

Roderick H. Boes

# **The Physics of Encounter**

## ***Toward a Theory of Consciousness***

*Does consciousness exist throughout the universe?*

Based on scientific investigations of anomalous phenomena, this book addresses a number of related questions.

Does it explain the reports of encounters with “aliens”, apparitions, disembodied minds?

Does it explain the ghost-like forces that cause Recurrent Spontaneous Psychokinesis (RSPK) = “poltergeist” events?

Does it explain why experiments have shown that prayers can heal?

Does it provide evidence that the mind survives the death of the body?

Yes, it does.

It points the way toward an increasingly fruitful dialogue between science and religion.

It points the way toward a more firmly grounded assumption that encounters with the unknown during our lifetime are but a foretaste of our ultimate encounter with the Universal Mind.



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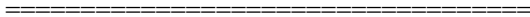
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## Acknowledgements

Back in 1950, when I enrolled in college, such concepts as quantum vacuum fluctuations and oscillating strings were not yet in the textbooks on physics. The quirky particles that physicists decided to call quarks had also not yet been introduced as conceptual constructs. I recognized their pivotal role in what has become the subject matter of this book while I was working as a journalist in Germany. After my retirement, I was able to visit the scientific conferences that helped me bring my project to fruition. I am grateful to Prof. Hal Puthoff for the detailed description of his interpretation of quantum vacuum fluctuations and their relevance to my own approach. Encouragement and feedback came from many members of the Society for Scientific Exploration, in particular from Prof. Robert Jahn, Prof. Henry Bauer, Prof. Garret Moddel, Prof. Hans-W. Wendt, and Dr. James Beichler.

The nitty-gritty details of how to apply the laws of physics to the study of anomalies were the subject of many lively discussions I have had in my hometown of Berlin with the physicist and parapsychologist Dr. Wilfried Kugel. As shown in chapter six of this book, the “logical” interpretation of empirical evidence in this field is often a matter of hot scientific dispute. I am indebted to Dr. Kugel for helping me pursue my own thoughts, independent of his conclusions, on the basis of published research, about which he provided helpful information.

I am grateful to Dr. Edward Lantz for his supportive reaction to my metaphorical images of quantum vacuum bubbles containing the qualia of consciousness. They correspond to the principle used in his projects involving total sensory immersion in wrap-around screens. On the subject of UFOs, I was encouraged by the support of the geophysicist Dr. Oliver Stummer. Prof. Leo Ferrera of MUFON-CES provided me with many useful articles and sources of information while I was attending his workshops. Reinhard Nühlen of DEGUFO was very helpful in alerting me to various conferences and possible contacts regarding UFOs and other anomalies.

Many details in this book are owed to my encounters with a broad spectrum of scientific interests. I am grateful for the conversations with Dr. Rosemarie Pilkington about her research on séances, with Prof. William Roll about Poltergeist phenomena, and with Dr. Roger Nelson about his Global Consciousness Program. Thoughts shared with Dr. Lawrence Fagg, Dr. Robert Brueck, and many others, have confirmed my views about the spiritual aspects of scientific research.





## Preface

Will scientists be able to build computers that have “a mind”? Does it take a brain to create consciousness? The Physics of Encounter suggests that a mind can be regarded as a physical system that processes information and *feels* something while doing so. How does physical reality produce feelings? What are mind events? Physicists are unable to explain the paradoxical relationship between the measurable effects of matter and the inaccessible “inner” reality of a mind that is aware of its own existence.

The Physics of Encounter proposes a geometric model for describing the unobservable processes that create the events experienced in the mind and also create the elementary physical events in space and time. The proposed images of the interaction between mind and matter touch upon deeply personal philosophies and religious views. This book, therefore, was written for broadly interested readers of all backgrounds. Where I have quoted from scientific publications, I have explained the concepts that may not be familiar to everyone. Theoretical physicists should find the book worthwhile because it suggests answers to some vexing questions within their field.

The puzzles addressed in this book involves more than the “normal” events that occur when physical reality affects the mind. Why is it that just *thinking* something can influence events outside the mind? Two radically different kinds of reality seem to be “entangled”. What evidence is there that the mind can exist outside the brain? Is it possible that our consciousness survives the death of our physical body?

Part One of this book describes the basic features of the Physics of Encounter. Part Two shows that this model can shed some light on the details of “anomalous” events that the currently known laws of nature cannot explain. Part Three shows that the proposed scenario is in accord with a broad range of conceptual constructs currently used by physicists.

For easy cross-reference, I have identified quoted arguments when they are repeated in a different context. This applies, for example, to the argument by Jahn and Dunne (3/8) about the “generous use of conceptual metaphors”. The numbers in parenthesis indicate that this argument was first quoted and elaborated in chapter three, reference note number eight.

The proposed model of mind/matter interaction shows that appropriate metaphors are a first step in developing a new theory. The Physics of Encounter provides metaphorical descriptions of assumed, unobservable processes. Needless to say, it does not claim to be a full-fledged theory. In one important respect, however, the metaphorical model presented in this book does what a good theory should do: it proposes experiments for verifying the assumptions. The proposed experiments are described in chapter twenty-two.

## PART ONE

### What is the physical reality of consciousness?

#### *Chapter 1*

##### **Open questions about the laws of nature.**

Can physics help us understand telepathy? How can the mind of one person exert a direct effect on another person's mind? What about the effect of mind on matter? Can the human mind bend forks, or were the demonstrations of this purported feat just a hoax? Whatever the answer, there's strong experimental evidence that the mind does influence elementary physical processes. Nobody knows how this is possible. Experiments that provide facts are one thing. Educated guesses how to interpret them is something else. Do some people possess a mysterious power to heal because their mind enables them to focus their bioenergy on the ailments of others? If so, what is that energy? What about UFOs and the "aliens" who reportedly pilot them to earth from far-away regions of our universe? Should we take all of this as evidence that there are conscious minds with extraordinary abilities that are "not from this world"? The answers to these and similar questions are open to debate.

Not all of this debate is scientific. Strong emotions and attitudes come into play. Heated arguments are exchanged between two highly polarized groups. There are the stern "debunkers" who regard much of what is published on this subject matter as myth and sensationalism. On the other side of the barricade are those who ferociously defend what are, at best, controversial beliefs.

The main purpose of this book is to show that much of what science cannot (yet) "prove" is worth a closer look, based on an enlarged understanding of the laws of nature. I would like to stimulate a feeling of intellectual adventure and of reverence for the majestic possibilities of the mind as it interacts with physical reality and triggers the amazing events that are called "anomalous". The *Physics of Encounter* suggests a conceptual model of the processes involved. It is supported by a broad array of experimentally verified facts.

Secondly, the book points to some of the good reasons for a healthy dose of skepticism regarding claims about events that seem to violate the laws of

nature. The arguments presented here, therefore, also highlight the need to “debunk” what is pure hype and irrationalism.

Thirdly, the description of the views on the above issues provides some eye-opening insights into the battles fought in the scientific establishment. Keen minds trained in logical reasoning are embroiled in quarrels over the interpretation of facts, over scientific methodology, and the spiritual aspect of efforts to understand the universe in which we live.

This book describes the role of a *hidden source of energy* in producing anomalous events. When UFOs are observed, unusual magnetic disturbances make compass needles gyrate wildly, stalls automobile engines, and garbles radio reception. In published investigations we read that at locations where UFOs appear to have landed, the earth was scorched and plants had aged prematurely. Many of the sightings were reported by airline pilots. Radar operators at airports confirmed that they saw blips on their screens that matched the location of the sightings. In several countries, the military was sufficiently alarmed to dispatch fighter planes.

The scientific debate over the origin of this hidden source of energy, and what it can do, spills over into the domain of *religion*. The energy creates our consciousness, which we gratefully experience as something radically different from what is regarded as the blind and unfeeling reality of material objects. Our consciousness fills us with awe because it lets us sense the immense possibilities of a mind that resides outside the limitations of space and time. On the worldly plane, telepathy shows that a mind can overcome these limitations. Who is to say whether the human mind is the only mind that is active in this universe of ours? Do some of the mysterious events involve *disembodied minds*?

Evidence is accumulating that consciousness can occur without any functional involvement of the brain. Much of the evidence comes from patients who were brought back to life after they had what seemed to be a fatal accident or heart attack. They were brain-dead and their heart had stopped beating. Nonetheless, the mind of these patients was keenly in action while doctors were laboring to revive them. According to those who were at the operating table and spoke to their patients afterwards, and other investigators of these *Near-Death-Experiences (NDEs)*, the patients reported that their mind floated above the operating table and enabled them to watch what was happening.

