Blending science and philosophy with common sense, The Goblin Universe is an easy and understandable guide that seeks to answer such questions as what is the paranormal,is there a God and is there life after death?

The Goblin Universe: Speculations on the Nature of Reality

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Speculations on the Nature of Reality

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The Real World

Webster's New World Dictionary defines metaphysics as that "branch of philosophy that deals with first principles and seeks to explain the nature of being and the origins and structure of the world." Metaphysics is then that portion of philosophy that examines the nature of reality and tries to find the fundamental principles underlying that reality. As such it is synonymous with ontology, which is the study of the nature of being or of ultimate reality. Originally applied to that collection of Aristotle's works dealing with first principles it is usually thought of as including epistemology, which is the systematic study of nature. Traditional metaphysics is an attempt to discover why the world is the way it is by the use of reason.

Pioneered by the ancient Greeks, reason alone was believed to be capable of understanding the true nature of reality. Distrusting observation as crude and unnecessary these Greek thinkers laid the foundation for much of Western civilization. However, two thousand more years of experience has shown that this idea was too limited. According to Immanuel Kant (1724-1804) pure metaphysics "is a mere delusion arising from the fanciful insights of reason into which is in truth borrowed from experience, and to which habit has given the appearance of necessity," or in plainer English, Kant felt that metaphysics is purely speculative being isolated from the rest of philosophy by its complete independence from experience. Since "reason is a pupil of itself alone" Kant believed that metaphysics must be purified by criticism if it is to have any permanent meaning.

And it must be admitted that Kant was right. To find a safe path through a maze of competing ideas and theories does require observation an experiment if metaphysical thought is to be more than mere speculation. If metaphysics is to contribute to modern thinking it can no longer isolate itself from the

empirical and must be willing to face criticism from any quarter. The danger, to which it has yielded in the past, is that it becomes so enamored with the experimental method that it begins to kowtow to it. This subservience has resulted in the low esteem in which metaphysics finds itself today.

For it cannot be denied that metaphysics has a bad reputation—the poor kid from the streets. No more deadly insult can be hurled at a scientist than to refer to his work as metaphysical. Yet if we apply the scientific method to metaphysical questions will not we lose the essence of what it is that makes metaphysics unique? With its heart gone, all that is left is simply poor science. If metaphysics is to contribute anything to today's world, it must first be true to itself. Today the scientific method so dominates the world that a problem is deemed real and therefore worthy of study, precisely because it can be studied empirically. Metaphysics cannot allow itself to be bound by any such limits.

Available to those of us who are mathematically challenged metaphysics is the poor man's physics. By combining reason and revelation metaphysics attempts to deal with questions of first principle that cannot be answered either experimentally or mathematically. Any attempt to apply these physical methods alone to non-physical questions can only yield meaningless answers or the dismissal of the question as unreal. Neither approach alone can hope to reveal all of the truth. Reason without intuition becomes narrow and dogmatic, while uncriticised intuition is indeed mere speculation.

Where empiricism fails the only path left open is metaphysical speculation. This is the only alternative to complete inaction. We will avail ourselves of it. Here we will try to unite the ideas and beliefs of science, philosophy, mysticism, theology and magic into a coherent worldview. In our search for this comprehensive theory thought will be

allowed free-rein to go where it will and we'll see how what we find stands up to criticism.

As free spirits thought can go places inaccessible to empirical science. David Hume (1711-1776) established long ago that pure empiricism is not a sufficient base even for science and by so doing showed that whatever the explanation for the relative universe it is, at least partly, subjective. In subjective matters intuition must be our guide, although as John Locke (1632-1704) has said, it must still be judged by reason. Without such a ground it is very easy to have ones grand theories degenerate into sophism. We will encounter areas in our journey where Aristotelian logic does not apply. Still it is the best road map available and we will follow it wherever practicable.

What then is reality? Theologians have filled many volumes discussing this very question. Close behind come the philosophers filling many more volumes with theories of knowledge, theories of the nature of physical reality and theories of the ultimate. Within the last few hundred years' science has taken pride of place, shouldering all aside with its claims of a superior way of knowledge. What is one to make of all these seemingly irreconcilable views? Are they totally at odds, destined never to unite, or is there a golden thread that can lead us out of the maze? Can we combine all of these views into our own version of a Grand Unification Theory that will allow the underlying truths to stand forth?

For, after all, what the world is like should be perfectly obvious to anyone. To see the real world all you have to do is open your eyes and look. Out there is the real world of "shoes and ships and ceiling wax" while in here is the mind observing what is out there and, occasionally, thinking about it, all perfectly obvious to any right-thinking person.

Of course, no one can ever know exactly what another person is thinking; but the fact that each of us can understand the other is enough to show that both are experiencing, more or less, the same thing. If you ask someone to sit down in a chair, and he does so, the presumption is that what he experiences as 'chair' is the same as what you are experiencing. Anything else is nothing more than bohemian coffeehouse nonsense.

It is common enough knowledge that different people have different views of life. To see these differences one has only to talk to a Christian fundamentalist pondering how best to live in accordance with his beliefs and an east coast intellectual who believes in nothing. These underlying views are the conceptual framework upon which cultures are built and lives are lived. Put into words these concepts become ritual, art, myth and folklore. Different from culture to culture, changing through time, these conceptual frameworks are paradigms, which can be thought of as a model or blueprint. And just as a blueprint gives you the information needed to build your house, a paradigm gives you the information needed to build your world.

A paradigm is a shared set of assumptions, which govern the way we perceive the world. The picture built out of these assumptions allows us to explain the world, predict behavior, and to make choices. A paradigm constitutes a system for describing the world. From the time it is born a baby learns its native paradigm in the same way it learns its native language. For a child to be accepted as a full-fledged member of society it must capable of reacting to the world around it in the approved manner.

Today's paradigms find their base in a nature revealed by the methods of science. However, many people do not have what we might call the empirical temperament. These people are more comfortable within the shelter of religious thought or one of the New Age doctrines and feel alienation with the world

they live in. The attitude of some scientists does not help. While the best scientists think of themselves as "humbly picking up shells on the shores of knowledge" not all are so restrained.

Immersed within the rightness of their paradigm the writings of some scientists take a condescending attitude toward ideas and beliefs that are often outside of sciences boundaries. To many lay people this smacks of arrogance. The result is a backlash that sometimes throws out the baby with the bathwater. No one people and no one age has a monopoly on wisdom.

Before we go any further, it might be as well to pause and discuss just what we mean by consciousness, as it will loom large in our discussion. Thought of in different ways by different people this is how we will understand it here. I may give some expert the apoplexy, but at least we will all be in one accord. We will begin with William James (1842-1910) who said consciousness is a process that involves awareness; you lose it when you go to sleep and regain it when you wake up. To James life and consciousness are the same; there can be "no experience except where there is life." Consciousness is then an outcome of life and without it there can be no talk of experiences.

Over the years all attempts to understand what consciousness is has resulted in a complete lack of consensus. Years of effort by the best consciousnesses at hand have failed to produce so much as a generally accepted criterion. In fact, the effort to discover what kind of thing consciousness is has proved so elusive that the suspicion is raised that maybe it is not a 'thing' at all.

