of the perfect, unchanging ideas. Plato believed that the perfect forms have a real existence independent of and prior to any physical existence. And he believed that “above” the perfect forms and ideals there existed an unchanging “Absolute Perfection”—the first-principle of all physical existence.

Aristotle disagreed with his teacher on several points. He did not believe that the forms had a real existence, but existed in things and actions. He did not believe in the existence of a single “Absolute Perfection.” He believed that there were four causes to all things, but that there must be an “Uncaused Cause.”

These men differed in important ways. Plato was, like Thales, a monist (one idea, one principle). Aristotle was a pluralist with many forms and four causes. But they shared the belief that physical existence is an existence of matter and form. They were convinced that we can only find the truth of physical existence (all existence) by reasoning from the unchanging ideas, ideals and forms, and that our sensory perceptions of the ever-changing, formless matter of the material world are unreliable and false.

One of Aristotle’s students was a young man named Alexander. He was the son of Philip the king of Macedonia. Alexander died at age 32, but in the last 11 years of his short life he conquered all of the then known world. The conquests of Alexander spread the Greek (Hellenic) language and ideas from the Mediterranean sea to the Indian ocean. The later conquest of the Greek city states by Rome spread Hellenic ideas throughout the Roman Empire. When Alexander died Aristotle left Athens to avoid the fate of Socrates. He died one year later. The Hellenic vision as we know it was then complete.

Socrates, Plato and Aristotle were brilliant men. They were the profound thinkers who established the enduring foundations of our knowledge of ethics, politics and logic (the human studies). They asked almost all of the important questions about our human existence and answered most of them. But there is one truth of human existence that they could not know. It is that we are, and they were, by nature blind.

In our blindness they could not see the mountains on our moon. They could not see the moons of the planet Jupiter. They could not see the spots on the Sun, the spectra of the stars or the great spiral galaxies beyond our own. They could not see, or have knowledge of, the true nature of the universe. In our blindness they could not see the tiny bacteria and protozoa in the air they breathed and the water they used.

They could not see human blood cells, sperm cells or egg cells. They could not see chromosomes and genes—the patterns of biological existence. They could not see, or have knowledge of, the fundamental nature of life. In our blindness they reasoned to a false understanding of the nature of physical (and nonphysical) existence. In our blindness they demonstrated for all time that great brilliance cannot overcome our natural blindness.

Socrates was born about 469 BC. Aristotle died in 322 BC. In something less than 147 years these three thoughtful men transformed a confused Hellenic vision into a vision that has been a glowing tribute to the power of human reason for 23 centuries. Its vision of human existence is a vision of great truth. Its vision of physical existence is a vision of great error.

### 3.1.3 Reason, Revelation and Blindness

Human reason shown forth brightly from the Academy and Lyceum of ancient Athens. But “Divine revelation” did not come down upon a city.

Moseh (Moses) the “lawgiver” (1230 or 1540 BC—your choice) received his revelation on a mountain. Sidhartha (the Buddha) the “enlightened one” (600 BC) received his revelation under a tree in a forest. Jesus, the “Christ” (30 AD) received his revelation in a desert. Muhammad, the “Messenger of God” (610 AD) received his revelation in a cave. Each of these men went into solitude and in solitude they received a revelation that became one of the great visions of human existence.

Human reason and “Divine revelation” met in the great city of Alexandria. Plotinus (205-270 AD) lived in Alexandria with both the Hellenic and the Judeo-Christian visions (with reason and revelation). In his writings he described a “New Platonism” in which above the “Intellect-Principle” (above thought and object) there exists the “One.” Plotinus taught that we do not come to know the “One” through reason. When we reach the highest limits of reason we rise to knowledge of the “One” in a “mystical” silence.

In the next 1000 years the Islamic scholars led by El-Farabi (870-950), “Avicenna” (980-1037) and “Averroes” (1126-1198), the Judaic scholars led by Moses Maimonides (1135-1204) and the Christian scholars, most notably Thomas Aquinas (1225-1274), reconciled the reasoning of Plato, Aristotle and Plotinus with the revelations of Moses, Jesus and Muhammad. It was a brilliant synthesis. It was an elegant structure of knowledge. It was (and still is) a great blindness and a great arrogance.

It has been said of those “... who have eyes and see not, who have ears and hear not” that there are “none so blind as those that will not see,” a stubborn, perverse blindness. If this is true (and it probably is), then the next most blind must be those who are by nature blind, do not know it and are arrogant in their ignorance—an arrogant, ignorant blindness.

In those 1000 years the intellectual arrogance evident in Heraclitus, the error taught by Parmenides and the certainty of “Divine Revelation” combined to create a stubborn, perverse, arrogant, ignorant blindness that is still with us today.

Four centuries after Aquinas this arrogant, ignorant blindness was finally recognized and challenged.

### 3.1.4 A New Beginning

On a December night in 1609 we, the people of the Earth, through the eyes of one man began to realize that we are by nature blind. That man’s name was Galileo Galilei; who, in his own words, was a “Gentleman of Florence Professor of Mathematics at the University of Padua.” Galileo was one of the first men to build a telescope and was, perhaps, the first to observe the night sky through a telescope. On that December night he saw the mountains on our Moon. He continued his observations of the Moon, the moons of planet Jupiter and the stars through the winter. In March of 1610 he published an account of his observations in a little book entitled “The Starry Messenger.”

Most of the people of the Earth do not yet know it (or won’t admit it), But the year 1610 AD divides human history into two parts. All of the thousands of centuries before 1610 are the “centuries of our blindness.” The three centuries since 1610 are the “centuries of sight.”

“The Starry Messenger” and the other books that Galileo wrote were a challenge to “blind reason” by sensory perception. His books were seen as an attack on “Divine Revelation” and the authority of the Roman Catholic Church. Galileo lost his personal battle against the arrogant blindness of the orthodox

belief, but, like Socrates, his views have prevailed. Galileo died (under house arrest) in 1642.

Within a year of the death of Galileo a man by the name of Isaac Newton (1642-1727) was born. In one sense Newton finished the work that Galileo had begun. In a larger sense we are still struggling to finish the work they began.

In March of 1686 Isaac Newton published a book entitled *Mathematical Principles of Natural Philosophy* (the *Principia*). His book is a description of one of the great achievements of the human mind. Newton had studied the new astronomy and mechanics of Kepler and Galileo. He went on to formulate the “laws” of motion and gravitation and to invent the mathematics necessary to solve equations of motion. We call his great gift to us Newtonian or “classical” mechanics.

Newton went even further. In the *Principia* Newton described his “System of the World”—a new vision of physical reality that replaced the old vision from the “centuries of our blindness.” Newton’s vision of physical reality was a great synthesis. His system of the world was an elegant structure of new knowledge. But within it there is some measure of blindness and, in one sense, a touch of arrogance.