From this unique vantage point, they could see things that would have been totally outside their field of vision while lying on the operating table. Their brain was not functioning, but they could hear what was being said. When they quoted what they had heard, those who had done the talking were stunned that it corresponded precisely to their recollection. As reported by revived patients, their mind was pulled into the depths of a beyond where it received messages from a bright and loving source of light. Others reported encounters with images of loved ones who had died. These images communicated wordlessly, as if by *telepathy*.

There are strong similarities between such experiences and those described, in a totally different context, as encounters with the occupants of UFOs. The latter are experienced as encounters with alien beings. The “*aliens*”, too, communicate by telepathy. In many consistent reports from those who say they encountered them, the aliens expressed deep concern about the future of mankind, in particular about environmental devastation. In some respects, they act like the angels described in religious literature, admonishing us with wisdom and compassion. They seem intent on keeping mankind from coming to harm. In other reports, however, these aliens are described as coarsely indifferent to the feelings of individual humans as they pursue their goal of investigating the nature of life on earth. (Sinister plots to conquer our planet are not usually reported. They are the plots in science fiction movies.) Psychiatrists have examined many of the people who described such encounters - engineers, architects, housewives - and found that they were perfectly normal individuals.

The encounters with aliens or with loved ones during an NDE all involve images of *disembodied minds*. NDEs usually instill a strong belief that our mind will survive the death of our body. The Physics of Encounter supports that belief. It provides argument for the *pantheistic* view that God and the universe are one and the same, and that there may well be a cosmic consciousness.

That is reason enough to look for an alternative interpretation of the event that astrophysicists call the *big bang*, the presumed explosion that brought our universe into existence. Was that an act of creation? Or is it more logical to assume that the universe did not require an act of creation because it has always existed and will always exist? There are plausible cosmic scenarios that describe this possibility.

The Physics of Encounter suggests that, in our universe, all of reality is so interconnected that events occurring elsewhere, and/or at other times, can directly influence our minds here and now, and vice versa. There is a growing body of evidence that the effects of the mind on physical reality are exerted *instantly*. Physicists have begun to grapple with what seems like a logical impossibility: that events or changes in an unobservable reality can occur without the passage of time. As argued in this book, this occurs at an elementary level of reality that brings forth the physical reality outside ourselves (*matter*) as well as the reality we experience inside ourselves (*mind*). Both mind and matter are what physicists have called *emergent realities* arising from processes that occur below the level of observable physical events.

The processes occur in what physicists have called an *unobservable substratum* of ordinary reality. Hal Puthoff has described it as the *pre-manifest reality* of quantum vacuum fluctuations.<sup>(1)</sup> These fluctuations of non-measurable energy pervade all of space, even the vacuum in so-called “empty space”. The deeper and more fundamental source of energy is not like a separate layer of reality. It is intertwined with the ordinary reality that is “out in the open”. The paradox of timeless events in the “other reality” has become the subject of many scientific articles. The physicist John Briggs put it this way to the science journalist Thomas de Padova: “Time does not enter the picture until a quantum system interacts with its surroundings.”<sup>(2)</sup>

A quantum system contains interacting elementary particles. Each particle consists of a certain amount, or quantum, of energy. Quantum systems are the building blocks of all observable objects, including the human brain. In the quantum vacuum fluctuations of space, there are no quantum systems.

The Physics of Encounter describes how certain mind events are brought about by processes outside the human brain. They can occur in *disembodied minds* because the effects of events in the timeless reality underlying both mind and matter become instantly interconnected in large volumes of space. In the hidden reality of quantum vacuum fluctuations, the cause of an effect can jump across time as we experience it. Theoretical physicists have argued that the energy that creates elementary particles can influence not only future events, but also events that, for us, lie in the past.

In the world we observe, and in our minds, however, time only flows forward. Why is this so? This book will describe the processes involved.

My use of the expression “flow of time” will raise some eyebrows among mainstream physicists. For good reasons, they regard time as a dimension, not as a “flow” of something. The proposed metaphorical model does not contradict conventional scientific wisdom, but offers additional food for thought. To understand the nature of time, imagine a clock at the edge of a rapidly rotating disk and a stationary clock at the center of the disk. When you remove both clocks, you will notice that the one that was whisked through space has ticked more slowly. That’s the *relativity of time*. It makes you wonder. Something happened inside the clock that did not happen inside your mind. The Physics of Encounter suggests that time is not just a dimension, but also a process.

If you could travel through space at the speed of light, time, for you, would slow to a stop. The elusive reality of light and the counter-intuitive conclusions of relativity theories are a challenge to all critical minds.

***There was a young lady named Bright,  
whose speed was far faster than light.  
She set out one day,  
In a relative way,  
And returned on the previous night.***  
A. H. Reginald Buller

This is not possible, of course, not even theoretically. No physical body can travel at the speed of light, and the so-called “*arrow of time*” points both ways only in the world of elementary particles. The Physics of Encounter proposes a model for the processes involved.

Both time and space, in the proposed geometric model of mind/matter interaction, arise from *quantum vacuum fluctuations*. As interpreted here, a quantum vacuum contains something that is not yet anything measurable. It contains the invisible stuff of which mind and matter are made. It makes time flow. Expressed in terms of the images described in this book, experiments have shown that time can flow at different speeds. Putting a clock on a rotating disk is only an imagined experiment. Using a term introduced by Albert Einstein, based on the German word for thought, physicists have called the experiment a *Gedankenexperiment*. It illustrates that we “go with the flow”. We are inside the flow of time we experience and outside the time of the clock that ticks more slowly. What seems to occur in separate worlds, however, inside our mind and outside our mind, is no longer separate at a higher level of understanding. The flow of time is like

a river in which water swirls around rocks at different speeds as the current heads downstream.

In the above “Gedankenexperiment”, the clock in which time is slowed is like the mind of another person. We cannot look into it to see what is happening. Something quite similar happens in the mind of someone observing a UFO, or experiences what seems to be an abduction by its alien occupants. The expression “*missing time*” is often used by people who had the deeply unsettling experience of encountering this strange, inexplicable reality during an *altered state of consciousness*. The experience, in their mind, was very intense and seemed to last only a few minutes. When they found themselves back in the real world, they noticed that they had been “away” for a much longer period of time. In some instances, several hours had passed.

The intensity of such abnormal experiences is very similar to *Near-Death-Experiences*. Both are often described as “far more real than ordinary reality”. The Physics of Encounter suggests that the intensity of an experience is related to the unobservable processes that influence the density of matter. This ties in with the *theories of relativity* which state that when time is slowed at high velocities, space shrinks and the density of matter increases. In the proposed model of mind/matter interaction, the mind that is flooded with abnormally intense experiences does not move through space like the clock at the edge of a rotating disk. In a manner of speaking, we could say that space moves through the mind. Space fluctuates. The *quantum vacuum fluctuations* that give rise to the reality of space also influence our mind.

I have already mentioned that my arguments will raise some eyebrows because they seem to conflict with current theories, which describe the relativity of space and time in terms of tilted *coordinate systems*. The angle of the tilt is determined by the velocity of one system relative to the other. A system of coordinates is like a picture on a wall in front of you. The picture has two coordinates, which correspond to the vertical and horizontal edges of the picture. If there is no wall behind the picture and its top edge is tilted away from you, the picture you see is distorted. It is compressed. The space occupied by the picture you see becomes smaller. Space “shrinks”. That corresponds to the increase in the density of matter mentioned above. Tilting the picture by 90 degrees relative to your line of vision, as described above, will compress the picture into a horizontal line. If the picture is tilted



so that one of its *vertical* edges moves away from you, this distorts and compresses the picture in a different way.

The picture is a coordinate system that has only two coordinates. The equations of relativity theories describe the relative shortening or lengthening of *four coordinates*: the dimensions of space and of time. One of the coordinate systems that tilts, relative to the other, is the one that describes, in mathematical terms, the relative motion of the observer. The model of mind/matter interaction proposed here describes how the “tilt” ties in with the quantum vacuum fluctuations of space. How should we visualize these fluctuations? They create the reality that exists outside ourselves (matter), and the reality we experience inside ourselves (mind). To describe them is not an easy task. The next chapter will show what difficulties are involved.