For most people consciousness is the sum total of all mental processes. All that one needs to find consciousness is to close ones eyes, look inward, and there it is a continuous soliloquy streaming past the mind's eye. Here we do our

thinking, make decisions, learn new skills and solve problems. This understanding of thinking goes back to Descartes (1596-1650) who considered consciousness to be the defining feature of thought. He used the term "consciousness to include everything that is within us in such a way that we are immediately conscious of it. Thus, all the operations of the will, the intellect, the imagination and the senses are thought." Each morning we get out of bed and face another day. Externally there are the tasks of the day, that unceasing round of doings, while internally flows a never-ending monologue of hopes, moods, musings and reveries, a place where your Walter Mitty self fearlessly faces down life's challenges. An organ called a brain is producing all of this, and in studying the phenomenon of mind it is here that science begins its search.

Remember that, although the brain receives the attention, it is only one part of the overall nervous system. Responsible for the control of all voluntary and involuntary muscular reactions the nervous system divides into two main divisions: the central nervous system and the peripheral nervous system. The central nervous system consists of the brain and spinal cord and is roughly speaking, that portion of the nervous system encased within a protective covering of bone; the skull and the spinal column respectively.

The peripheral nervous system is that part of the nervous system that is outside this protective sheath. These are the nerves themselves. In its turn, the peripheral nervous system also divides into two divisions: the somatic division and the autonomic division. The somatic division is responsible for acquiring sensory data and carrying the impulses that govern voluntary muscular reactions, while the autonomic division handles the motor impulses that regulate heartbeat, breathing, digestion and all of the other involuntary reactions. This overgrown swelling, known as the brain, is the site where

consciousness traditionally resides. This brain divides into three parts: the hindbrain, the midbrain and the forebrain. The hindbrain is that part of the anterior portion where it first begins as a swelling of the spinal cord called the medulla oblongata. This is the part of the brain that most resembles the spinal cord in the organization of its tissues. Found here are the reflex centers where breathing, cardiac and alimentary actions are controlled.

Setting above the hindbrain, figuratively if not literally, is the cerebellum. The cerebellum controls equilibrium, co-ordination, balance and anything that requires precision of movement. We all have faced the challenge of learning a new skill. Initially each new action must be thought out, with will power applied to keep to the task of learning. This can be a long, difficult and tedious process, but given the necessary effort at some point what was hard will now be easy. The skill has become second nature with concentration being no longer necessary. In fact, thinking about ones actions will now inhibit rather than enhance ones performance. When we reach this stage the cerebellum is in control.

Medical science places the origins of consciousness in the operations of the forebrain. This divides anatomically into the diencephalons and the cerebrum. Composed of the thalamus, hypothalamus and epithalamus the diencephalons serves as a relay center for sensory impulses, reflex actions and controls some levels of emotion. Also controlled from here are water balance, fat metabolism, sleep, blood pressure and body temperature.

The other division of the forebrain is the cerebrum. When most people think of the ‘mind’, it is the activity of the cerebrum of which they are thinking. The pride of humanity it is here that conscious behavior and intelligence resides. The outer layer of the cerebrum is the cortex—the famous gray

matter—that consists of about 10 billion nerve cell bodies. With each of these cells having the possibility of many tens of thousands of interconnections with other cell bodies, the brain has a complexity that puts a computer to shame, if there is such a thing as a soul, surely it in the cerebrum that it will found.

Exactly how all of this translates into the phenomenon of consciousness is not at all clear. Spiritualism along with some of the New Age doctrines sees consciousness as some kind of force field, such as auras, psychic vibrations, luminous vapors, halos or orbs. Magnetic fields also had their followings.

Not surprisingly, science will have no truck with any of this. True to themselves, scientific explanations try to ground themselves in physiology and to eschew all talk of outside forces. Sigmund Freud (1856-1939), for example, pictured the mind as producing waves of interference that caused psychic pressure to build up in the mind and to burst forth as awareness. While the Gestalt School of psychology thought of these waves as electro-magnetic fields that formed visual images on the surface of the brain. This idea fell out of favor when these fields where never found.

Theories that are more recent take their stand in mathematics and computer theory. According to this school, the brain is nothing more than the biological equivalent of a computer and all thinking is mere computation. What the brain does is to carry out sufficiently complex mathematical operations—called algorithms— and thought, feelings; everything in fact that is associated with consciousness appears. It is on thinking like this that the artificial intelligence people pin their hopes.

Many others have found the idea of the holographic mind attractive. According to this idea our brain, mathematically or otherwise, constructs reality by interpreting frequencies from a realm that transcends time and space. We will come back to this

idea later. Current efforts aim at demystifying even this, and to make thought a straightforward result of the biology of the brain. Consciousness is, then, just a product of the interaction of the neural network and the external environment and nothing more. Free will disappears and what is left is a society that bears a close resemblance to an ant colony. In the end where all of these groups differ is in how much relative importance to attach to physical processes in the formation of that thing we call mind.

Philosophically these various positions run the gamut from materialism to idealism. On the one hand we have the consciousness does not exist at all school and on the other hand are those who feel that the mind is greater than, an inexplicable by any physical description. The most extreme of these views hold that the mind is a universal property of the cosmos like gravity or electro-magnetism. In this view, the mind is not a producer of consciousness but a receiver of consciousness; rather like a television set tapping into the TV signals that are all around it.

Within the last century the strides science has taken in understanding the workings of the brain have been stupendous. Science has teased its morphology, physiology, and the chemical reactions driving these processes into the open and pieced them together into a high level of comprehension. Of course, there is always more to learn, but a consensus would probably agree that the basic workings of the nervous system are now fairly well understood. Still this understanding is not perfect, there remain problems to overcome and one of the most challenging is to explain that most awesome of beasts, Mike the Headless Chicken.

It's September 1945, World War II had just ended and on his farm outside of Fruita, Colorado Lloyd Olsen is killing chickens. Along with his wife Clara, Lloyd is running a small

farming operation. To supplement their income the Olsen's raise White Rock chickens, some of which they utilize themselves and some they sell at market. In 1945, killing chickens was a low-tech affair involving a chopping block and an ax. A bird would be laid across the block and one swift cut would severe its head. Some of the birds died instantly while others would get up and run a few steps before falling over dead.

Finally, the head was lobbed off a White Rock rooster before it was tossed down with the rest. This rooster, however, declined to die. When, after many minutes, it was still alive Lloyd began to feel sorry for it and instead of going ahead and finishing it off gave it some minimal first aid. And it lived!

Except for the little matter of having no head the chicken—who they named Mike—didn't seem any the worse for his experience. Fed crushed corn by having it poked down his esophagus and given water with an eyedropper Mike was a perfectly healthy chicken. Turned out in the yard with the other chickens he would try to behave in a normal manner. He would scratch about, try to preen himself and even was heard trying to crow, although the best he could manage was a gurgle.

It did not take long for news of the headless chicken to get around and soon the neighbors began to arrive, one of whom described Mike as "real peppy." By early October, the LA papers had picked up the story and the headless chicken was news. It was not long before a promoter named H.B. Wade contracted the Olsen's and with visions of wealth in their heads, Mike went on tour; being shown to paying audiences in LA, Fresno, Phoenix, Salt Lake, New York, Atlanta, and Seattle. He even made a triumphant tour of England.