“If I have seen further ... it is by standing on the shoulders of Giants.”

and:

“I frame no hypotheses; for whatever is not deduced from the phenomena is to be called a hypothesis; and hypothesis, ..., have no place in experimental philosophy.”

In the first part of his *Principia* Newton stated a number of definitions and then added a “scholium” (comment). In that comment he stated the following:

- I. “Absolute true, and mathematical time, of itself, and from its own nature, flows equably without relation to anything external, and by another name is called duration: ...”
- II. “Absolute space, in its own nature, without relation to anything external, remains always similar and immovable. ...”

Galileo and Newton could with the aid of a telescope, see what Plato and Aristotle could never see. They could see and could begin to know the nature of the Sun, the Moon and the planets. But to state the nature of space and time is to go beyond what we can see. To go beyond what we can see is a self-inflicted blindness. To go beyond what we can see is to grope in the dark. In darkness we can become confused and lose our way. To walk an unknown way in darkness requires some measure of courage or foolishness or arrogance.

There are no phenomena from which to deduce Newton’s statements about absolute time and space. Those statements are hypotheses, postulates, assumptions (whatever) that, in Newton’s view, “have no place in experimental philosophy.” But to have a vision of reality we must go beyond what we can see. We must go beyond what we can see and know to what in our blindness we believe. Newton gave us a new mechanics and a new vision of reality. We now know (believe) that some part of his vision was, and is, wrong.

Olaus (or Ole) Romer (1644-1710) was a contemporary of Isaac Newton. Around 1675 he discovered through careful observation of the moons of Jupiter, that it takes about 1000 seconds for a ray of light to travel across the diameter of the Earth’s orbit (about 298 million kilometers). Through his careful observations we came to know that light travels through the universe at an extremely high velocity (about 300,000,000 meters per second—about a million times the speed of sound). Romer detected the fact that light is not an instantaneous phenomenon. Light moves through the universe at an extremely

high, but finite, speed. This fact is important because in some way (we still are debating how) the velocity of light is related to the fundamental nature of space and time. It took us about two centuries to begin to understand the importance of Romer's discovery and to begin to question Newton's statements about absolute space and time.

Galileo, Newton and their contemporaries were human, and being human they made mistakes. But we owe them a great debt. At Galileo's birth human reason guided by "Divine Revelation" was the only recognized source of knowledge about physical existence. Sensory perception (the observation of physical reality) was considered unreliable and of little or no value. At Newton's death a small group of thoughtful people were convinced that the observation of physical reality is essential to our search for knowledge about the nature of physical existence. Reason and "revelation" were replaced by reason and observation as the sources of our knowledge of physical existence. Reason and observation became the foundation of what we now know as the scientific method. In one brief span of years the orthodox belief of the past was challenged and exposed as the arrogant blindness that it was (and is). Our eyes were finally opened and we began to recognize the limits to our vision—our natural blindness.

### **3.1.5 From Blindness to Blindness**

We, the people of the Earth, share the gift of sight. Our human eyesight is a very precious gift, but it is a very limited gift. There are limits to how distant, small, fast or slow a thing we can see. There are narrow limits to "what" we can see (visible light). These natural limits to our vision have been with us since the beginning of human life. Within those limits, we can see. Beyond those limits we are blind. We can see well enough to live our daily lives. But with our limited eyesight we cannot see the foundations or the vast extent of the universe in which we live. We are by nature blind to the fundamental realities of physical existence.

In the three centuries since Galileo and Newton the intellectual heirs of those brilliant men have gradually pushed back the limits to our human vision. Through the careful work of a few thoughtful people we, the people of the Earth, are now aware of our natural blindness. But in their relentless drive to know the nature of physical existence those same few thoughtful people have, in this century, gone beyond the limits to our human vision to a new blindness and a new arrogance.

The development of the telescope and the microscope has moved the limits to how distant or small a thing we can see. The development of photography has moved the limits to how dim, fast or slow a thing we can see. The narrow limits to "what" we can see have been pushed apart by the development of a variety of instruments that enable us to in some way "see" most of the electromagnetic energy spectrum. These changes to the limits to our vision have, in the last three centuries, revealed things that have been hidden from us since the beginning of human life.

But the limits are still there. The new limits to our vision are far smaller and far more distant than those of the human eye, but they are just as real. We can compute the limits, the resolving power, of our most powerful electron microscopes ( $1.1 \times 10^{-8}$  cm for a 1 million volt instrument) By throwing matter particles at each other and measuring their scattering we can estimate their size (about  $1 \times 10^{-12}$  cm). The foundations of physical existence are hidden well below the new limits to our vision.

We can compute the limits, the sensitivity and the corresponding reach of our most powerful optical and radio telescopes. Within that distance we have not yet found the end or the edge of the universe. The full extent of physical existence is hidden beyond the new limits to our vision.

Beyond the new limits to our vision is a blindness. In this century we have pushed beyond these new



limits and are groping in the darkness of a new, self-inflicted blindness. We have established a new orthodoxy and we have acquired a new arrogance. The old arrogance was (and is) a blind, ignorant arrogance. (Those who followed Plato and Aristotle were ignorant of their blindness.) The new arrogance is a blind, foolish arrogance. We now know the limits to our vision but we have foolishly chosen to ignore them. Since 1910 we have been using “blind reason” to arrogantly debate the nature of what we in our blindness cannot see.

### **3.1.6 What We See and Know**

On our way from the old blindness to the new blindness we have discovered many things about the nature of physical existence. We have discovered a few things about the nature of matter and energy—the foundations of all physical existence.

After a century or more of experimentation, theorizing and debate (“reason and observation”), we now know (accept) that visible light, ultraviolet light, X-ray and infrared radiation, heat and radio energy are all a phenomenon that we have named electromagnetic. We have come to know that this electromagnetic phenomenon has both a continuous “wave-like” and a discrete “particle-like” (quantized) nature. We now believe that the “particles” (quanta or photons) of radiant energy that heat and light the universe have no mass (inertia or “weight”) and always exist in motion, scattering out through the universe, at the characteristic velocity of light.

We have also come to know that radiant energy is squeezed out of matter at extremely high temperature and concentration. We know that it radiates out through the universe to be absorbed by matter at some, usually lower, temperature and concentration. We call our measure of energy and temperature “entropy.” We now know that the entropy, the amount of low temperature (“low quality”) energy in the universe is continually increasing. In this century we have discovered that in addition to the heat and light from the stars, the universe is filled with a cold (“3 deg. K”), diffuse electromagnetic radiation with an approximately thermal distribution of energy versus frequency. We are still debating the nature and meaning of this reality of physical existence.