#### NOTES

- (1) Puthoff (August 2002), *Personal communication*
- (2) de Padova (1998), p. 29

## Chapter 2

**Physics and metaphors. “Visualizing” invisible forces. Waves and bubbles. The pull of gravity and the push of waves. Points of encounter and zero-point energy.**

To visualize the unobservable processes through which our consciousness “tilts reality”, so to speak, we need to be clear about the distinction between the reality inside the mind and the “outside” reality of matter events. Let’s say you are deep asleep in your bedroom. During that time, you are not aware of your own existence. Your consciousness has taken “time off”. Let’s say the sun has just gone up and a dog starts barking outside. This wakes you up. You see the dog through the window. Now there is a reality inside your mind that was not there before. You see and hear the dog and probably feel a little irritated to be awakened so early. The dog was out there all the time, but now there are *two realities*: the dog out there and the mix of events in your mind. The mix includes the image of the dog, the sound of the dog’s barking, and the irritation you feel. The reality of your consciousness has popped into existence.

What happened? Your brain has revved up and re-created the normal waking state of your mind. It has created images, sounds, and feelings. All of that is an *additional* reality, which is not identical with the dog outside your window and yet somehow intertwined with it.

The physical reality of the dog is a structure of interrelated atoms. So is your brain. When it creates your consciousness, it generates electrical events, measurable energy fields, wave patterns that can be observed on an oscillograph. None of those observable (measurable) events are identical with your consciousness. What happens inside your mind is not accessible to anyone outside your mind. Your feelings, needless to say, are strictly your own. The same is true for the images in your mind and the sounds of which you are aware. No matter how deeply scientists probe into the interconnected atoms of your brain, they will not find the replica of a dog there. How big is that dog in your mind, anyway? It is not a measurable reality.

The events we need to understand, in terms of unobservable physical processes, are events in the *mind*, not in the *brain*. The observable physical reality of the dog exists *outside* your mind. It is the reality that the German philosopher Immanuel Kant called “*the thing-in-itself*”. Kant argued that this

reality is unknowable. All you can possibly know is the world of your inner experience. Sure, you see the dog. But that's because images arise in your mind. What is the dog really like? It consists of atoms. And atoms, the building blocks of "the thing-in-itself", are mostly empty space.

In a physics course I took as a student in the 1950's, I learned that we could picture the structure of an atom as a miniature solar system, because the atomic nucleus is like a sun surrounded by planets, i.e. by electrons, which travel around the nucleus in orbits. To visualize the dimensions of subatomic particles, we were told that if an atom were the size of the Notre Dame Cathedral in Paris, the *nucleus* would be no larger than a pea and the *orbital electrons* would be like specks of dust. How does so much empty space become the building block of something we can see and touch?

What holds the atom together? How should we imagine its surface? Instead of the walls of a huge cathedral, there are just specks of dust. Besides, some invisible force inside the atom must cause electrons to move in orbits, and to change orbits in what are called *quantum jumps*. We can picture an atom, but we can't picture that force. How do you visualize something that is invisible? Take the influence of gravity, for example. We cannot see gravity. But it is "out there", everywhere in the universe. Einstein said that gravity is not a "force" in the usual sense. Gravity, he said, is just the "geometry of space" that influences the motion of objects.

This book is about the geometry of invisible, elementary processes. They create the elusive substance of elementary particles and the events we can see (moving objects) and they also create the events we experience in our mind: consciousness. John Wheeler hit the nail on the head when he said: "There is nothing in the world except empty, curved space. (...) Physics is geometry."**(1)** Wheeler died in 2008 at the age of 96 and was hailed as "one of the most influential theoretical physicists of the past century." At the university of Princeton he gained a reputation as an "expert on the unimaginable".**(2)**

The Physics of Encounter proposes metaphorical images to describe what we cannot see. It describes consciousness in terms of an invisible physical reality. The images suggest that gravity and mind have much in common. Gravity is a mysterious influence. It is like a force of attraction. Throughout our universe, the pull of gravity makes it seem as if objects are tugging at each other across empty space. Big (massive) objects exert a stronger pull than smaller (less massive) ones. The pull of the big object is like that of an

invisible fisherman reeling in his catch on an invisible line. The gravitational attraction of our earth makes objects fall to the ground.

In some respects, gravity is like light. Both are a reality “out there” that we cannot touch. But there is a basic difference. Gravity affects the motion of our body. Light affects the experiences in our mind. We can rely on the pull of gravity if we decide to cool off by plopping into a swimming pool. Light, on the other hand, does not pull us. It comes toward us.

Atoms send out particles of light called photons. The energy of a photon is a puzzling kind of either/or reality. A photon can hit a surface like a particle. Then we know where it is, or more precisely: where it *was* at the instant it hit the surface and created an effect. As soon as a photon makes an impact, it is no longer at that point. It is out of sight, so to speak, because it is replaced by a wave, like a pebble that was dropped into a pond. The pebble sinks, but now there are waves.

The waves expand outward from the point where the pebble disappeared. They gradually flatten out, but if we imagine them as ocean waves splashing against the walls protecting a seaport, we can see that they are not just an up-and-down motion within a surface. They push against the walls of the seaport. In the world of elementary physical reality, there are two kinds of forces. Some push, like waves, and some pull, like gravity.

The waves, the pebble and the pond are similes, figures of speech in which one thing is compared to another. In this case, they give us some idea of what photons are, or rather: what they do, even though we cannot see them. For the sake of simplicity, I will not use the word simile in this book, but the better known word “metaphor”, although the dictionary tells us that the meanings are not quite the same. *Metaphors* are words or expressions that clarify matters, but should not be taken literally. When physicists speak of electron orbits, for example, they are using a metaphor.

The word *electron orbit* is a metaphor because electrons do not travel in orbits the way planets do in a solar system. We cannot see electrons moving around the nucleus of an atom. In fact, we cannot see them at all when they are inside an atom. We can only make educated guesses about what is happening inside an atom. The orbit of an electron is an array of points around the atomic nucleus where electrons can be assumed to exist for fleeting moments, sometimes here, sometimes there. The same goes for the word *quantum jump*. We cannot see an electron making the jump. First the electron is in one orbit, then it is suddenly no longer there. It simply

disappears and instantly re-appears in a different orbit. It skips over the space in between.

A change in orbit changes an electron's characteristics. What are they? As an elementary particle, an electron does not have very many. Its energy is one of them. It changes when an electron makes a quantum jump. If all of a particle's characteristics radically change at once, which can happen, wouldn't the particle lose its identity? Is an electron making a quantum jump still "the same" electron? Instead of saying that a particle jumps from here to there, shouldn't we say that it ceases to exist and that, at the same instant, a different particle surfaces elsewhere? The world of quantum jumps is a conceptual minefield. It can blow away certainties about the nature of reality. That is not necessarily a bad thing. Some former certainties need to be discarded to arrive at a better understanding of invisible forces.

Another elementary characteristic, also a metaphor, is called *particle spin*. Here, too, it's the same story. We cannot see what we want to describe. We cannot verify that something actually rotates. The logical justification for saying that some particles have spin is the fact that the observer of a particle may suddenly be confronted with a surface of the particle that has a different characteristic than the surface previously observed. Then, continuing to look at the particle, the observer sees the same surface again. The conclusion seems obvious: seeing different surfaces of the same thing while keeping an eye on it must mean that it rotates.

But it is not that simple. Metaphorically speaking, it is not possible to keep an eye on the world of particle spin and quantum jumps without blinking. In that kind of a world, what is a surface, anyway? You guessed it: it is a metaphor. A *particle* is not a concrete thing with a surface we can see or touch. It is more like a bundle of intertwined processes, something dynamic, not static.

In that kind of a world, a *surface* is also something dynamic, in constant change. It is not like the flat surface of a pond into which we can drop a pebble. In one way, though, the dynamic surface in the world of invisible forces and the placid surface of a pond are similar. They both separate two different kinds of reality. The surface of the pond separates it from the air above it. The surface is "there", all right, but it exists only if two other things exist: the thing that is the pond and the thing that is *not* the pond (the air above it). All things have a surface. If we consider the whole universe as one thing, could we say that the universe has a surface? It would be a surface

that separates something from nothing. This is not like the question about how many angels fit on the point of a pin. In theoretical physics, the question about the nature of “nothing” inside a world that is filled with something is not a meaningless question.