Mike usually drew a good crowd, both of the curious and of those who thought it was all a hoax. Finally while on tour Mike died. With his passing went the Olsen's dreams of wealth. In the

end they made enough to buy a new tractor and pay off a few debts, but that was all. In death Mike suffered the fate of many another of the near great and quietly faded from memory until today few have ever heard of him.

So what are we to make of Mike the Headless Chicken? To begin with it must be understood that this was not a tabloid hoax, but a well-documented story. Thousands of people went to see Mike, many with the avowed purpose of exposing the hoax. From our view today it is hard to see how such a hoax could be carried out. No conditions where placed on when or how Mike could be viewed. Many watched Mike right on the farm walking around with the other chickens. This would seem to rule out illusion, as the ability of the magician to control what the audience sees is the essence of illusion. The only alternative would be some sort of robotic device, yet even today's computer driven dinosaurs would not fool many people for long. In addition, if the whole thing was some sort of a trick, why declare Mike dead before the money was made? In view of these circumstances, we must accept the judgment of the time that all this was real.

This creates a problem for it goes against everything we think we know about the workings of the brain and the nervous system in general. I am sure someone will immediately point out that a chicken's nervous system is not exactly comparable to mammals. We will grant this. A chicken, which has very little brain to begin with, relies more heavily on ganglia and reflex action to control its bodily functions. This is how it can get up and run with its head chopped off. I have seen my father kill chickens in exactly this way so I have a little experience in this matter. Yes, I have seen chickens with their heads off get up and run, but a minute or two was all they would last before falling over dead. This is not the same thing as living for a year.

Well, you say, this was an anomaly, a once in the history of the universe event, comparable to a chimpanzee typing out the complete works of Shakespeare. This may well be, still it happened and therefore requires an explanation. And none of the currently accepted theories can provide that explanation. Somewhere in the workings of the nervous system is something not accounted for, somewhere a piece of the puzzle has been missed. For it is a plain fact that according to current theory it should be impossible for any creature of the cellular complexity of a chicken to live without its head. So what is this missing piece? I have no idea. Still it is a good story to keep in mind when someone is complacently expounding on how well we understand the workings of the brain.

Sciences method of dealing with the problem of consciousness is the physical approach. Here consciousness is linked to the physical, which is then broken down into parts. The premise being that if you can understand the parts you can understand the whole and that the whole cannot be greater than the sum of its parts. This attitude tends to concentrate on the origins of consciousness, but has less to say about what it is. It is to this question of what it is that we will turn in the next chapter.

Before we go further, however, a couple of more terms need defining. We'll be using the terms subjective and objective rather freely and it might be as well to state what they are; which, as before, will be a strictly working definition and may not fit every expert's idea of what is proper. When it comes to experts, however, a line of Mayor Richard Daily's of Chicago may be quoted: "experts, what do they know?" Within philosophy subjective theories of knowledge claim that we do not know an independent world as the basis of our ideas only feelings and thoughts are real and a subjective being is wholly a creation of whose feelings and thoughts. Subjectivism states

that perceptions are all that can be known. These perceptions exist in the mind as ideas and it is impossible to go beyond them. Since all that can be known are the ideas of the mind then the world exists only within the mind of the knower and consists of "perceiver and perception, minds and ideas."

Objective theories of knowledge claim that we can know an independent world of material objects. An objective being is one where the object is perceived as real and existing independently of the perceiver. Matter is real and can be directly perceived through the senses. It is, as Bertrand Russell says; "what satisfies the equations of physics." Of course, both subjective and objective theories have many variations and competing schools of thought, but here it is enough to think of the subjective as the mental and the objective as the physical sides of reality.

Both of these ways of looking at reality have their champions. By and large the objective view of reality is the one held by the average person in Western society. This is an outgrowth of Western religious thinking. Within Judaic-Christian-Islamic traditions, God created a material world. "In the beginning God created the heavens and the earth (and) **. . .** saw that it was good." Eastern thought has leaned toward the subjective view that the world is maya, an illusion. Accordingly, eastern thought believes that there is only mind in a world of ideas. We will return to this subject later, but for now, we will carry on with our quest to discover the nature of consciousness.

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The Tip of the Iceberg

Up until the end of the 19th Century the workings of the mind and consciousness where considered as being synonymous. When a judgment was made, when something was learned this was done in a conscious manner. All thinking was conscious thinking and the very idea of the subconscious—Freud had not discovered it yet—was unknown.

The first challenge to this idea of an all-inclusive consciousness occurred in an experiment conducted in 1901 by the psychologist Karl Marbe. What Dr. Marbe discovered made the Marbe experiment psychology's Michelson-Morley experiment. The experiment itself was a model of simplicity. A subject sat at a small table facing the experimenter. On the table in front of the subject were two weights, one heavier than the other was. What the subject had to do was pick up both weights and decided which was heavier. Easy enough but when looked at closely the data revealed a startling fact, one that left the psychologists of the day dumbfounded. This was the finding that consciousness played no part in the decision making process at all.

Doing the experiment yourself easily proves this. Pick up any two objects and judge which is heavier. If we pay strict attention to how we get this answer, it will be seen that a decision is made without any awareness of how it came about. The answer is just presented to the conscious mind; no discernable thinking goes on at all. In fact, if you consciously try to determine which is heavier it will be found that the answer takes longer to arrive. Consciously trying to arrive at an answer seems to inhibit rather than enhance the process.

Further thought shows that the same thing applies to the formation of concepts and ideas, to reasoning and to the

learning and performance of a skill. Examine the common experience of driving to work each morning. There you are peacefully driving along your mind occupied with this morning's sales presentation, or listening to the radio, or replaying lasts nights big game, anything but driving. Yet, in the end, the car pulls into its accustomed parking space and you are there. During the drive you may have focused your attention on your driving at intervals, but this attention will not have lasted long. No, your subconscious mind drove the car to work; consciousness was not required for the task at all.

The ability to function better with 'no mind' is a feature of most activities. By letting your consciousness go your body reacts directly and enhances your performance. Developing this ability is one of the goals of the martial arts. Learn to make your mind like water and your skill will be at its greatest. Address a golf ball with grim determination to consciously make that perfect shot and watch the ball slice into the trees. Then something distracts you, your mind wanders and your body smoothly executes its swing and straight down the fairway goes the ball. And this is not just confined to golf, it can be seen in all types of activity; playing a musical instrument, bike riding, tennis, painting, writing, anything at all involving skill. Consciousness plays a role in the learning process, but we can say that a skill is learned only when it becomes automatic.

Everyone has had the experience of wrestling with a problem that just seems to defy solution. Finally, you give up and go on to other things and then the answer just pops into your head, seemingly from nowhere—Archimedes running down the street naked shouting eureka. This is such a common experience that it has prompted the British physicist Wolfgang Köhler to talk about the three B's, the Bus, the Bath and the Bed as the places where the greatest discoveries are made. What this shows is that consciousness is not required for creativity either.