We now know (accept) that all material existence, all matter, is an inertial (mass or “weight”) phenomenon that also has a discrete “particle-like” and a continuous “wave-like” nature. We know that, like energy, matter has electromagnetic characteristics. But we know that unlike radiant energy, matter particles usually exist at velocities well below the velocity of light.

We also know that the quality of matter we call “mass” is in some way related to the fact that matter particles (that we have named atoms, electrons; etc.) tend to move toward other matter particles and collect together—a phenomenon that we have named gravitation. But in this century we have discovered that gravitation is in some way limited. If we have interpreted the “red shift” of galactic starlight correctly, the largest aggregates of matter, the galaxies and groups of galaxies we see scattered out through the dark night of the universe, are all moving apart from each other. They are, like energy, scattering out to the ends of the universe. We are still debating the nature and meaning of this reality of physical existence.

The meaning of most of what we have discovered is still being debated. We believe that the galactic recession, the entropy increase and the “3K” background radiation of the universe are related, but the nature of the relationship is not at all clear.

In this last 100 years we have discovered several things about the nature of physical existence that are even more fundamental. We have discovered some of the relationships between matter, energy, motion,

space and time. We have discovered some fundamental relationships between the foundations of physical existence and the basic fabric of the universe.

We have discovered (and used) the fact that matter and energy are in some way equivalent. Matter can be converted into energy and energy can be converted into matter. This equivalence can be stated as follows:

$$E = Mc^2$$

(Where E is energy, M is mass and c is the characteristic velocity of light.)

We are still debating our understanding of this equivalence. We generally agree (believe-accept) that both matter and energy are some form of motion.

We have discovered (and tested) the fact that our measures of space and time are in some way related to motion. The relationship of our measure of time to motion is as follows:

$$tv = tr \sqrt{1 - \left(\frac{v}{c}\right)^2}$$

(Where tv is time at velocity v, tr is time at rest and v/c is the ratio of v—the velocity of motion to c—the characteristic velocity of light)

Because this relationship contradicts Isaac Newton's assumptions of absolute space and time, an extremely sensitive and difficult interferometer experiment to measure the movement of the Earth through the "Aether of space" (and absolute space) was performed 13 times between 1881 and 1930. (The predicted motion was never detected.) This relationship (one of a set of relations known as the Lorentz transformations) has also been verified through measurements of the radiation from high speed particles. We now believe (accept) that Newton's assumed absolute space and absolute time do not exist.

The Lorentz transformations and the mass-energy equivalence discovered by Einstein are mathematical statements about the fundamental nature of physical existence. The mass-energy equivalence equation states that the destruction of matter (mass) will release an enormous amount of energy (a demonstrated fact). It also states that the creation of matter requires an enormous amount of energy. The equation states that if matter is a created existence, it was created from energy (or a motion common to both).

The Lorentz transformation of time measurements states that as the velocity of motion approaches the velocity of light ( $v/c = 1$ ), the measure of time approaches zero. It states that at the velocity of light the measure of time is zero; which is to state that at the velocity of light the "passage of time" is stopped. We call such a timeless state eternity. Radiant energy moves through the universe at the velocity of light. Radiant energy exists in a timeless, eternal state. The Lorentz transformations state that all matter in the universe exists in time and that the energy that heats and lights the universe exists in eternity. We do not know or understand the meaning of this reality of physical existence. The reason may be that we do not understand the fundamental nature of space, time and motion.

For centuries we have known the simple, yet fundamental, relationship between motion, space and time:

$$velocity = \frac{space}{time}$$

This equation states that motion, space and time are interdependent. If there is no time, there can be no

motion. Timeless eternity is a motionless existence. The Lorentz transformations state that radiant energy, scattering out through the universe at the velocity of light, has a timeless, motionless, eternal quality or nature. If motionless, eternal energy is a contradiction, or stumbling block to our understanding, it is probably because we are in some way blind.

We can see and measure the length, width and height, the 3 dimensions, of an object. We can see and measure the “space” it occupies. But we cannot see or measure the “time” it occupies. We do not, and cannot, see or measure time. What we call the measure of time is a measure of uniform motion. To measure time we measure some uniform motion (the turning of the Earth, the swing of a pendulum, the vibration of a crystal or an atom). The nature of time is beyond some limit to our vision. Our attempts to discuss the nature of time and eternity is yet another self-inflicted blindness.

### **3.1.7 The Unseen and the Unknown**

In the preceding sections I have tried to describe the limits to our vision and our self-inflicted blindness. I have done so for two reasons:

1. I believe that most, if not all, things are defined by their limits. Physical existence is defined by the limits to physical existence (whatever they may be). Our knowledge of the nature of physical existence is defined by the limits to our knowledge. And I believe that as distasteful as it may be to our human egos, there are limits, fundamental limits, to our knowledge.
2. A note for later discussion. I believe that we cannot really know what we cannot in some way “see” and recognize. I believe that this limit to our knowledge is established by the fundamental nature of nonphysical existence.

The words “never” and “always” should be used with great care. The following statements are unproven assumptions and should be recognized as such.

We can never see, measure or know the fundamental nature of time and eternity. We can never see or know the future or the distant past.

We can never see or know the fundamental nature of the matter particles that are the foundation of all physical existence. If we can reduce the limiting wavelength of our microscopes about 10,000 times to the estimated size of matter particles, we will still be using an electromagnetic phenomenon to create an image of an electromagnetic phenomenon. The nature of the matter particles will be hidden in beautiful diffraction or interference patterns.

We may never see or know the full extent of the physical existence. If we can keep on increasing the size and sensitivity of our optical and radio telescopes, we will eventually encounter one of two possible situations:

1. We will find no more galaxies beyond some distance that is well within the reach of our telescopes.
2. We will find all galaxies receding at essentially the velocity of light at some distance that is well within the reach of our telescopes.

If we encounter the first situation, we will have found the “edge” of the universe and we will know the full extent of a finite universe and something of the void beyond. If we encounter the second situation, we will have found an eternal outer limit to our vision and will never know what lies beyond that limit and whether the universe is finite or infinite in extent.

There are limits and we can “never” see beyond them. But we can easily go beyond the limits to our vision by using “blind reason” to create models of an unseen reality. We can build mathematically correct models of those unseen realities. We can, by observing the phenomena of physical existence, recognize relationships and then formulate “laws,” principles, rules and equations that accurately describe the phenomena.

We can, through the processes of induction, invention, intuition and “revelation,” find a concept or model of the underlying reality that is consistent with the observed phenomena. The Ptolemaic, Earth-centered, epicyclic model of planetary motion is such a model. Maxwell’s equations that accurately describe the propagation of electromagnetic “waves” thru a medium we cannot detect may be such a mathematically correct model. The quantum mechanical model of an atom with unseen “atomic electrons” may be such a model.

A mathematically correct model of an unseen reality may be conceptually wrong. We can continually revise the model “to save the appearances,” but if we in our blindness picked the wrong model, it will continue to be the wrong model. How can we know the nature of unseen realities?