In the world of particle spin and quantum jumps, a surface separates two different invisible forces. That makes it pretty tough to visualize the surface, i.e. to come up with suitable metaphors. Two metaphors that come to mind are the pull of gravity and the push of waves. In a world of invisible surfaces, these metaphors make sense only if we put them into the context of another invisible “something”: a *point*. Like a surface, a point is nothing by itself. It exists only as part of a geometric image, or configuration, that includes something else.

In theoretical physics, there are point-particles. A *photon* is such a particle. It makes an impact at the point where it hits matter. Since matter consists of atoms, does this mean that a photon hits the surface of an atom? Photons are emitted from atoms and are absorbed back into other atoms. They “make waves” while doing so. Let’s go with the image that an atom is mostly empty space in which invisible forces influence the electrons that exist at uncertain locations around the nucleus. If we visualize all of these possible locations in their entirety, they are an array of points surrounding the nucleus. Since electrons can be anywhere within an orbit, the points are located next to one another. Geometrically, that corresponds to a closed, more or less spherical surface. It is not like a membrane with a certain “thickness”. The surface is there because two opposite forces are there.

A photon that is emitted from an atom hits the surface of the atom that absorbs it, like a pebble dropped into the surface of a pond. The impact makes waves in the electron orbits and in the space across which electrons make quantum jumps. The waves are changes in the array of points marking the possible locations of electrons in the atom. Since there is no wall that separates the inside of an atom from the outside, the waves inside atoms spread out into the space outside atoms, and vice versa.

If we picture space as a sea of invisible waves, an atom is like a natural harbor. Outside the harbor, there are strong winds and ships traveling at full speed. Think of the choppy waters when ocean waves are pushed against one another by gusting winds blowing from different directions. For good measure, picture the waves made by ships criss-crossing the surface of the ocean. All of these waves interfere with one another and create complex

patterns of ups and downs. The winds, in this image, are invisible forces. The ships symbolize physical objects. At the center of the metaphorical harbor, things are not as calm as they appear to be on the outside of the atom. The *atomic nucleus* is like a caldron of boiling water, bubbling over, vibrating violently and passing on those vibrations to the space around it.

To continue the description of events in the world of atoms and particles, it is necessary to switch metaphors. That's because the surfaces in that world are not like the surfaces of ponds and oceans. These are more or less flat. The surfaces of atoms and particles, on the other hand, enclose something. Very broadly speaking, these surfaces are like the surfaces of bubbles. Atoms and most particles, as interpreted here, have many surfaces that are like interconnected bubbles. Not static bubbles, but like the soap bubbles that expand while children are blowing them up. The waves in space, outside atoms, are also like the surfaces of expanding bubbles, and these bubbles also enclose something. Metaphorically speaking, that "something" is like the breath that expands the soap bubbles mentioned above. It is an invisible force rooted in the nature of our universe. In later chapters, the nature of that "breath" will, of course, be explained in more detail.

To make these metaphors fit the elementary reality described in physical theories, we must take into consideration that there are waves on the surfaces of the bubbles, and these waves are also like the surfaces of expanding bubbles. Since there are waves in the surfaces of these bubbles, too, the surface of a bubble consists of layers of bubbles which get smaller and smaller toward the outer layer of these metaphorical bubbles.

The Physics of Encounter suggests that the smallest possible bubble is not of the same "stuff" as the bigger bubbles. That's because the smallest possible bubble cannot have a surface consisting of bubbles. If it did, it would not be the smallest possible bubble. Instead, the smallest possible bubble must have a surface consisting only of *points that will expand into bubbles*.

In the proposed scenario of mind/matter interaction, this point corresponds to what physicists have called *zero-point energy (ZPE)*, or vacuum energy. In this scenario, the quantum vacuum fluctuations that exist throughout space are expanding and collapsing bubbles. Each of these bubbles is a quantum vacuum. I will therefore call it a *QV-bubble*.

When a QV-bubble expands, its surface interacts with the invisible stuff of which other bubbles are made. This involves a *stage of uncertainty*. The

surface interacts with another surface only if both surfaces *resonate* with each other. If this is not the case, the surfaces pass through one another and continue to expand. The resonance is a process that occurs at what I have called a *point of encounter*. Surfaces can resonate with one another because every surface is like a complex pattern of waves that are superposed on one another. If this resonance occurs at a point of encounter, the surfaces involved in the process collapse. The process creates new QV-bubbles, which expand from points of encounter. The details of this process are described in the following chapters.

Paradoxically, the process creates certainty from an initial uncertainty. The *unobservable* elementary reality creates the *observable* higher-level reality characterized by the certainty of cause and effect encapsulated in the laws of nature. As Isaac Newton showed, for example, we can count on the laws of nature when an apple falls out of a tree. In this case, it is the law of universal gravitation.

Originally, the motion of objects was the domain of what is called Newtonian physics. Einstein enlarged Newton's theoretical framework by looking at the motion of objects relative to the motion of the person observing the motion. The observed motion of a specific object at a specific moment, he found, is not something two different observers would agree upon if their own motion is not the same, relative to the moving object. Motion is measurable in terms of the time required to travel a certain distance through space. But Einstein showed that time and space are not immutable realities that exist on their own, independent of the observer.

Einstein's theory of relativity is a monumental landmark in the efforts to understand the laws of nature. But it is not the "whole picture". Just like Newtonian physics, it illuminates only certain aspects of reality. More problematic is the fact that the relativity of space and time, as described by current theories, does not fit into the framework of an equally fruitful theory called quantum mechanics. It describes the interaction between elementary particles. Einstein's equations pinpoint the precise location of a gravity effect. The theory of quantum mechanics uses a different set of images, or metaphorical representations. The "particles" are metaphors. A particle is a measurable amount or quantum of energy, but it is not a graspable something. It is more like an intertwined flow of energies at a location that cannot be precisely pinpointed in space and time. The location is shrouded in the above-mentioned *uncertainty*.



To reconcile the contradictions between quantum mechanics and relativity theories, a number of physicists have come up with the theory of *oscillating strings*, or oscillating thrusts. Opinions are divided whether string theory does what it is supposed to do. The Physics of Encounter proposes an enlarged interpretation of these metaphorical strings. This interpretation describes how the thrusts inject vacuum energy into the above-mentioned QV-bubbles. The bubbles expand and collapse as their surfaces interact at points of encounter. In the proposed geometric scenario, the quantum vacuum fluctuations that result from these encounters are the unobservable reality from which all observable reality arises. That includes the events described by quantum mechanics as well as Einstein's "geometry of space". It also includes the process that underlies the emergence of consciousness from physical reality. It is a process that allows the mind to influence what is observed. The pivotal role of oscillating strings in this process is described in the next chapter.

#### NOTES

(1) Misner and Wheeler (1957), p. 526

(2) *Der Spiegel* (2008), p. 200

## Chapter 3

**Oscillating strings and the ingredients of consciousness. Intertwined realities. “There is more to time than just a dimension.” The initial void: creating something from nothing.**

Two metaphorical images dominate the geometric scenario proposed by the Physics of Encounter to describe the unobservable physical origin of consciousness. One is the interaction between QV-bubbles that results in *quantum vacuum fluctuations*. The other is the interaction between *oscillating strings*. Strings come into play as the smallest possible elementary reality in the expanding surface of a QV-bubble. That smallest possible entity must be smaller than a bubble, but it must, logically, be larger than a point. A point by itself is nothing. A point has no dimensionality. But two points, interconnected by an invisible force that oscillates between them, would fit the bill.

The expanding spherical surfaces of QV-bubbles consist of countless oscillating thrusts that push outward, in the direction of the expansion. The thrusts also interconnect the points within the spherical surface, oscillating at right angles to the direction of the expansion. Based on the interrelated images of QV-bubbles and oscillating strings, the Physics of Encounter clarifies three important aspects of mind/matter interaction that have not been satisfactorily explained by current physical theories.

1) The scenario of spherical surfaces expanding from QV-bubbles provides a geometric model of the distinction between *inside* reality and *outside* reality. The events that occur inside a person’s mind are not observable by anyone else. They are *subjective* reality. The events that occur outside a person’s mind are *objective* reality. Mind events are enclosed events and therefore unobservable by others. They occur on the inside of the spherical surface. Observed events occur on the other side of the spherical surface.

2) In this scenario, the elapse of *time* can be defined as a process that involves both inside and outside reality. The process occurs as interacting spherical surfaces expand and collapse. The subjective reality of time is the continuously changing mix of the elementary ingredients of consciousness. The objective reality of time is the decay of elementary particles. The role of oscillating strings in the creation and interaction of particles and in creating

the non-particle reality of consciousness is one of the key issues examined in this book.