Indeed, it is possible to envision an intelligent being capable of performing any of the tasks of an ordinary person who is not conscious at all. Given all this, it becomes difficult to imagine what the properties of consciousness might be.

Before a thing can exist it must have some properties, extension for instance. Yet we have already established that consciousness does not extend into any other of the mental processes. If none of the other mental processes imposes a limit upon consciousness then the only thing that can impose such limits is consciousness itself. And therein lies the secret of how it can be so limited within the minds functioning's and still appear so dominant, for consciousness can only be aware of what it is aware of and it is for this reason that it looms so large in its own estimation.

If consciousness has no great extension then what about continuity, we may not understand much about consciousness; but, at least, we can know that it is always present when we are awake. And right away we run into exactly the same problem as before. Just as a flashlight must be turned on to enable you to see in the dark, so you can only know you are conscious when you are conscious.

Once, many years ago, I was waiting in line at the license bureau when a young man came walking down the sidewalk opposite the window where I was standing. This young man—who looked to be in his early twenties—was, presumably, an epileptic. For as he passed by the window he suddenly stopped in his tracks remaining completely immobile for several minutes before continuing on his way as if nothing had happened. He was completely unaware of having missed a step. For him his walk had been perfectly normal and if no one told him of his episode and he did not notice the missing time he would have never known that anything was amiss.

The problem faced by that young man on that long ago sidewalk is the same one we face here. Think of what it is like to go to the movies. The picture on the screen appears continuous although it is really being created by a series of still pictures projected so rapidly as to appear continuous. Who's to say that we do not produce consciousness in the same way? It may be continuous or it may not, but the fact that we can only be aware of being aware when we are conscious means that it is a question without an answer.

If consciousness is not necessary for any of the mental processes then the only thing left is the act of perception itself with consciousness being a phenomenon not a thing. Roger Penrose in *Shadows of the Mind* (Oxford University Press, 1994) considered this phenomenon to have both an active and passive aspect. Awareness itself is the passive aspect, but the ability to know carries with it the implication of choices. It is this increased ability to choose that forms the active aspect of consciousness. With the freedom to choose comes the feeling of free will. Once free will appears, it is only a short step to a feeling of self.

If we concentrate upon the act of perception then surely something is learned. We learn where consciousness is located. Be conscious of being conscious and, if you are like most people, it will seem as if consciousness is located in the head just behind the eyes. Not only do we locate it here in our own heads, but we do so in others as well. You can see this assumption in the age-old practice of making eye contact with the person with whom you are speaking.

When ask to describe what they see when they turn their eyes inward most people will give some variant of the movie theater analogy. In this simile consciousness becomes you seated in a movie hall while the picture passes on the screen before you. Contained within this analogy is the implication of

space. The theater represents the 'space' within which the action takes place since the idea of a screen and a watcher implies a space between them. All of this is produced by the fact that the easiest way to think about something is to make it a 'thing'. And by the rules of the everyday world a thing must exist in space.

Considered rationally it is obvious that there is no space behind the eyes. What we are seeing here is the mind creating space and, by extension, time. With the separation of space and time, geometry comes into existence. Geometry, however, implies three dimensions, which means that a three dimensional hologram makes a better analogy than a two dimensional movie. In this scenario, the subconscious mind takes all incoming sensory data, filters it through all the other workings of the mind and produces this hologram. And just as it creates space and time 'in here' so it create space and time 'out there'. What this does is give us our first glimpse of the mind creating reality.

While we are on the subject, please note that locating consciousness behind the eyes is only a convention. Aristotle, for instance, located consciousness in the upper chest just above the heart, the brain being thought of as a mere cooling organ and even today there are people who would locate their consciousness there. There is, however, no necessity for it to be located in any one place and, in fact, it does not have to be located in the body at all. Take the famous out-of-body experiences (OBE's) many people have had due to injury, drugs or meditation. In a typical episode, people will find themselves floating above their own body that they can see with perfect clarity. Their perceptions seem normal in every way; they 'see' what is happening and later are able to describe the actions of anyone who was present quite accurately. If not for the unusual

point of view, the experience would appear normal in every way.

Let us take a minute to examine an out-of-body experience and see what light it throws on the nature of consciousness and the workings of the mind. The traditional explanation for an OBE is that every mortal possess an inner spirit or soul. Thought of as having an independent existence, this vital force or élan vital is capable, under exceptional circumstances, of leaving the body. Although always attached to the body by an invisible cord the astral body can go anywhere and is still capable of perceiving its surroundings in a normal manner. This explanation has generated considerable heat between those who believe in this ethereal being and those who dismiss the whole business as superstitious nonsense.

To date neither side has been able to muster an argument of sufficient weight to force the other side to change their minds. Why is this? Is it because the whole phenomenon simply does not exist or is it, perhaps, that both sides are wrong and there is some third explanation for the whole business? It turns out that there is such an explanation and that it has something to say about the nature of consciousness and the nature of reality as well. To begin to understand what this is lets look at one of the most common of these experiences; that of the patient under anesthesia.

The purpose of anesthesia is to render someone unconscious so as not to feel any pain during an operation. However, as more than one study has shown, only the conscious mind shuts down; the subconscious goes right on functioning as usual. Normally the mind takes all incoming data and processes it into a holographic image. When you gaze out of your eyes at the “purple mountains majesty”, it is this three-dimensional hologram that is being seen. This is not just true for seeing; hearing, touch, taste and smell are all expressed within the

hologram in exactly the same way. And remember that this hologram is not attached to anything, locating it in the head is just a convention.

While under the knife the subconscious is still functioning, is still taking in sensory data just as it does when awake. Normally we remember none of this, but under certain conditions the mind can take all of this data and produce a hologram just like when it is awake. Of course, the eyes are closed and it is not seeing directly, but it has enough information to imagine what the scene should look like. A nurse is heard to walk across the room and pick up an instrument from a gurney and this information is converted into a mental image of the nurse walking to the gurney. This created image may or may not correspond exactly with what the conscious tenets of the room observed. When the patient later tells of seeing the nurse cross the room it is going to be assume that what she saw was the same as what everyone else saw and as long as there are no glaring inconsistencies whose to know?

The mind has now created a holographic image of the room and the people in it. However, it cannot project this image from its ordinary point of view. To do so would mean you could again feel pain. It, therefore, projects it from some other viewpoint and since your body would be in view from that viewpoint, it duly includes it within the picture. And understand that what the mind is doing here is exactly the same thing it does while awake. No psychic powers are needed whatsoever. What you are seeing while reading this book is just as much a construct of the mind as the experience of floating in the corner of the room. Thought of in this way the holographic image and reality itself become difficult to distinguish.

All of this is interesting because, at last, we have learned something about the nature of consciousness. This is that the hologram the mind creates and the state of being conscious

cannot be separated. When the hologram is present—whatever the viewpoint—you are conscious, when it is not you are unconscious. Forcibly stopping the mind from generating the hologram is how you render someone unconscious. The world we live in and the knowledge of that world then become two aspects of the same thing.