We cannot.

What, then, is the nature of physical existence ?

Within the limits to our vision and knowledge we know that it is a vast phenomenon of matter, energy and motion. Beyond the limits to our vision it is a phenomenon of time and eternity, the finite and perhaps, the infinite—a vast and profound mystery.

## **3.2 *The Nature of Nonphysical Existence***

### **3.2.1 The Unseen and the Known**

To discuss the nature of something that is “nonphysical” is to discuss something that we cannot see with our eyes or any of the instruments we have invented to bring the invisible realities of physical existence within the limits of our eyesight. To go beyond the limits to our vision to debate the nature of a physical phenomenon that we cannot see is a self-inflicted blindness—a blind, foolish arrogance. How, then, can we discuss the nature of nonphysical existence—something not visible to our eyes? Perhaps we cannot. But let us explore the possibility that we can know of the existence of something that is not physical. Let us begin by exploring the nature of life.

### **3.2.2 Structure, Complexity and Life**

For centuries we have known that there is a unique, fundamental difference between the animal or vegetable and the “mineral” existence, between what we now know as the atomic-molecular existence and the much more complex, ordered existence of biological life. Since the invention of the microscope, we have come to know that all the forms of life we see about us are an organic, cellular existence. In this century we have discovered that a single microscopic cell is an extremely complex structure made up of “thousands of millions” of complex molecules which in turn are made up of hundreds or thousands of atoms. We now know that the complex structures of a cell support the replication of complex molecules. This complex, low temperature, molecular replication (growth) is the essential difference between the inanimate (“mineral”) existence and the animate, active existence of life.

The complexity that is biological life is more than great numbers or the orderly arrangement of molecules. We can now “grow” (recrystallize) single crystals of silicon that are millions of millions of atoms in an ordered arrangement. These large crystalline structures have been one of the basic materials of “solid state” electronics, but they are not life. Complexity is more than number and order. It is number, diversity and order. Biological life requires the ordered arrangement of a great number of different molecules—an “ordered diversity.” Biological growth is the reproduction of an ordered diversity.

The reproduction of a material structure requires three things. It requires the existence of matter (atoms, molecules) that can be assembled into a reproduction or copy of the existing structure. It requires the availability of the energy necessary to drive the assembly process. And it requires the information that describes “what goes where.” The structure, the complexity, the “ordered diversity” that is biological life requires matter, energy and information.

### 3.2.3 Matter, Energy and Information

In the last two centuries we have learned something about matter and energy. In this century we have learned something about information.

Through our studies of the realities of existence we have come to know that the only way that we can measure eternal energy in space and time is to observe its effect on the motion of temporal matter, we now measure the the rate of motion of matter (the intensity of energy) in “degrees” of temperature (or in “electron volts”). About 1850 a man named Rudolf Clausius established a measure of the energy content and temperature of physical systems that we call entropy (A high entropy condition is a condition of low energy “availability”). In this century we have come to know that the electromagnetic energy that heats and lights the universe is released from matter at very low entropy (extreme temperature and density) in the centers of the stars. We know that energy flows from our star, through our lives, to join the “3K” background energy at the immense entropy (extreme cold and emptiness) of intergalactic space. We know that physical processes driven by differences in temperature (or its equivalent) result in an increase in the entropy and uniformity of physical systems—are “positive entropy” processes.

Since Isaac Newton we have known that it is gravitation that keeps our “star-planet home” together. In this century we have come to know that the energy releasing processes of the stars are driven by gravitation. We now know that, within its limits, gravitation concentrates the matter of the universe and drives the “galaxie process” (whatever it is) that lights the stars. The process of discovery and debate is still going on so we do not yet know the full reality (truth) of the action of gravitation in time. We do know that the gravitation associated with the matter in the universe concentrates matter and forces it into a dense, nonuniform condition. To the extent that entropy is a measure of low temperature uniformity, gravitation drives a “negative entropy” process in the universe.

For centuries we have been aware of the existence of something we call information. To possess information is to be informed. The words we use to discuss this reality of our existence have Hellenic or Platonic meanings. Plato taught that we are informed through participation in some knowledge of the perfect forms (*eidōs*), ideals or ideas. The ideals or “forms” of things or actions are abstract patterns or models. To have knowledge (*epistēmē*) is to recognize or perceive directly. To be informed is to recognize or perceive directly the patterns in things and actions. Information is in some way related to the recognition of patterns.

The existence of information is dependent upon the existence of patterns in physical existence. An

arrangement of stones, notches on a wooden stick, knots in strings, impressions on a clay tablet and patterns of ink on a piece of paper can be what we call “stored” information. The unseen patterns we hear, smell or taste can be what we call “transmitted” information. Information is dependent upon the existence of patterns in physical existence, but it is important to note that patterns are not information. An undiscovered or unrecognized pattern in material existence is not information. It is only when a pattern is recognized that information exists. We do not store or retrieve information. We do not transmit or receive information. We store and transmit physical patterns.

In this century by studying the flow of signals through communication systems, we have discovered something about the “information capacity” of the patterns in physical existence. In 1948 a man named Claude Shannon established the mathematical measure of the patterns associated with information. He discovered that the information related to a pattern or message was dependent on the size or length of the pattern, the number of possible symbols in the pattern and the probability of their occurrence in the pattern. We now know that the information “capacity” or “utility” of a physical pattern has the same mathematical form (with a negative sign) as the energy “availability” or “utility” of a physical state—entropy. A cold, diffuse physical state and a large, complex physical pattern are high entropy and high negative entropy (“negentropy”) realities. A hot, concentrated physical state and a small, simple pattern are low entropy and low negentropy realities.

We now believe that the entropy of physical states and the negentropy of physical patterns are in some way related, but, again, the nature of the relationship is not at all clear.

### **3.2.4 The Ordered Diversity of Life**

In the last 100 years we have come to know something of the vast complexity of the cell—the basic unit of biological life. We are still trying to unravel the extreme complexity of that existence, but we now know something of the diverse unity of the cell.

We now know that the great diversity of the cell is due in large part to the wide variety inherent in a class of molecules we call proteins. Protein molecules are polymers, very long chains of smaller molecules, that we have named amino acids. The great variety of proteins is due to the extremely large number of ways that 20 or so different amino acids can be linked together. It is the linkage of the amino acids within the protein molecules that determines the size, shape, structure and activity of the many different proteins within a cell.

When we build some structure we must cut our material into parts of the right size and then join the parts together. What we can cut and join with our hands is limited by their size. To build a very small structure we need very small tools. We have found such tools within living cells. In our studies of the biochemical processes of the cell we have discovered a large class of protein molecules that act as catalysts for specific chemical reactions. These molecules can make or break the bonds that hold molecules together. We have named this class of molecules enzymes. These complex molecules have coiled and folded shapes in which some parts of the molecule are adjacent to other parts. We now believe that the shape of the parts and the electromagnetic nature of atoms create what we have named “active sites” that can make or break atomic-molecular bonds. We believe that these are the tools that are used in the molecular assembly process that is biological growth.