3) In the proposed scenario, the *location of the observer*, relative to the observed reality, can be pinpointed in space and in time. That is important because seeing something involves photons, the particles of light. They impact on atoms and are emitted from atoms. An act of observation needs to be understood in terms of events in the world of elementary particles and the forces acting between them. Those events include the observer and the observer's influence on what is observed. In the Physics of Encounter, the location of the observer is defined in terms of expanding spherical surfaces and the point of encounter between these surfaces. QV-bubbles containing the elementary ingredients of consciousness are created at points of encounter. The observer's location is where the observer's consciousness is continuously re-created from one point in time to the next.

The motion of the observer (a continuous change in location) is a pivotal concept in the theory of relativity. If the observer moves at high speed (in an accelerating spaceship, for example), this changes the reality in which the observer is located. Time is dilated and space contracts. More precisely: the motion changes the interaction between the moving physical system and the space through which that physical system moves. The physical system is the spaceship and everything in it, including the observer. The change is "relative". The interaction differs from the reality observed by someone who is not in such high-speed motion. The contraction of space increases the density of all physical objects in that space. The objects acquire more mass and become heavier. The dilation of time makes clocks tick more slowly and also retards all biological processes. The body of a high-speed space traveler ages more slowly.

The Physics of Encounter shows that the dilation of time increases the *intensity* of each experienced moment. During an altered state of consciousness produced by an anomalous event such as the observation of a UFO or a Near-Death-Experience (NDE), time is slowed through a process that corresponds to accelerated motion through space. The location of the observer, in this scenario, should not be equated with the location of the observer's physical body. It is the location of an unobservable process that influences the atoms of the brain. Usually, that process takes place in the brain. But during an NDE, for example, many people, while clinically dead during a brief period of time, have a so-called "out-of-body" experience.

When they were brought back to life after a heart attack or a serious accident, their descriptions of this experience were remarkably consistent.

The term “observer”, in theoretical physics, can be equated with the *consciousness*, or mind, of the observer. An act of observation, as defined here, occurs in the nucleus of an atom. It is a process that resonates, through quantum vacuum fluctuations, with countless processes in the nuclei of other atoms. A mind event, therefore, can instantly influence events at other locations in space. In psychokinesis, for example, the power of the mind can cause objects to move. In telepathy, mind events influence the events in another person’s mind. The effect of a specific mind event occurs, paradoxically, at more than one location. One location in space and time is, of course, within the flow of mind events that constitutes a person’s consciously experienced identity. It is anchored in the physical structures of the brain. Infinitely many other locations, however, exist as the *possibility* of identical influences throughout space and time. When and where, and to what extent, these influences cause mental or physical events depends on the above-mentioned *resonance* at points of encounter between the wave patterns of the expanding spherical surfaces.

The Physics of Encounter suggests that a point of encounter is one of the endpoints of an oscillating string. The two endpoints of the string are located opposite each other in the surfaces of two QV-bubbles just before an encounter between the two expanding surfaces. An encounter between the surfaces of the two bubbles is an event that connects two points, one each in the surfaces of the smallest possible bubbles. Surfaces, as I said, are interconnected points.

In terms of high school geometry, we could say that two points that are opposite each other in two surfaces expanding toward a point of encounter will merge and become one point when the encounter occurs. But in the elementary reality of the proposed scenario, there are no visible lines and points, no surfaces that move through space. There is only a hidden, non-measurable energy that oscillates between two points: the energy of oscillating strings.

This energy causes the expansion of QV-bubbles. To visualize the process, think of the energy that instantly flows from one point to the other as a *line of thrust* that is like a bolt of lightning. Think of what you see when you watch a fireworks display. Singling out one point in the dazzling spectacle, you see the point explode into a multitude of lengthening bright

lines. Their endpoints are like the outline of a luminous sphere. The bright lines are lines of thrust and their endpoints are the surface of the sphere. The sphere ceases to exist as the bright lines fade away when their energy is spent. To assure the continued existence of the sphere, at least for a while, a multitude of events would have to occur at the same time, one at each endpoint of the lines of thrust. Each event would again have to be an explosion, but a smaller one this time, again sending lines of thrust into all directions. The surface of the luminous sphere would then appear to consist of luminous bubbles.

If you imagine the same type of events in the surfaces of these bubbles, in a continuing sequence of fireworks explosions in the surfaces of the bubbles, you see an expanding spherical array of *increasingly smaller bubbles*. The bubbles on the inside of the spherical array disappear when the energy of the thrusts is spent, but additional bubbles continue to appear in the expanding surface of the sphere. Their number increases as the expansion continues.

This process will, of course, soon run out of steam. As the bubbles get smaller and smaller, down to the smallest possible bubble, the expansion of the sphere would eventually come to a halt. What keeps the process going? Only a continuous infusion of energy can assure a continuous expansion. This energy is part of the process that creates time.

In the proposed scenario of this process, *countless* lines of thrust are directed outward, into all directions, from the point where a QV-bubble originates. Within the spherical configuration of their endpoints (i.e. within the expanding surface of a sphere), the separation between any two endpoints located next to each other is not a separation in *space*, but a separation in *time*. The “length” in the dimension of time is very short compared to the corresponding length of the thrust in the dimension of space.

The geometry of the outward thrusts in the three dimensions of space can be compared to the two-dimensional geometry of the spokes in a bicycle wheel. The distance between any two endpoints of the spokes located next to each other in the rim is very short compared to the length of the spokes. Even if there were an infinite number of spokes, there would still be separation between their endpoints at the rim because the spokes are not parallel, but extend away from the center of the wheel. This geometric relationship is equally true for the countless thrusts within the three dimensions of space that are directed outward from a central point.

Together, their endpoints are a spherical configuration. The following pages will show why the expansion and collapse of this spherical surface corresponds to the process that creates time.

The bubbles in the spherical configuration of bubbles interact with one another. They expand and collapse where their surfaces encounter one another. Each point of encounter is the origin of a “fireworks explosion”. The point is the endpoint of an oscillating string toward which the energy of countless other thrusts is directed in a process that involves a “resonance” of interacting, unobservable energy waves. The surfaces of all QV-bubbles are waves consisting of smaller QV-bubbles, expanding and collapsing. The smallest “something” in this process is larger than a point but not yet a bubble, as described above. It is an oscillating string.

Since each bubble expands into all directions, the process that creates an expanding bubble is not only like an explosion, but also like an *implosion*. When bubbles within the spherical configuration of bubbles expand, half of the surface of each bubble expands outward, *away from* the point where the spherical configuration (the “fireworks display”) originated, but the other half expands inward, *toward* that point. An implosion, as interpreted here, is like an inward expansion. As part of a process that begins on a spherical surface and impacts on the origin of that surface, an *inward expansion* creates the inside reality of our consciousness, and with it the elapse of time as we experience it. An *outward expansion* creates the elapse of time outside our mind, in physical reality.

All observable physical events are like the outward expansion of a fireworks display. Implosions are unobservable inner events. The proposed scenario shows why both processes are interrelated and why they do not “run out of steam”. The surface of the expanding spherical configuration, as I said, is a wave. When that surface is encountered by a wave that resonates with it, the surface collapses because the effects of the implosion cancel the effects that were created at the point where the expanding bubble originated. When a bubble “collapses”, it disappears from the three dimensions of space *-relative to the observer*. For the observer, it is now one of the countless bubbles in a larger spherical configuration that is a different dimension - the dimension of time. As these bubbles interact, the process of expansion continues. The larger spherical configuration, or bubble, in this scenario was, in turn, created at a point in the expanding surface of an even larger bubble. All such points are points of encounter between resonating wave patterns.

The process of expansion does not, of course, continue indefinitely. It must be understood in terms of the influence of consciousness on physical events, and vice versa. The mind of the observer is an integral part of the above process. Successively experienced moments in time are created as the wave patterns of QV-bubbles interact. *The observer is part of the wave* at the location where the wave passes through a point in space. The observer contributes to the creation of the wave at that location. More about that later. What needs to be clarified first is how the thrusts of oscillating strings create a reality that is different from the dimensions of space: the reality of time. To describe that process, I will have to switch metaphors.

Think of a line of thrust as an ocean current that flows along the shoreline of a beach. If two currents of equal strength flow into opposite directions along the shoreline, they create a spot that is dangerous for swimmers. At the point where the two currents encounter each other, their effects cancel each other along the shoreline and create a current that flows away from the shoreline. Swimmers at that location are swept out to sea.