This, however, raises a problem for if an OBE is just consciousness displaced why do we not feel pain while it is occurring. And the answer seems to be that the relation between consciousness and pain is more complicated than it appears at first sight. Of course it is well understood that consciousness plays a role in voluntary actions but the idea that it might have a role to play in involuntary actions is certainly counter intuitive, for by definition an automatic action is done without conscious thought.

The first thing to notice if we are to understand how the mind can appear to be conscious while the body appears unconscious is to note that there seems to be two types of pain. The first kind is an ordinary involuntary automatic response, while the second is—so to say—a voluntary automatic response. The first is what might be called ordinary pain. People dying from chronic illness will, while seemingly unconscious, moan and toss around and show every sign of suffering pain, although it is possible that these people are not unconscious but semi-conscious. Be that as it may, perhaps the point can best be shown by looking at ordinary reflex action.

We are all quite familiar with the physical sensation of being hurt. Single-celled organisms exhibit avoidance behavior toward adverse stimuli that is, if not a sign of pain itself, certainly its precursor. In humans pain, and the attempts to avoid it, are just as basic as breathing. Still it has long been known that there is more of a connection between pain and the mind than the simple fact that pain isn't felt while unconscious.

The yogis of India have known for a 1,000 years and the medical profession for a 100 years, that it is possible to mentally control pain through various meditative and bio-feedback techniques. Within all this is a curious feature that is not often mentioned.

Reaction to pain is usually thought of as being controlled by the subconscious mind. The fact that organism that cannot be said to be conscious appear to react to pain can lead to no other conclusion. However, consider this, if you touch your hand to a hot stove it will instantly jerk away. This is what my high school biology teacher called a reflex action. Touching the hot stove generated a signal in the nerve endings of your hand that passes along the nerves of your arm to the spinal cord where a nerve center processes it and sends out the signal to retract the hand. So efficient is the process that the hand can jerk away from the heat before the mind is even aware of the pain. No reaction could be more fundamental, yet be it noted, if you are unconscious it does not work.

Well of course it does not work your unconscious. True enough, but there still seems to be a little more going on than just being unconscious. If an experimenter where to take a frog and apply some kind of irritant to one of its legs that leg will jerk away. Now render the frog unconscious and repeat the stimulus, the leg will no longer react. Cut that same frogs head off, however, and the leg will once again react to the stimulus. Somehow what little brain a frog has is controlling whether this reaction occurs or not.

In considering this problem, it is first necessary to make a distinction between being unconscious and being asleep. If you are asleep and your little brother jabs you with a pin you jump up and start pummeling him. But if you are unconscious the same jab will have no effect at all. Indeed, this is a classic test to see if someone is really unconscious. Simple organisms do

not exhibit this trait, only when an organism has evolved to a level of complexity that allows it to be rendered unconscious does this trait appears.

This reaction, or lack thereof, to pain is such a fundamental feature of living things that it could almost be used to define when the first glimmerings of consciousness appear. This cannot have happened by accident, but could only have come about through the forces of evolution. This can only mean that this reaction has some purpose, in a Darwinian sense, in the struggle for survival. What can this be? How can channeling reflex actions through the conscious mind increase an organism's chance for survival?

If attacked while asleep your reaction is to wake up and fight or flee. However, if you are unconscious you do not have this option. Say you are being mauled by a grizzly and have been knocked unconscious. Now your best chance of survival is to remain absolutely still and play possum. If, however, while unconscious your reflex actions continued to cause your limbs to jerk and twitch your chances for survival would go from not very good to zero.

The mind generates consciousness to perform specific functions one of which is to experience pain and to guide the bodies external reaction to that pain in a manner best suited to survival and it is this same reaction that is showing up in OBE experiences. There is more than one tale from the hunting literature where someone being mauled by a lion calmly stood off to one side and watched it happen.

In an out-of-body experience the ordinary senses seem to be working and yet one feels no pain. Data collected by the senses is utilized, but data generated within the body itself is not. The reason for this can only be the same reason your hand does not jerk away from a hot stove if you are unconscious. If, while floating disembodied, you continued to react to pain this

would be identical to the problem encountered during the bear attack. What this is showing is that being aware of pain and having pain is not necessarily the same thing. The physical sensation of pain and the mental awareness of pain decouple with each being able to exist independently of the other. This forces us to consider the possibility that some, at least, of the body's workings that have always been considered as physical reactions are actually part of the paradigm and that the paradigms role is greater than it first appears.

Having trouble following all this? It is easy enough to say that the world one sees is analogous to a hologram, but comprehending it is another matter. Let us think about it for a minute and see if we can be make it a little clearer. Pick some object, a chair lets say, and look at it. And while you are looking, consider what is happening. Light is reflected off the surface of the chair enters your eyes and strikes the retina. Here the energy from the photons is converted into a signal that is passed along the optic nerve to the brain. The brain then processes this signal, using all its preconceived ideas of what a chair should be, to create a three-dimensional picture of a chair.

The mind then projects this 'holographic' chair into the conscious mind and perceive this picture as real. Whether or not there is an exact correspondence between the chair 'out there' and the chair 'in here' is an unanswerable question because the chair that the mind has formed is the only chair you will ever see. Not only is it not possible to know what the external chair is really like, it is not even possible to prove that there is an external chair at all.

We have been rather free and loose with our use of the word consciousness. There is really no generally accepted definition for the term consciousness and I will not try to supply on here. Rather we will simply take it to be the commonly held experience of awareness and to note that what I have been

calling consciousness most people would divide into consciousness and self-consciousness. The difference between the two is subtle and debating the proper definition for each has kept several generations of psychologists gainfully employed, but we will take a stab at it anyway.

For many people the most familiar of the schemes proposed for understanding the structure of the mind is the one created by Sigmund Freud. Within this scheme, the mind is divided into four parts: the ego, the id, the superego and the libido. His ideas have been attacked by many and are not generally accepted today, but they are still a perfectly serviceable way of dividing the workings of the mind.

Our own scheme, which replace Freud's terms with the subconscious, conscious and self-conscious, runs something like this. Think of the mind as an iceberg. The subconscious represents the vast bulk of the iceberg that lies beneath the surface of the water forever hidden from view. It is here that most of the actual workings of the mind take place. Here all bodily functions are controlled and much of thinking transpires. Characterized by the kind of thinking found in dreams, here our impulses push for gratification and the rules of logic do not apply. All of which has serious implications for the mind-world interactions.

Directly above the waterline sits the conscious portion of the mind. The division between the subconscious and the conscious minds is not a sharp one and it is not always easy to know with which one is dealing. And above this, at the tip of the iceberg, sits self-consciousness. Return to our analogy of the movie theater. Consciousness is then the picture on the screen, that continuous stream of pictures and dialogue that is forever passing through ones mind. With the appearance of consciousness the individual is now aware of what is

happening. Consciousness and awareness is then the same thing.

Self-consciousness is the watcher seated in the movie hall observing the picture on the screen. This is the mind watching itself. When we ask the question of "Who am I", we mean this watcher. Where a conscious being is aware, a self-conscious being is aware that it is aware. Self-consciousness then is the watcher.

Remember a time when you were completely immersed in whatever it was you were doing. As you concentrated your attention at some point you lost consciousness of self. Now you are only doing, not watching what you are doing, until you come to yourself with a start and realize that a considerable time has passed without your knowledge. When you were in this state you were conscious and when you are again aware of self you are self-conscious and this is the difference.