We now know that the specifications, the plans, the patterns that specify the structures of a living cell are stored within the cell in structures we have named chromosomes and genes. We now know that within a gene the specifications, for the structures of a cell are stored as the structure of long, ribbon-like polysaccharide molecules we have named nucleic acids. We now know (believe, accept) that four

different molecules (organic bases) that are attached to nucleic acids in sets of three are a 64 character code that is common to all forms of plant and animal life. We now recognize the nucleic acids as long messages that are the detailed specifications of the amino acid sequence in protein molecules.

We now know that different enzymes make copies of the nucleic acid codes which serve as nucleic tags for amino acids and as messages to tiny structures we have named ribosomes where the protein synthesis takes place. And we know that the metabolic activity that releases the energy to drive the cellular processes is centered in structures we call mitochondria. The nucleic acids associated with mitochondria suggest that they may be a form of precellular life and that the cell itself is a unity of earlier forms of molecular reproduction.

### **3.2.5 Information and Life**

We now know that life is a cellular existence. We know that a living cell is an ordered diversity. We know that cellular growth is the reproduction, the replication, of the ordered diversity of the cell. We know that the reproduction of an ordered diversity requires matter, energy and information (and tools).

Through the hard work of many dedicated people we are now able to identify many of the different kinds of molecules (matter) within the cell. We can also identify some of the metabolic processes through which energy is released within the cell. We now know something of the matter, the energy and the tools required for molecular replication -for biological growth.

What we have not found within the cell is the information that is required for molecular replication. We have found patterns, coded messages, stored in the structure of the nucleic acids of the cell. But, to repeat:

- Patterns are not information.
- There is no information in an unrecognized pattern.
- To be informed is to have knowledge of patterns or forms.
- To know is to recognize, to perceive directly.
- Information exists in the direct recognition of patterns or forms.

Information is not the physical existence of a pattern that can be accurately measured and fully described in units of space or time. Information is a nonphysical existence that cannot be measured or described in units of space or time. Information can only be known. I believe that it will be helpful if I interrupt this discussion at this point in order to discuss the language and logic of this discussion.

In this discussion of nonphysical existence I have attempted to use the language and logic of what we call the physical sciences. Of that language and logic it has been said that:

“What can be said at all can be said clearly, and what we cannot talk about we must pass over in silence.”

I chose to use the language of the physical in order to establish a firm basis for a discussion of the nonphysical. I have just gone beyond the limits of what I can say in the language of the physical sciences. To say that “Information is a nonphysical existence that cannot be measured or described in the units of space or time” is nonsense in that language and logic. The nonphysical does not exist in the language and logic of the physical sciences. I should also point out that two earlier statements: “There is no information in an undiscovered pattern” and “Information exists in the recognition of patterns”

are not verifiable through measurement. Their truth is directly perceived.

I do not intend to “pass over in silence” that which is nonphysical. I intend, instead, to use a more appropriate language and logic—to use a different “language game.” I intend to change from the use of the language of the physical sciences to the use of our common or everyday language that permits the discussion of unmeasurable, unquantifiable, experience. I am changing “language games” because I believe (I have become convinced) that it is only through our direct experience that we can know information and nonphysical existence.

Let us continue.

Information is a nonphysical existence that cannot be measured or described in units of space or time. Information can only be known through direct experience of the act of recognition. I believe that the information necessary for the molecular replication within the cell is created as the replication “tools” (the enzymes and such) are driven by energy to “sense,” “read” or “recognize,” the messages stored in the nucleic acids of the cell. I believe that information and life are two separate existences—each critically dependent upon the existence of the other. Biological life, an active physical existence, is totally dependent on the existence of information for its continued existence. Information, a dynamic nonphysical existence, is totally dependent on the active sensory processes of biological life for its recurring existence.

I believe that matter exists in time—is a temporal existence. I believe that energy exists in eternity—is the “Eternal Existence.” I believe that nonphysical information and active physical life are created by the action of Eternal Energy on temporal matter. I believe that in a very real sense we (all life) have two parents. One is a temporal parent. The other is an Eternal Parent.

### **3.2.6 Death and Knowledge**

Three centuries after the microscope was invented we now know that the essential process of life is molecular replication—the information process that makes all single cell and organic life possible. We now know that life requires communication—the exchange of biochemical “messages”—between the information processes within a single cell and between the cells of multicellular organisms. We are still studying the biochemical communications of life, so we do not know the full truth of this reality. But we do know that there is a significant difference in the result of single cell and organic communication.

Cellular life (single cell) is a controlled and regulated existence within the boundary established by the cell membrane or wall. But it is an existence characterized by “uncontrolled growth” (growth limited only by the resources and conditions of a cell’s environment). Environment permitting—cellular growth is continuous. Reproduction is by cellular fission, and the information process of the cell continues on in time as two (four, eight, sixteen...) independent cellular existences. It is a potentially immortal existence.

Organic life (multicellular) is a controlled and regulated existence in which the control and regulation extends beyond the boundary of a cell wall. It is an existence characterized by “controlled growth.” Organic life is not continuous. In its higher forms it begins with conception and an immature period of physical growth. It continues with a mature period of reproduction and ends with a period of deterioration and death. Organic life continues in time through generations of life; each generation carrying life beyond the death of the preceding one.

Organic life begins with a single cell that contains all the stored patterns, the complete genetic code, necessary to specify the structure of the entire organism. But during the early development of organic



life an extremely complex intercellular communication process progressively “masks” more and more of the genetic patterns in each cell so that the growing cells are differentiated and specialized into the diversity of cells that make up the tissue structures of organic life. This intercellular communication and the resulting specialization of cells is the unique difference between the single cell existence and that of organic life. I believe that this intercellular communication and specialization is enormously important. It is through specialization that we have sight and hearing; that we have memory and thought; that we have can have knowledge of existence.

Single cell life is a potentially “immortal” existence, but it is a blind, mindless, deterministic existence. Organic life is a mortal existence, but it is an existence of sight and knowledge. I believe there is some truth in the myth of the “Garden of Eden” and the “Tree of Knowledge.” The price of knowledge is death. But in the “centuries of our blindness” we got the truth “backwards.” Death is not the curse of knowledge. Organic life and death came first. Knowledge is a gift of specialized, organic life. I believe that we have been driven up from the “clay of the Earth”, up through precellular life, up through single cell life, up through organic life and death—to knowledge of the Eternal Light.