What happens at the point of head-on encounter between the two ocean currents illustrates the cancellation of lines of thrust within one dimension of space (the shoreline) and their transformation into a thrust that occurs along a *different dimension*. It is a line of thrust that runs at a right angle to the shoreline. In the metaphorical example of the shoreline, the thrusts are deflected into only one direction. The shoreline blocks the other direction. In the invisible physical reality of oscillating strings, thrusts toward each other are transformed into thrusts away from each other, into both directions and in continuous alternation.

This process corresponds to what could be called the *absorption* of equal and opposite effects, at a point of encounter, into a new reality created at that point. The reality is radically different because of the right angle that distinguishes each new event from the event that created it. In the unobservable, elementary reality of oscillating strings, the “absorption” at a point of encounter can deflect lines of thrust into a dimension that is not one of the three dimensions of space. This is what happens when countless thrusts converge on a common point of encounter from all directions of space. They create the dimension of time.

The thrusts, in this case, originate at a spherical array of points located around the common point of encounter. All thrusts collide head-on at that point. The thrusts cancel one another in all dimensions of space and are

deflected into a new dimension. The deflection is like a rotation of all thrusts by 90 degrees. The new thrusts occur at right angles to the cancelled thrusts. The new thrusts, therefore, are “rotated” out of all three dimensions of space. Geometrically, the new reality created by this event is a spherical configuration consisting of interrelated points. It is like a surface that surrounds the point of encounter. The surface is a “fourth dimension” because all three dimensions of space intersect the spherical surface at right angles. The surface is not located in space because the thrusts have cancelled one another in all dimensions of space. The thrusts cannot, logically, rebound into the space in which they have cancelled one another. They are deflected, or absorbed, into a different dimension, just like the thrusts that I compared to ocean currents in the metaphorical image described above.

The creation of a *surface* by equal and opposite *lines* of thrust can be visualized by imagining two garden hoses squirting thin streams of water at each other. If the separation of the nozzles is minimal, and if the nozzles are pointing directly at each other, the water will splash outward in a plane. The surface of the plane corresponds to what string theorists have called a “brane”. (The term is derived from the concept of a membrane. More about that in later chapters.)

The spherical array of points created by the encounters described above is like a surface that encloses the quantum vacuum of a QV-bubble. The thrusts of oscillating strings inject vacuum energy into the bubble. The two endpoints of a string are locations where vacuum energy is absorbed or released, in continuous alternation. Each endpoint is shared by countless other strings, or lines of thrust. The spherical surface is the dimension of time. It is a spherical array of interrelated points just like the metaphorical fireworks explosion.

The event *creates time* by creating a surface that does not expand into the dimensions of space. Time elapses as the expanding spherical surfaces interact at points of encounter. As described in the preceding chapter, the surfaces interact only if both surfaces *resonate* with each other. If the interaction occurs, the surfaces collapse and new QV-bubbles expand from the points of encounter. The spherical surface consisting of interrelated points is a *closed surface* because the points are connected by oscillating strings. The oscillations between the endpoints of the strings occur *within* the surface. The surface expands as additional QV-bubbles are created within it.



The interaction of expanding spherical surfaces consisting of QV-bubbles creates the quantum vacuum fluctuations of space. When the surfaces and the QV-bubbles within them collapse at points of encounter, the new QV-bubbles created at these points once again expand into spherical surfaces, which continue to expand until they are encountered. The size of these spheres, therefore, can vary. The surfaces of the spheres may expand across long distances within the universe, or interact here on earth. Since the surfaces of these spheres contain the vacuum energy of QV-bubbles, I will call them *VE-spheres*.

The creation of time through the interaction of the QV-bubbles in the surfaces of VE-spheres occurs when this interaction creates elementary matter events and elementary mind events. Time is a process. “There is more to time than just a dimension”. The physicist Avshalom Elitzur made that point at a scientific conference on the “Frontiers of Time”.**(1)** His reasoning supports the scenario proposed here. It has far-reaching implications. Since expanding and collapsing QV-bubbles in the surfaces of VE-spheres are the quantum vacuum fluctuations that pervade all of space, we can assume that these fluctuations are a source of hidden energy in the universe. The energy is hidden because it does not exist in the three dimensions of space. It is the energy that *creates* time. In other words, our universe consists of two kinds of reality. The quantum vacuum fluctuations of space are what the physicist Hal Puthoff called a *pre-manifest* reality. The reality we observe and experience is *emergent* reality.

The hidden energy is *vacuum energy*. The fluctuations of this energy occur at points of encounter between QV-bubbles in the expanding surfaces of VE-spheres, and these hidden events create time by causing observable events in space. Each point of encounter exists in three-dimensional space like the tip of an iceberg. In this scenario, the tip of the metaphorical iceberg is a zero-dimensional point. These unobservable points in space are the sources of hidden energy. This is why, as Puthoff said, “space is a player, not just a stage”.**(2)**

The metaphor that “space is a player” corresponds to Einstein’s reasoning that the “geometry of space” causes objects to move, relative to one another, in accordance with the gravitational attraction between them. As I mentioned in chapter one, the influence of gravity is not a measurable physical force like the electromagnetic radiation of light. The influence of gravity can only be *calculated* from the mass of the moving objects and from the way they move. Einstein used the term “point-objects” to describe how

the effects of gravity can be mathematically pinpointed in the geometry of space. As interpreted here, these point-objects are points of encounter between QV-bubbles in the quantum vacuum fluctuations of space. In the proposed scenario, the effect of gravity corresponds to the minimal amount of vacuum energy in the “tip of an iceberg” that is hidden in a sea of fluctuating vacuum energy.

In this scenario, the anomalous events that seem to defy the known laws of physics are energized by abnormally large amounts of vacuum energy. The scenario describes the relationship between gravitational effects, vacuum energy, and the “dimension” of time. For simplicity, I will continue to use the word dimension in this context, even though, as Elitzur said, “there is more to time than just a dimension”.

In the pre-manifest reality of interacting QV-bubbles, time does not (yet) exist because at that level of reality, there are no measurable matter events. Matter events are created by interactions between elementary particles. As explained, each particle is a “quantum”, or certain amount, of measurable energy. In the theory of interactions between particles (“quantum mechanics”), such interactions create the “quantum systems” of observable matter. Where these quantum systems do not exist, the process that creates time does not occur. As Briggs explained (1/2), “time does not enter the picture until a quantum system interacts with its surroundings.”

>A reminder: the numbers in parenthesis and separated by a slash identify the number of the chapter and the number of the reference note, respectively, where a quote was first mentioned and elaborated.<

The arguments of Elitzur, Puthoff, and Briggs support the scenario proposed here. When expanding QV-bubbles interact, this invisible, timeless process makes space a “player” in creating the reality we observe. The interaction takes place at points of encounter between the expanding surfaces of VE-spheres, because these surfaces consist of QV-bubbles. In visualizing this scenario, the distinction between a QV-bubble and a VE-sphere should be kept in mind. A QV-bubble is a quantum vacuum, but the space enclosed by a VE-sphere is not. The vacuum energy of QV-bubbles exists in the instantly expanding *surfaces* of VE-spheres.

For simplicity, I will occasionally use the term *VE-surface* to describe the effect of the vacuum energy that exists in the surface of a VE-sphere. The effect creates an elementary event (a gravity effect) at a point of encounter. The oscillating strings that inject vacuum energy into QV-bubbles connect

the timeless, hidden reality of quantum vacuum fluctuations with the reality of observable events. One endpoint of a string absorbs the vacuum energy in the hidden reality, the other endpoint releases that energy into the reality of time and space as we experience it, in instantaneous alternation. Through the oscillating energy within the metaphorical “strings”, the two realities become inextricably intertwined.

When countless oscillating strings converge on a common point of encounter from all directions, that point becomes the origin of a QV-bubble. The Physics of Encounter suggests that the location where a QV-bubble begins to expand corresponds to what the mathematician and computer scientist Michael Manthey called an *initial void*. Such locations, he said, are always either “empty” or “full”, which corresponds to the digits “zero” and “one” in the “either/or” (binary) process of digital computation and information transfer. In this context, we could say that the two endpoints of oscillating strings are located, in alternation, in two intertwined realities of which one is “empty”, filled only with vacuum energy, and the other is “full”, in the sense of containing the energy of the interacting particles that are the building blocks of matter. Manthey called the locations of such binary processes *event buffers* where “we can get something from nothing”.**(3)** As interpreted here, these event buffers are QV-bubbles that expand from “nothing” (a quantum vacuum) and create “something” (particles) at interrelated points of encounter. The process that creates particles from interacting QV-bubbles will be described in later chapters.