Whichever theory you like you will find that most try to understand consciousness by stating what it does. And by adopting this line of thought psychologists have revealed not only what it does, but also what it is. Consciousness is the quintessential functional entity—a term we will be seeing a lot more of later.

A functional entity is a 'thing' that can only be said to exist while it is performing its functions and which has no independent existence beyond those functions. The reason that trying to decide what consciousness is has proved so difficult now becomes clear. Consciousness is not anything at all, it has no physical existence in the classical sense and when you are passed out drunk or otherwise unconscious it does not sit around a quiet room somewhere waiting to be called.

Consciousness does not create the worldview—that is the job of the subconscious—it is only to be aware of it. Tradition links consciousness to intelligence with consciousness being a

by-product of that intelligence. The Marbe experiment has shown that there is no necessity for this link. It is possible to imagine a being with a very advanced intelligence that is still not conscious. What then does consciousness contribute to the struggle for survival?

The function of the brain, reduced to its lowest common denominator, is to make choices. It maintains physiological control of the body too, of course, but it is when it begins to make choices that a mind is present. The more complex the mind the greater the number of choices that are available and the greater likelihood of making a correct choice, this gives any creature a tremendous advantage. It is no coincidence that the most advanced thinker on the planet is also its dominant life form.

When, in that long ago Precambrian sea, the first single-celled organism deliberately turned toward the light mind had its beginnings. The human mind is, however, a lot more complicated than a heliotrophic bacterium. As it stands, the theory indicates that when complexity reaches a certain point, when intelligence rises above a certain level, some sort of critical mass is reached and—like wetness from water—consciousness appears. While it is possible to imagine an intelligent being that is not consciousness, its role in establishing dominance is to great for it to be a mere by-product. Somewhere, somehow being conscious must confer some advantage in the struggle for survival.

Several ideas have been put forth as to what this might be. Right now the idea that consciousness enhances ones ability to plan is in favor. I believe, however, that there is a little more to it than this. I submit that this advantage is an increased ability to concentrate, which in turn allows the brain to utilize its increased complexity more efficiently. Being consciously aware of a problem brings the power of the will to bear on its solution.

This heightened level of awareness concentrates all of the minds abilities and by so doing enhances it ability to make choices.

Consciousness does not do the thinking, what it does is to focuses the world picture into a sharper image. An enhanced ability to concentrate results in the enhancement of all other abilities be it will power, creativity, or any other. The ability to keep after a problem, to worry about, fuss over and plod along until the answer is found gives the bearer a priceless evolutionary advantage. This problem solving ability has placed mankind on the top of the evolutionary ladder.

With the insight's provided by modern physics it may now be possible to begin to find the place of consciousness in the scheme of things while bringing something more solid than just endless argument to bear on the problem. Using this knowledge as a base some of the old problems of philosophy, mysticism and magic take on new meaning. Freely ranging through whatever discipline that has an insight to give it should be possible to create a synthesis among these widely differing views and to use it, like a beacon of light, to illuminate some of life's most perplexing problems. And since we are going to use the findings of science as our base for this synthesis we shall begin there.

The Shadow World

Modern science began when Galileo Galilei (1564-1642) combined the empirical methods of observation and experimentation with mathematics. This happy combination has proven so successful at problem solving, improving the standard of living, and generating new knowledge that it has become the dominant fact of life on earth. Science is responsible for almost every characteristic of modern life. Where is the tribe so remote that it is untouched by science, what philosopher is so brave as to expound a theory that contradicts it, even the most conservative of religious fundamentalists hold their views in defiance of science. From humble beginnings, science has expanded until no corner of the globe has been left untouched.

Between the dawn of the Twentieth Century and its close, the old, predictable, stable world of Newtonian physics gave way to a much broader vision. The clockwork universe was replaced by a universe of the infinitely strange that Sir Isaac might fail to recognize. With its coming, the Newtonian concepts of time and space vanished into to the realm of the quaint; OK for dealing with ordinary problems of the sub-light world, but hopelessly unable to probe into the true center of reality.

Much has been made of this revolution and the great strides it has made, which is true enough when dealing with the abstract mathematical formalism of these theories. It is less so when it comes to forming this new knowledge into a coherent, understandable picture of reality. For, like everyone else, the only world these scientists have ever experienced is the three-dimensional world of everyday life. Living in a three-dimensional world, our language and thought patterns are three-

dimensional as well and adapting them to describe a four-dimensional reality is no easy task. How well they have succeeded is a matter of some debate.

It is not too much of a stretch to see the concept of the space-time continuum (we will get to this shortly) as nothing more than a mathematical description of the mystic's idea of the unity of existence. The similarity of these two points of view has not escaped notice and whole books have been written on the subject, although there is a conservative faction within the scientific community that denies any such relationship. For them the equations revealed by relativity and quantum theory imply no such conclusions.

The mention of the word mysticism strikes fire for these scientists. Unfortunately, for their position the similarities are so great that no amount of mathematical manipulation has made them go away. No, the coincidences are too great to ignore. The Heisenberg lines have crossed an opened a window into the heart of reality.

As any scientist would be quick to point out, science is a method not a philosophy. Science has no philosophy or creeds and the only belief required is belief in the method. This method is a strictly rational one of dealing with facts that can be proven or disproved. Its main weapons in this empirical approach are experimentation, observation and reasoning from known causes. When dealing with objective reality it is the most effective method known for solving problems.

It is upon this foundation that the whole of science rests. Attempts to understand the physics underlying the workings of the world began with the Greeks, but took a giant step forward with the work of Isaac Newton. Traditionally this became classical physics. If you want to get technical, however, classical physics is actually composed of Newtonian and

relativity theories, all science, in fact, from before 1924 and the advent of quantum mechanics.

Driven to the country by the plague Newton is said to have gotten the inspiration for his theory by seeing an apple fall from a tree. At that moment, the realization flashed into his mind that the force that made the apple fall and the force holding the planets in their orbits was the same. From this insight he went on to create the mathematics of a theory that is one of the great triumphs of the human mind and in so doing he brought order out of chaos and secured man's place in the universe.

Newton's world is a clockwork world. This is a deterministic world where every effect must have a cause with the laws of motion precisely controlling all future behavior. This mechanical universe operates independently of any observer or any human choices. If a thinker, with sufficient brilliance was given enough information he could, in theory, work out the entire happening of the universe from beginning to end.

If determinism is one plank of the theory then objectivism must be the other. The whole premise rests upon the idea of solid objects moving in empty space. There objects exist apart from any human desires or perceptions. Called "the zone of the middle dimensions" this realm of the big and slow is identical with the ordinary world of our daily experiences. Within this zone classical physics is still a perfectly valid way of describing the universe.