### **3.2.7 “Law” and Information**

During the last three centuries we have reshaped our ideas about existence by “grinding” them against the truth of hard reality. We now know (accept, believe) that the lowest level of physical existence, the atomic-molecular, responds in very predictable ways to changes in the environment in which it exists, we have discovered many of these predictable (“cause and effect”) relationships (and have named them somebody’s law, rule, principle or theory). We now know (accept) that these levels of existence “obey” known (or unknown) physical “laws.”

A physical “law” is not a rule that is decreed and enforced. It is a predictive relationship. It is usually a mathematical statement of a relationship between a cause and an effect in the atomic-molecular existence, or between a stimulus and a response in the biological existence. When direct mathematical analysis is impossible or too difficult, we can and do use statistical analysis on a large number of responses to find a significant relationship between the responses and possible stimuli. Statistically significant relationships help us predict the probable behavior of large populations of atoms, molecules, cells, organisms or people.

We may never know of the first, simplest life, but we do know that the viral and single cell life forms existing today are relatively simple, yet complex, biochemical systems that are very mechanistic in nature. We have in this century begun to trace the complex electrochemical pathways within a living cell that enable these tiny organisms to make simple, reflexive responses to changes in their environment. We now believe that the simple forms of life exist (grow and reproduce) in ways that are established by complex electrochemical feedback systems. We believe that simple life is “governed” (in a more complex and less direct way) by the same physical “laws” that establish the lower, non-biological, levels of existence.

At higher levels of organizational complexity the reflexive responses are supplemented by what we have named unlearned “instinctive” behavior. These complex, genetically coded, behavior patterns make possible the survival of lifeforms more complex than the viral and single cell life. At even higher levels of complexity the “instinctive” patterns of behavior are supplemented by learned behavior as the new generation of a species stays with, and learns from, the older generation for some period of time. Here the first sign of a fundamental change appears. The responses, the behavior, the survival, of an individual member of a species (and through it the species itself) begins to be dependent, in some part,

on its past learning and life experiences. At this level of complexity the “information-life process” has been driven beyond the limits of rigid, genetically encoded, reflexive or “instinctive” existence.

At the highest levels of biological complexity the imitative learning of the new generation is supplemented by the active training of the young by the adults of a species. The information processing required for survival is so complex that a protected childhood of learning and training is required. The reflexive responses still serve a vital protective function. The unlearned “instinctive” desire to survive and reproduce is still strong. But individual behavior is dependent on a massively complex information processing capability acting on the random experience of life.

To go from the inanimate “mineral” existence to the animate animal or vegetable existence we took the step up from the physical existence of many individual molecules to the nonphysical existence of information and the diverse unity of biological life we must now take a second step up from “many” to “one.”

I believe that the behavior of a single member of a higher species is above predictability (above deterministic “cause and effect”). I believe that the massive, immense complexity, the diverse unity, of the higher brain structures creates an existence that is above computability; is above mathematical analysis and predictability. I believe that the “information-life process” on the Earth has been driven to a higher existence that is above physical “law.” I believe that the essence of that existence is choice—free choice.

### **3.2.8 Information and Choice**

The recognition of a physical pattern is the creation of nonphysical information. In single cell life forms, a reflexive response follows directly and logically from the act of recognition. When food or threat is recognized, a genetically specified series of biochemical reactions occurs which results in an observable response. A thermostatically controlled heating system is a common, but crude, single function example of this kind of simple reflexive processing. In organic life forms with several specialized sense organs both the patterns to be recognized and the survival responses are more complex. This higher level of information processing is a set of genetically specified, “instinctive” survival strategies and tactics. A lone spider spinning a web that is characteristic of its species is a familiar example of this kind of complex information processing.

At still higher levels of organic life many of the strategies and tactics for survival are learned by observing and copying the successful behavior of adult “survivors.” The best of the computer programs that have been written to play the game of chess are relatively crude, but complex, examples of logical processes that learn by observing others. These programs learn to play a fairly good game of chess by reading and evaluating (“observing”) hundreds of chess games that have been played by good human chess players. These programs recognize and weigh the strategies used in the “observed” games and then store patterns that represent strategies and evaluations for use when playing the game against an opponent. These programs are rigidly logical, but their performance is impressive.

An information processor that learns by observation is uniquely different from reflexive or “instinctive” processors. A learning processor is adaptive and open ended. The processor begins processing with only the essential capabilities of pattern recognition, analysis and storage. New observations, new patterns, are recognized and evaluated by comparing them to previously stored patterns that are the essence (the “form”) of what were once new observations. This means that the very first sensory pattern (the sound of a mother’s heartbeat for example) is first stored as an unrecognized pattern. This also means that the learning process is order dependent. How a new observation is

processed is dependent on what previous patterns have been processed. But what is most important is that when a learning, reasoning, information processor stores incomplete or conflicting observations it can reach a condition of logical uncertainty from which the initiation of a response would be illogical. What a learning information processor does when it recognizes the illogic of uncertainty is dependent on its electronic or genetic programming. There are several possible “uncertainty responses.” They are:

1. Quit. (Write error messages or cry and fuss.)
2. Keep trying. Make another observation and repeat the process. (This is a potentially infinite loop.)
3. Request Help. Request a decision or a decision rule from its “trainers.” (Go ask Mom or Dad.)

Note that two of the three possibilities listed above assume the existence of another information processor and the third has the potential for endless processing and no decision. What happens when the “trainers” aren’t around?

Here the analogy between the electronic and the biological learning processor fails. The learning computer program exists alone. The learning biological processor coexists with many reflexive and several “instinctive” processors. The biological learning processor is “sitting on top” of several very powerful non-learning processors. These lower level processors can and do interrupt the logical processes of the learning processor in special circumstances. I believe that there are at least two such circumstances. Both occur when the learning, reasoning processor is attempting to resolve a logical uncertainty. If the situation is very threatening a lower level processor may abort the uncertainty processing and initiate a lower level response that is based on cold, irrational, “instinctive” fear. It is a logical response of a lower, unreasoned, “illogical” quality.

If the situation is not threatening, the learning processor may continue trying to resolve the logical uncertainty of the situation for an extended time. At any time a lower level processor may inform the learning processor of some condition (hunger, weariness, frustration etc.). If the uncertainty is not resolved, the signals from “below” will become more insistent until the high level processing is interrupted and an illogical choice is made between what may be several alternatives of apparently equal value. The choice may be made and remade several times before the high level processor finally gives in to the illogical necessity of decision. I believe that the frustration, or whatever else forced the decision, does not influence the nature of the response chosen. Its only contribution is the blind selection of the state of the logical reasoning process when it was interrupted. I believe that there is no logical connection between the new observation, the stored patterns, the uncertainty, and the chosen response. The choice is an illogical, free choice.