The philosopher Slavoj Žižek used an image that is strikingly similar to Manthey’s concept of an initial void. He argued that not only matter, but consciousness, too, arises from “nothing” in terms of observable physical space. Consciousness, he said, “explodes” from a “non-All, a gap, a hole, in reality itself, filled in by phenomenal experience. (...Consciousness...) arises from an irreducible external *Anstoss* (...i.e. disturbance...). The subject emerges through the disturbance.”**(4)**

In Žižek’s scenario, which also supports the metaphorical images proposed here, the word “subject” stands for the subjective reality of consciousness, which enables persons to act on their own accord instead of being a passive object. The German word “Anstoss” can be translated as a push, or thrust. As interpreted by the Physics of Encounter, it is the thrust of an oscillating string that occurs in the surface of an expanding QV-bubble at a point of encounter with another QV-bubble. When the expanding surfaces of two bubbles interact, a new bubble is created at the point of encounter.

The “disturbance” is the collapse of the interacting QV-bubbles. The “explosion” of consciousness described by Zizek corresponds to the instantaneous, timeless expansion of a new QV-bubble. The word “phenomenal experience” stands for the conscious mind experiencing the phenomena created by physical processes.

A phenomenon, according to the dictionary, is “any event or circumstance that is apparent to the senses”, and secondly, “in Kantian philosophy, a thing as it appears in perception as distinguished from the thing as it is in itself, independent of sense experience.” I already mentioned the German philosopher Immanuel Kant who argued that the objective reality outside the mind, “the thing-in-itself”, is unknowable. I mentioned that the atoms of all “things” are mostly empty space containing invisible forces, and that the atoms of a barking dog can influence the atoms of your brain, thereby triggering the creation of something that was not there before: your consciousness, which did not exist while you were sound asleep.

The Physics of Encounter shows that, at the elementary level of reality, consciousness and the physical reality that creates it are two sides of the same coin. Egon Freiherr von Eickstedt, a German physicist, described the relationship in terms that correspond to the scenario proposed here. Elementary reality, he said, is a “a focal point of density and at the same time the expansion of that point into a field. That reality is not a thing, but an event. The self is created as the outward flow of such events meets the oncoming flow of non-self events.”(5)

The “self”, of course, is the conscious mind of a particular person. “Non-self events” are physical events that occur outside that person’s mind. The “focal point of density” is a point of encounter between two QV-bubbles that are located, respectively, in the surfaces of two interacting VE-spheres. The density is created by the countless thrusts of oscillating strings that exist in an expanding spherical surface. The “expansion of that point into a field” is the expansion of the new QV-bubble that is created at the point of encounter. The “outward flow” is the expanding spherical surface containing the “self”. The “oncoming flow” is the expanding spherical surface that impacts on the mind of the observer of physical reality.

Wolfgang Pauli, an Austrian physicist who won a Nobel prize for his work on quantum mechanics, used a similar image for his description of the interaction between consciousness (the “psyche”) and physical reality: “From an inner center, the psyche seems to move outward, in the sense of an

extraversion, into the physical world.”(6) The word “extraversion” can be equated with the concept of expansion. The “inner center” corresponds to the point of origin of an expanding QV-bubble. It is a point encounter between QV-bubbles. The encounter and the resulting creation of a new QV-bubble is an elementary event. It is an encounter between the mind and the physical reality of events outside the mind.

In keeping with all of the above-mentioned reasoning by highly respected theoreticians, the process of mind/matter interaction described by the Physics of Encounter is based on the assumption that the properties of consciousness are created in interacting QV-bubbles. These properties, or characteristics, of consciousness are like the elementary “ingredients” of the reality that is experienced when the mind encounters the reality outside itself. These ingredients are not, of course, physical substances. To think of them as the *qualities of experienced reality* comes close to the dictionary definition of the appropriate concept. The word used by scientists is *qualia*. The singular form of that word is *quale*. It is pronounced qua-lee. The syllable qua is pronounced as in quality (alternatively, as in quail). Qualia, the dictionary tells us, are “independent, universal qualities such as whiteness and loudness”. They are information supplied by the senses, and feelings, which have their “own particular quality without meaning or external reference”.

The dictionary phrase “without meaning or external reference” is of special importance here. Think of the two realities that exist if a barking dog wakes you up. The first moment of your newly activated consciousness is an event “without meaning or external reference”. You become aware of yourself. Before you open your eyes and start thinking, there is just an initially indefinable instant of “loudness” in your mind. At the same time, as I said, you might feel irritated about the termination of a refreshing sleep. The initially indefinable negative feeling and the loudness are qualia.

The same applies to the above-mentioned “whiteness”. Try to imagine that your bodiless “self” is floating at the center of a sphere, and that the inside of the spherical surface is white. You would be surrounded by meaningless whiteness without any “external reference”. You would not even know that the whiteness is a surface. If the spherical surface that encloses your moment of consciousness expands away from you, there is no way for you to know that this is what’s happening. For you, nothing would be happening as long as the surface remains white.

Events begin to “happen” for you when the whiteness is replaced by various colors, and when other sensations and feelings enter into the mix of qualia. What creates these ingredients of consciousness? The Physics of Encounter suggests that qualia are created inside QV-bubbles by the vacuum energy of oscillating strings.

Theoretical physicists describe a string as a one-dimensional (!) reality, defined by its two endpoints. This means that the string itself has no “thickness”. It is an invisible, non-measurable burst of energy. The string is as short as it can possibly be. It is so short that it is below the threshold of observation. What is an “observation”? When you observe the dog that awakes you, as described above, you experience the qualia that are created in your mind. The image of the dog in your mind is like a mosaic of qualia. What you experience as a pattern in space is actually a sequence of mental events that are the focal points of (subconscious) attention. These focal points are points in time. They expand into the experienced moments that are the qualia in QV-bubbles. Each moment fills the entire “space” of your mind. You do not realize it, but what seems like an instantaneous observation is like a scan of the points in time that you see as a spatial pattern.

The sequence of all-encompassing, mind-filling events creates the experience of space. Each event is an experience of uniform quality like whiteness or loudness, but these qualities change from one point in time to the next. When QV-bubbles interact, new QV-bubbles are created at points of encounter. They are points in time. Each new QV-bubble contains the changing qualia of consciousness.

When oscillating strings create qualia they also create physical reality. The string theorist Brian Greene pointed out that strings exhibit a wide variety of “vibrational patterns” and that these vibrational patterns correspond to the properties of elementary particles. He argued that “what appear to be (...) particles are actually different ‘notes’ on a fundamental string”.(7) Greene’s acoustic metaphor can be readily applied to all elementary ingredients of consciousness. The sound of “notes” in the mental “space” filled with qualia are vibrations in the quantum vacuum of QV-bubbles. Strings create expanding QV-bubbles and oscillate within them. The vibrations are, of course, a metaphorical image, not like the vibrations of sound waves or the electromagnetic vibrations of light waves. But sounds, colors, and all other qualia are the “given” properties of a conscious mind and in that sense are like the equally abstract characteristics

of a particle such as its electric charge, its mass, or its spin. As I explained, to say that a particle has “spin” does not mean that “something” actually rotates. Physicists have deduced the existence of spin from the changing characteristics of what is assumed to be the surface of a particle.

The qualia in QV-bubbles allow a conscious mind to experience events in space and time. The expansion of QV-bubbles and their interaction at points of encounter, however, are timeless events in a *pre-manifest* reality. The building blocks of our everyday experience, on the other hand, are an *emergent* reality that consists of elementary particles. Particles are created at interrelated points of encounter between QV-bubbles. The interrelated points correspond to what physicists call a *coupled map lattice*. A lattice, in this context, is a three-dimensional pattern of points. It couples, or connects, mind events created by the brain with events (interacting QV-bubbles) outside the brain. The Physics of Encounter describes this process. It is *dialectical* process in which time and space are created by timeless events.