Albert Einstein, doodling mathematical equations in his spare time at the Berne Patent Office, laid the groundwork for the theory that would topple Newtonian physics from its throne. Usually thought of as the Theory of Relativity, Einstein's thinking actually manifested itself as two theories. First published in 1905 the Special Theory of Relativity deals with uniform motion, while the General Theory, published in 1915,

deals with non-uniform motion. There is a lot of experimental evidence in support of the Special Theory of Relativity and it has been pretty well proven to everyone's satisfaction. The experimental evidence in support of the General Theory of Relativity is weaker, but it is so elegant it is used extensively anyway. Curiously, when Einstein won the Nobel Prize it was not for either one of his relativity theories, but for an earlier work on light quanta that is considered one of the founding papers of quantum mechanics.

Relativity theory has a reputation for being esoteric and abstruse, but the difficulty arises not from the fact that the ideas themselves are so hard to comprehend as from the fact that they contradict common sense. In our everyday common sense view of the world we know what the shape of a coin is or the length of our own foot, space conforms to Euclidean geometry and time flows perpetually onward. All of this is so obviously right that there must be something wrong with anyone who questions it. There is a truth lying behind everything we know and our task as human beings is to discover this truth. And therein lays the problem, for what relativity theory is showing quite clearly is that this concept of a concrete world forming the framework of our beliefs and understanding is an illusion.

The universe as viewed through the lens of relativity theory is a strange place. Here the speed of the light coming out of the headlights of a speeding car never increases rather it is the car that gets shorter. Acceleration becomes indistinguishable from gravity, while matter and energy are interchangeable, one into the other. The idea of cause and effect loses its meaning with the order of any set of events depending upon where you are standing when you see them, and that independent, objective world that we know so well begins—like the desert seen though heat waves—to shimmer.

Special Relativity—with, which we will be primarily concerned—is, based upon two postulates with the first being that the speed of light is a constant. Within Newtonian physics, velocity is the distance traveled divided by the time it takes to cover that distance. Here both time and distance are thought of as constants. A minute is a minute and a foot is a foot and remains the same no matter how one looks at them. Einstein turned this on its head.

Within the new system it is the speed of light that never changes and time and distance that are the variables. What this means is that the speed of light will never be observed to travel at any other speed than 186,000 miles per second. The light coming from the headlights of a car traveling at 60 miles per hour is not the speed of light plus 60. No matter what the relation between you and the light source the recorded speed of light will never vary.

From the first postulate flows the second postulate that simply says that all motion is relative, hence the name. This means that movement can only be considered as moving in relation to something else. If you are in a spaceship in a completely empty universe there would be no way of telling if you were moving or not. Indeed, since there would be nowhere to move to the very idea of motion is meaningless.

But, you say, if you accelerate then you can feel that you are moving. And this is true; you would feel an increase in g load, as an astronaut would say. However, in this situation it is always possible to argue that you are motionless and that it is the force of gravity that is increasing. Without a point of reference that allows a judgment to be made, there is no way to decide which alternative is correct.

This idea of relativity extends to more than just motion; rather it is a property of all physical existence. Nothing—nothing— exists except in relation to something else. Once it is

realized that these two postulates do not contradict each other the entire logical structure of the theory will appear and all the unfamiliar features of a relative universe will follow.

So what are these strange features? We will begin by asking a very simple question. How long is a one-foot ruler? A no brainier right, a foot long ruler is 12 inches long and this is easily verified by anyone who cares to measure it. What was not understood before Einstein was that all of the people doing the measuring were doing so from the same frame of reference. And that it is this similarity of viewpoints that creates the illusion of uniformity.

Within a relative universe there are no privileged frames of reference, up-down, in-out, moving-stopped all of these things are dependent upon the frame of reference of the observer. All experience loses its absolute significance being true only in relation to something else, if everything in the universe instanteously doubled in size how would you ever know it. Up-down, in-out is observer dependent and cannot be decided by experimentation.

Einstein's eureka moment came when he considered what would happen to a measurement if velocities approaching the speed of light were involved. Imagine yourself standing on the observation deck at the airport watching a plane fly past. For you, standing firmly on the ground, it is the plane that is moving. However, there are no privileged frames of reference. One person's experience is just as true as another's. To someone on the plane it would be just as true to think of themselves as being at rest and that the airport is moving. Thinking of the plane as moving and the airport as stationary is only a convention.

Now let us perform an experiment. As you watch the plane fly by imagine a friend is holding up a ruler in one of the windows. Further, imagine a supercharged plane capable of

reaching speeds that are a sizable percentage of the speed of light, and that you have a very quick eye. As you stand watching you measure the ruler you are using as the control and find, as expected, that it is 12 inches long. However, when you measure the ruler in the window of the plane as it passes by you find that it is only 10 inches long. Moreover, it is not just the ruler that has gotten shorter, your friend, the plane, everything in fact will be found to have shrunk by the same amount.

To your friend on the plane making her own measurements everything is perfectly normal. Her ruler is still 12 inches, she is still the same size and the length of the plane has not changed a bit. From her point of view, your ruler is 10 inches long. The question of how long a standard ruler is now has two answers. And the thing that must be understood is that both answers are right.

How can this be? You quickly recheck your measurements, but they are accurate. The answer lies in the invariability of the speed of light. Since the speed of light cannot change in our equations, the other factors must. In fine, this means that as any material object accelerates it will get shorter and its mass will increase. The true nature of reality is then the exact opposite of what common sense would dictate. Einstein summed up how this is possible when he said; “Length is what we measure with a measuring rod and time is what we measure with a clock.” If a ruler is measured as being 12 inches long then that is its true length, but if it is measured as 10 inches long then that is its true length. There is nothing else.

Moreover, what is true of its length is just as true of all aspects of an object. Take a fifty-cent piece and hold it out in front of you. Held upright it is a circle, but rotate it 45 degrees and it is an ellipse. Of course, everyone knows that the ‘true’ shape of a coin is a circle, but just like the idea that the plane is moving and the airport is not, this is only a convention taught to

us in childhood. Just as the true length of a ruler is whatever it is measured to be, so the shape of a coin is whatever it is perceived to be. To assign the coin a circular shape is an arbitrary act that gives us another glimpse of the minds role in creating reality. Or, as James Jeans put it: "As the subject [relativity] developed it became clear that the phenomena of nature were determined be our experience rather than by a mechanical universe outside of, and independent of, us."

All of which means that in the final analysis ultimate reality is a personal affair. This in turn leads to the conclusion that any idea we may have of reality as an amorphous mass within which all of humanity lives and breathes is wrong. Instead, it would be more correct if we were to use the simile of a honeycomb in a beehive to describe realities structure. A honeycomb is composed of innumerable cells, each slightly different, yet with none more right than the other. Reality is then not continuous, but is composed of individual realities all united to make a whole.

Within relativity theory, space and time are no longer considered separate things. Rather—like two sides of the same coin—they are what Herman Minkowski called space-time. He then elaborated this idea into the concept of the space-time continuum. In this continuum, there are no events, no causes and no parts. This is a united whole where individual events lose there meaning. This "astral world embraces all that was, is, or will be and people like us, who believe in physics know that the distinction between past, present and future is only a stubbornly persistent illusion."[1]

While this four-dimensional space-time is considered by physicists to underlie reality it is not the world we live in. This is the "middle dimension" where space-time splits into space

[1] Albert Einstein

and time, an evolutionary necessity for survival. This three dimensional world of the middle dimension is, of course, the holographic world we have already spoken of. So accustomed are we to living in this three-dimensional hologram that it is very difficult to conceive of any other.