We call a large biological information processor a brain. The massive complexity of the higher brain structures is the genetically specified structure of an extremely sophisticated logical, learning, reasoning information processor and several coexistent lower level processors.. The operation of learning processors can result in logical uncertainty. I believe that in overcoming uncertainty, biological necessity creates illogical free choice. Biological necessity, forces illogical choices out of a logical, reasoning information processor and in doing so creates an information existence that exists above the rigid logic and “cause and effect” of physical “law.”

### **3.2.9 Unity and “Self”**

We have been aware for centuries that in some way “The whole is greater than the sum of its parts.” We recognize the unique difference between all the pieces of something and the assembled unity of all the

pieces. This is not an illusion. It is a recognizable truth on which our existence depends. The difference between scattered parts and the unity of the whole is nonphysical information.

We (some of us) know (believe) that the slowly assembled unity of the atomic-molecular existence, driven by energy, is the higher biological existence. The diverse unity of a passive, static, physical existence, animated by energy, is the unique, nonphysical existence of information and active, reproductive, life. There is a unique, fundamental difference between a molecule (a protein, lipid, polysaccharide, etc.) and life. The ordered diverse unity of the one creates the other.

I believe that there is a unique, fundamental difference between an information processing cell and a “self.” I believe the massively complex diverse unity of the one creates the other. I believe that the normal functioning of an assembled unity of information processing cells (the biological structure we call a brain) creates a non-physical information existence (the “mental” existence) that we call “self.” I believe that the essence of our conscious individual “self” is logical reasoning and illogical choice.

I cannot describe “self”, but it is the active “inner me” that is writing this, and the active “inner you” that is reading what I am writing. “Self” is the “I” in the phrase “I think (or doubt), therefore I am.” I believe “self” is (like information) a nonphysical existence that can only be known by experiencing it. We have known of “self” and “person” for thousands of centuries. We have studied the “self” (the Hellenic “psyche”) for 20 or 30 centuries. In the last hundred years we have begun to study the operation of the complex unity of the brain that creates “self.” But for all our experience and study we know very little about the creation of “self.”

I believe that reasoning, choice and the conscious “self” are created by the extremely complex information processes of the brain. I believe that in the higher brain structures the complex interaction between a learning, reasoning, adaptive information processor and genetically specified information processors creates a “mental” information existence that can be, and is, both logically rational and illogically free. I believe that the complex learning and reasoning processes of the brain create a thick “information membrane” or wall, that isolates and establishes (creates) “self” within and above the biological existence below. I believe that the lower information processes of the brain keep the reasoning “self” in touch with biological reality and drive this “mental cell” up out of uncertainty and endless mental contemplation to illogical choice and freedom.

I believe that “self” becomes “person” as the mental “self” learns to live with “its” body, the “outside” world and other persons. I believe that we (and many of the higher animals that express “personality”) are “self.”

### **3.2.10 Logos (Word)**

We have known for 30 (or 30,000) centuries that there is a unique difference between human life and every other form of life on the Earth. We knew this before we built cities, before we invented agriculture.

We now know that there is a unique difference between the single cell forms of life and the multicell, organic life that makes all higher forms of existence possible. There is a unique difference between a single cell creature and a tiny multicellular organism, although both “obey” physical, biological “laws.” There is a unique difference between a dog and a human although both exist above physical “law” as “self”, as a personality. In both comparisons there is a unique difference between the less complex and the more complex species of life. I believe that the unique difference is caused by (is) “voice.”

In the last hundred years we have come to know something of the “voice” of the cells. We have

discovered that the cooperative, interdependent existence, the balanced growth of multicell, organic life is critically dependent upon the chemical messages exchanged between the cells of an organism. We know very little about intercellular communication, but we do know that when this “organic” communication is distorted or disrupted, the result can be uncontrolled (“single cell like”) growth—a growth we call cancer.

Twenty or thirty centuries ago we concluded that to be human was to be rational. We concluded that it was our human intellect, the ability to process information as abstract symbols, that raised us above all the other species of life on Earth. But the only measure of interior rationality is exterior communication—signs and speech or “voice.” Reason and speech (the Hellenic “logos”) are interdependent, but I believe that it is not reason, or rationality that is the measure of what is human. It is speech, the use of a language, that is the unique difference between human and all other life.

We do not know how we alone on the Earth attained speech. I believe that speech is one of the three critically interdependent phenomenon. They are reason, speech and cultural group. We could not have attained speech without reason (something to say) and a kinship-tribal, cultural group (someone to say it to). Our human voice is the gift of the complex information processing capability of the human brain, but it is not an individual gift. It is a social gift—the work of many “inner selves” (persons) reaching out to others of like kind. We learn a language from others in our culture, and through our adopted language we reach out from our “inner self” to be one with others and participate in a larger human existence. I believe that the “voice” of the “self” (like the “voice” of the cell) creates a new larger lingual, “spirit,” existence in the universe.

### **3.2.11 Word and “Spirit”**

I am “self,” a mental existence (“I think, therefore, I am.”) but I do not think alone. “I” (my “inner self”) live a distinct, isolated existence within my brain, but I live a shared human existence. I think with images, ideas, concepts, words (whatever). The images I use may be uniquely mine, but the words I use are a gift I share with all those who understand the verbal symbol system called the English language. (Actually I speak an American “dialect” of the English language.) I believe it is through the language I use, through the words I have learned from my parents, and others, that I have joined the humans of the Earth.

We are born a “potential human.” It is through our use of words that we really become human. A “potential human” (a human baby) does not become human outside a human family. In the extremely rare known occasions that a human baby was adopted by an animal mother, the “potential human” did not achieve speech, did not become human. It is only in a human group where words are spoken that a baby can become human.

I know (have absolutely no doubt) that “self” (the active “inner me”) is individual. I believe (I am convinced) that “human” is lingual, social. There is ample evidence that a normal human personality can be destroyed, or permanently damaged, by isolation, by loss of human contact. I believe that “human” is “self,” word and group. We each become human by using words to join our cultural group. If by choice, or accident, we stop exchanging words or signs with our human group, if we become isolated, we can lose our “human” quality. I believe that words are, the lingual existence is, the essential reality of human existence.

We frequently use the word “spirit” when discussing the “self.” We recognize a “happy spirit,” a “gentle spirit,” the “feminine spirit,” the “masculine spirit.” But beyond these personal characteristics we associate certain characteristics with the “American spirit,” the “English spirit,” the “Latin spirit,”

the “African spirit” (or “Soul”), the “Oriental spirit” (or “Mind”), and with the Jewish, Christian or Islamic “spirit.” There are small, but obvious, structural and color (biological) differences between the different human groups, but their “spirit” is not biological, it is lingual, when a baby of one racial or ethnic group is raised in a different linguistic, cultural group, the child (to the limit allowed by adult prejudice) adopts (becomes a part of) the “spirit” of the group in which it is nurtured. It does so by learning the words, the ideas, the beliefs, the attitudes, the customs of the linguistic—belief (cultural) group.

I recognize a “self” within me. I recognize (assume the existence of) a “self” in other persons. I believe “self” acquires “spirit” (“soul”-“mind”) by sharing in the “spirit” of a language group, a belief group, a culture. We are born, we snare the “spirit” of our culture by sharing the words, the beliefs of our culture, and we die. We are mortal. Our biology fails, our mental activity, our “self” loses existence, but the “spirit” we share lives on. The “spirit,” the words, the beliefs, the culture, we learn from our parents and teach to our children, lives on generation after generation. Our linguistic-belief “spirit” is immortal.

I believe that “logos”, the lingual existence, a cultural “spirit” is a new larger, nonphysical, immortal existence. “Spirit” is thousands—millions—of persons (“selves”) united by word and belief. I believe that we are the mortal cells of immortal human cultures—immortal linguistic-belief “spirits.”

### **3.2.12 Choice and “Spirit”**

The gift of life is a precious gift. We are still discovering and debating the biochemistry of life. We as yet do not know how the temporal atomic-molecular existence was driven to the extreme complexity that is biological life. And we do not know how single cell life was driven into a cooperative, interdependent, organic existence whose growth is controlled by a complex chemical “voice.” We do not know how the “information-life process” began or how it was driven up to the mammalian life we share.

I believe that we have been given an even greater gift. It is a gift of mental life, consciousness, choice, “self” and personality. It is a gift that our human species shares in varying degrees with many other species of life on this planet. (I believe it is a gift we probably share with many species on other planets near other stars.) We now know that the gift of “self” (the self-awareness we experience) is dependent on biological life and the normal functioning of a large brain. As with biological life, we are still discovering and debating the functioning of the brain. We do not know how the complexity of the brain creates choice and “self,” and we do not know how the “information-life process” was driven to the complexity necessary to create memory, intellect, choice, consciousness and “self”—a nonphysical, mental existence.

I believe the greatest gift we have received is the immortal, lingual “spirit” we share. It is a special gift that we do not share with any other species on this planet (and share only with those species in the universe that have attained “voice”). Our knowledge of this gift is so primitive that most of the people of the Earth do not recognize it as a social gift. We do know that lingual, belief, cultural groups can be immortal. (They can live on through generation after generation of human life.) We do know that cultural groups have unique “spirit”, and that individual persons share in, and transmit, the “spirit” of their linguistic-belief group. And we do know that the immortal “spirit” of a cultural group is dependent on words and language. But we do not know how our species (ours alone on the Earth) was driven from “self” and “person” to “voice” and “spirit.” We do not know how the “spirit process” was started. We do not know how we became human.

I believe that the “information-life process” was driven beyond physical “law” to choice. I believe that

the beginning of the “spirit process” involved a choice. I believe the critical choice was in some way a social choice. I believe the choice involved words—primitive conversation. I believe that the “transition generations” of our species (our “first parents”) made choices that involved “self” reaching out through “voice” to “group.” I do not know how we were driven to a social existence far, far larger than that of any other species on the earth. I do not know what pressures were applied to biological and personal life on the Earth. And I do not know how our “first parents” (of all the primates—of all the species of the Earth) responded in what was a verbal, social way. But I believe that we alone chose to unite through words in what has become a new, larger, social, lingual, “spirit” existence.

I believe we chose “voice.” I believe we chose to reach out through “voice” to others. I believe we chose to be one in “spirit.”

### 3.2.13 The Pattern of Existence

I believe that through the processes of discovery and debate we can know something of the reality, the truth, of existence. I believe that in this century (after 3 or 4 centuries of discovery and debate) we can begin to see a pattern to the reality of existence.

I believe that if we examine what we now know of existence, we can recognize six forms of existence that exist in three fundamentally different “levels of existence.” I believe that if we look further, we can “see” a vision of higher forms and higher levels of existence. This pattern of existence (the known and envisioned) can be expressed as follows:

|   |            |                       |                       |                     |                       |
|---|------------|-----------------------|-----------------------|---------------------|-----------------------|
|   |            |                       |                       |                     | ????                  |
| 4 | Spiritual  |                       |                       |                     | “Human” →<br>Galactic |
| 3 | Personal   |                       |                       | Mental →<br>Lingual |                       |
| 2 | Biological |                       | Cellular →<br>Organic |                     |                       |
| 1 | Physical   | Atomic →<br>Molecular |                       |                     |                       |
|   |            | ????                  |                       |                     |                       |

In the diagram above a step to the right is a movement from “one” to “many.” A step up is a step from “many” to “one.” A horizontal step is a combination forming a larger existence. A vertical step is a new creation, a fundamentally different existence—a higher unity.

The lowest level in the diagram—below the level of physical existence—is the profound mystery of the existence of temporal matter and Eternal Energy. It is that part of physical existence that “we cannot talk about” and that I must humbly and reverently “pass over in silence.”

The first step up that I can talk about is the step up from the atoms and molecules—the “hard reality” of physical existence—to the vastly larger, active, physical existence of biological life and the nonphysical existence of information created through the action of Eternal Energy on temporal matter. The second step up is from organic life to the existence of choice and the mental “self” created through the active information processes of massively complex brain structures.

These two steps up (and two to the right) are the steps from temporal matter and Eternal Energy to our mortal “selves” and immortal, lingual, cultural “spirits.”

I have added a fourth level to the diagram above because I believe that some kind of a “unity process” can be recognized in the pattern of existence. I believe that a negative entropy process that joins the temporal and the Eternal is transforming the universe from a vast and scattered simplicity to an equally vast and complex unity. The gravitation of temporal matter drives it into the hot, concentrated existence of stars and galaxies. The formation of stars releases Eternal Energy from temporal matter which drives matter in the joint creation of biological life and nonphysical information, choice, mortal “self” and immortal “spirit” (the joint creation of higher negative entropy).

I believe that through “voice” our “first parents” chose to become “one in spirit” and formed our lingual, tribal, cultural spirits. Since then we have had unending tribal intolerance, warfare and imperialism. I believe that if we, the people of the Earth, are to participate in the growing Unity of the universe, we must choose to rise above our divisive, tribal, existence to become truly “one in spirit”—our “Human Spirit.”

And of the future—the envisioned unknown.

I believe that when we have become our human “spirit cell” we must then reach out through some “voice” (some common language) to the other “spirit cells” in our galaxy to form a vastly larger organic, lingual-spirit, Galactic existence. The next step would appear to be a step up to a still higher Unity within the universe of space, time and eternity. But I can go no further. Unlike Plotinus, I am unable to rise in mystic silence to a knowledge of the “One.” I must stand in humble and reverent silence before the growing Unity and profound mystery of physical and nonphysical existence.