As consciousness focuses on space-time, the three-dimensional world emerges like a wave from the ocean. The wave is a distinct entity, but it must not be confused with the ocean. Think of our daily world as the shadow of four-dimensional space-time. A shadow is a projection of a three-dimensional object onto a two-dimensional surface with its shape varying as the angle of projection varies. This analogy—used by mystics, philosophers and now physicists—has its origin in Plato's parable of the cave.

When his students would ask about the true nature of reality Plato would tell them this parable. Imagine a cave in which there is a man chained to the wall. His position in the cave is such that he can never see the entrance, all he can see are the shadows cast on the wall in front of him. Of the beings that pass the entrance of the cave and cast the shadows, he can know nothing. Their true nature must remain a mystery to him. All that he can ever know about the real world outside is what he can deduce from watching the ever-changing shadows.

All of which bears more than a little resemblance to the esoteric ideas of mystical thought. So much so, that it makes many scientists nervous. For them mysticism is an esoteric delusion whose tenets cannot possible be accepted. The idea that the findings of physics can be used to understand mysticism or for self-examination causes their hackles to raise, mysticism is speculation science is fact. To them the theory of relativity is concerned solely with the measurements of external data. The vehemence of some of the statements used in support of this

idea, however, raises the strong suspicion that their reactions owe more to bias than to reasoned argument.

To these scientists the mathematical formalism of physics has nothing to say about mysticism and those who do try to show such a connection have been "smitten" by Eastern religious thought. Nevertheless, if these writings are read with attention it will be found that the arguments as to why the statement of a physicist is an insight into the true nature of reality and the exact same statement from a mystic is nonsense are not conspicuous. More often ridicule is simple heaped upon those who are trying to find some common ground between the two and this cannot be said to add weight to their position.

To be fair what is found so objectionable is a lack of logic. Logic after all is the foundation of science, allow logical contradictions and it becomes possible to prove anything and rational thought is at an end. Within the rules of science, anything that cannot be dealt with rationally is automatically suspect. This is the problem intuition has to face whenever it is offered as evidence. Still it is the judgment of humanity that intuition is a valid way to gain knowledge. The insights of Einstein, Heisenberg and Bohr owe at least a nod to intuitive perceptivity.

Still great effort has been expended to show why the plain evidence before our eyes just is not so. This has proved a difficult task for the simple reason that these two lines of thought do not just seem to be saying the same thing; they are saying the same thing. As Lawrence LeShan has shown it is perfectly possible to take statements made by mystics and statements made by physicists, mix them up, and then be unable to tell who made which statement. To disallow the insights of one group while allowing those of the other is to base your decision upon who made the statement rather than its contents. No, the inescapable conclusion is that if one is right they both

are and the overwhelming weight of evidence says that physics is right. The Heisenberg lines have crossed.

Before moving on to quantum mechanics we should point out that the revelations of relativity theory lead to even stranger conclusions than are usually supposed. To get an idea of what these may be lets look at one of relativities best-known consequences, which is that the speed with which time passes is inversely proportional to velocity. This is the well-known fact that the faster one goes the slower clocks will run until at light speed they will stop completely. To see what this means for ultimate reality as a whole let us look at relativity's most famous contradiction, the twin's paradox.

We begin with identical twin brothers. One twin—we will call him Larry—becomes a schoolteacher and stays at home, while his more adventurous brother—we will call him Darryl—becomes an astronaut. When the brothers are 30 years old, Darryl goes off on a spaceship capable of traveling at a large percentage of the speed of light. For stay at home Larry celebrating his 60th birthday 30 years has passed. However, upon his return home Darryl will find that for him only 10 years have passed. Due to the slowing down of time at ultra high speeds, Darryl is only 40 years old. And this is not just a figure of speech. The clock on the spaceship showed that 10 years had passed and the crew duly aged 10 years. The clocks on earth showed that 30 years had passed and everyone there aged 30 years. "Time is what you measure with a clock."

The mind rebels at this. Surely no two such different answers can both be right. One has to be right and the other wrong and the simplest way to find out which is which is to check the age of the universe. Did this wonderful, galaxy filled, ever expanding universe age 10 years or did it age 30 years? And the answer is, it did both. Larry, at home, aged 30 years and no matter what measurements he makes or where in the

universe he makes them he will always find that 30 years have passed. Darryl, who aged 10 years, can make the same measurements and he will always find that 10 years have passed. This must be so; no single person can measure time as passing at different rates within his own life.

Not only are the twin's now different ages, but also two alternate histories of the universe have been created. Now suppose there is a third brother who also made a journey in a spaceship so that—for him—15 years have passed, now we have three different histories of the universe. The honeycomb structure of reality once again reveals itself. This is why there is no such thing as the age of the universe.

Now wait a minute this can't be right, after all scientists have measured the age of the universe, haven't they? They have indeed with the current estimate being between 10 and 15 billion years. And the key word here is estimate. Lets suppose that two scientist decide that instead of measuring the age of the universe in billions of years they will measure it to a billionth of a second. Further, suppose that both are using identical atomic clocks. One of these scientists does her work in a laboratory on earth, while the other does his work aboard the space station. Due to the different speeds of one lab relative to the other each will arrive at a different answer. The same thing would happen if the two scientists were on different planets with different rates of rotation.

No matter who measures the age of the universe they can only do so using their own clocks that will always give an answer consistent with the experience of the person making the measurement. This is why there is no correct answer to the question of the age of the universe. The age of the universe does not exist independently of the one asking the question. While we are here, please note that when someone takes a measurement—and this is true of all measurement—then all of

the reality that this person can experience will reflect this measurement. When the mind creates a reality by taking a measurement it creates all of reality. And, just like in the twin's paradox, when a history is created, all of reality must conform to that measurement.

What this means is that our analogy of the honeycomb is too limited. There we tried to show that reality is composed of the individual realities of everyone living. The twin's paradox is showing that each of these cells is a universe unto itself. At any given moment every person is creating their world out of the measurements, i.e. experiences, of their lives. Moreover, since no two people's experiences are identical no two universes will be either. Nevertheless, what must be understood—what the twin's paradox is showing clearly—is that the two universes are equally true. There is no privileged frame of reference.

Relativity has stood on its head the common sense daily world we live in. At the same time, it gives us a mathematical basis for the Eastern concept of maya, which is that the world we live in is as much mind created as not. With the discoveries of Einsteinian physics the idealism of philosophy and the illusions of mysticism have found their mathematical expression.

All of this is a little more complicated than just taking measurements. To begin to appreciate what these other complications are we will look at that other great achievement of 20th Century physics, quantum mechanics. What relativity does for the macro-universe quantum mechanics does for the micro-universe. And what it reveals is even stranger than what relativity shows. Any effort to understand this shadow world must consider these findings. This is the task of the next two chapters.

Blending science and philosophy with common sense, The Goblin Universe is an easy and understandable guide that seeks to answer such questions as what is the paranormal,is there a God and is there life after death?

The Goblin Universe: Speculations on the Nature of Reality