A dialectical process is one that is best described in terms of what seems to be a logical contradiction. How can time be created by timeless events? Dialectical processes resolve the paradoxes of elementary physical reality. Philosophers who espouse the concept of dialectics regard it as a dynamic principle inherent in nature. It states that every elementary effect generates an opposite effect, and that the two opposites energize a process that makes them part of a larger whole. In that sense, the effects at the two endpoints of oscillating strings could be called dialectical opposites. The strings create and connect two intertwined levels of reality: the hidden level of reality consisting of quantum vacuum fluctuations and the observable level of emergent reality consisting of quantum systems. The vacuum and the non-vacuum are part of a larger whole that encompasses opposites. They are what Zizek called an “All”, meaning: the totality of our universe. In our universe, the elementary ingredient of consciousness is the quantum vacuum in a QV-bubble. It is, as Zizek said (3/4), a “non-All, a hole in reality” that is “filled with phenomenal experience”, i.e. with consciousness.

The counter-intuitive aspects of the elementary, hidden reality cannot always be adequately expressed in our everyday language. For simplicity, I will use the customary grammatical structures. Describing the timeless interaction between QV-bubbles with reference to a specific outcome as an “instantaneous succession of events” is a case in point. (Language buffs will readily identify that phrase as an oxymoron.) The logic of language distinguishes what happens now from the future and the past. The expansion

of a spherical surface containing QV-bubbles is, logically, the cause of a future event. The event will not occur until the expanding surface is encountered. But the expansion of the unobservable surface is instantaneous (a timeless event), therefore it is not necessary to “wait” until the encounter occurs. The future is contained in the expanding surface as a broad spectrum of possibilities, even though the encounter has “not yet” occurred. I will use sentences that make the customary distinction between past, present, and future, even though the hidden reality in our universe exists in an eternal NOW.

Occasionally, during an *altered state of consciousness*, we may catch a glimpse of the interconnectedness of all reality that exists where “time does not enter the picture”. The most striking and awe-inspiring example of this kind of event is a *Near-Death-Experience* (NDE). Thanks to the advances in medical science, an increasing number of people have been revived from clinical death. Their heart had stopped beating. Their brain was no longer functioning. Many had an NDE. Their conscious mind had hovered above their lifeless body and had watched what was going on. Then it left the scene and went on a journey into another world. When it “returned” into the body that was restored to life, it was an enlightened mind. Through an NDE, people who were brought back to life acquired an unshakable confidence that the mind survives the physical death of the body.

In the metaphorical scenario proposed by the Physics of Encounter, the human mind “travels” with the expanding surfaces of VE-spheres because the surfaces consist of the QV-bubbles that contain the basic ingredients of consciousness. Within the world of quantum events, which is the world that includes the atoms in the brain, the human mind does not stray very far from the biological reality of the brain in which it is rooted. Things are radically different when the mind enters the uncharted realm of timeless events during altered states of consciousness. These occur not only during NDEs, but include encounters with UFOs and “aliens”.

In the hidden reality of fluctuating vacuum energy, encounters between QV-bubbles containing the qualia of consciousness occur if the expanding VE-surfaces containing the metaphorical bubbles are “in resonance”. The concept of resonance will be explained later. Without this resonance, no encounter occurs. The VE-surfaces pass through one another and continue to expand. As interpreted here, encounters correspond to what physicists have called the *potentialities* (possible events) of mind/matter interaction. Robert Jahn described these potentialities as “ineffable”. The dictionary defines



ineffable as “too overwhelming to be expressed in words, as in *ineffable beauty*, or too awesome or sacred to be spoken, as in *God’s ineffable name*”.

Jahn has emphasized that a description of the physical processes underlying the reality of consciousness requires “the generous utilization of conceptual metaphors” to access a “sea of ineffable, complexly intertwined potentialities”.(8) This endeavor is well worth the effort. If we want to understand consciousness, we must understand what allows us to see beauty and fills us with awe. We must understand the events that cannot be explained by the currently known laws of physics. They are caused by the hidden energy in a timeless reality. A daunting task - and an exciting challenge.

***It is impossible to meditate on time  
and the mystery of the creative passage of nature  
without an overwhelming emotion  
at the limitation of human intelligence.***

Alfred North Whitehead

Based on the assumptions presented in this chapter, here is what the Physics of Encounter says about the processes underlying consciousness and the perplexing aspects of time.

1) Time is more than a dimension. Like space, which is “a player, not just a stage”, as Puthoff said (3/2), time is a process that involves the observer.

2) The process occurs where the self observes (interacts with) non-self reality. It occurs when mind encounters matter. (In this context, the terms “self” and “observer” have the same meaning. “Non-self” reality, as defined below, consists of unobservable processes underlying the emergence of matter and of other minds.)

3) The location of the observer, as defined here, is the location of the QV-bubble that contains the qualia (the basic ingredients of consciousness) experienced by the observer at the instant the QV-bubble interacts with non-self reality. QV-bubbles exist in the expanding surfaces of VE-spheres. All QV-bubbles in a VE-surface are alike. Non-self reality, therefore, exists outside that surface. It exists in the surfaces of other VE-spheres. (The distinction is complex because every surface is a pattern of superposed, intertwined surfaces. More about that in later chapters.)

4) Time is the dynamic boundary, or horizon, of the observer's experienced moment. It is the expanding surface of a VE-sphere. The expansion (the flow of time) is a continuous, smooth, uninterrupted process. As soon as an encounter occurs, a new VE-sphere instantly expands from the point of encounter on the expanding surface.

5) Nothing actually moves. The invisible boundary of the self is continuously re-created as new VE-spheres expand from the point in time where the self is located. All points on the expanding surface of a VE-sphere are equivalent points in time.

6) As soon as the surface of a VE-sphere that contains the observer's present moment has encountered the non-self reality of another VE-sphere, both surfaces cease to exist for the observer. This corresponds to what physicists have called the collapse of a probability wave. As interpreted here, the wave is the surface of a VE-sphere expanding toward the observer. The wave ceases to exist for the observer because the encounter creates a new experienced moment for the observer. It is a new QV-bubble that expands into a new VE-sphere.

7) Nothing actually collapses or disappears. The thrusts of oscillating strings converging on common points of encounter continuously create the surfaces of QV-bubbles and VE-spheres, without interruption. They are the quantum vacuum fluctuations that create the emergent reality of mind and matter, of consciousness and time. Specific configurations of encounters contribute to the creation of specific qualia and to the quantized effects of elementary particles.

8) The collapse of a probability wave corresponds to the "absorption" of equal and opposite thrusts into a point of encounter. I described the process in this chapter by comparing it to the opposite thrusts of ocean currents along a shoreline. The encounter of the thrusts creates an additional dimension, i.e. right-angle thrusts directed away from the original flow and away from each other.

9) The opposite thrusts within the additional dimension, directed away from the point of encounter, correspond to the two directions of time that exist at the elementary, non-observable level of reality. Relative to the present moment experienced by the observer, therefore, the effect of the encounter can cause an event in the future or in the past.

10) The two possible effects of an encounter, in the future or in the past, co-exist as equal possibilities in a probability wave, i.e. in the expanding surface of a VE-sphere. The two possible effects can be visualized as the two hemispheres of an expanding VE-sphere that is created at a certain distance from the observer. One hemisphere expands toward the observer and the other hemisphere expands away (recedes) from the observer. Relative to the observer, the oncoming hemisphere expands forward in time and the receding hemisphere expands backward in time. When either hemisphere is encountered at any one point, the entire wave (the whole VE-sphere) collapses. Therefore, when one of the two possible effects creates an event, this pre-empts the other effect.

11) Time only “flows forward” for an observer whose consciousness is rooted in a brain because the stable configurations of encounters in the atoms of the brain limit the self to encounters with what von Eickstedt (3/5) called “the oncoming flow of non-self events”. The observer’s body and brain remain at a fixed location while the invisible waves created by each act of observation (an encounter involving the atoms of the brain) expand away from the point of encounter.

12) Mind events mediated by the brain create effects that correspond to what physicists call retrocausation. They cause events that occur in the observer’s past. The retrocausation effects are transmitted by the expanding surfaces of VE-spheres created at points of encounter involving the atoms of the brain. Since they are surfaces receding from the points of encounter, they transmit effects backward in time, relative to the observer’s present moment.

The effects described above are possible effects that will not necessarily cause observable physical events. They correspond to what physicists call potential energy. They are the invisible (pre-manifest) reality of vacuum energy. The expanding surfaces of VE-spheres do not travel through observable space. The instantaneous expansion occurs in the dimension of time. It creates time as a continuous sequence of encounters involving the observer.

NOTES

- (1) Elitzur (2006), conference presentation
- (2) Puthoff (2001), conference presentation
- (3) Manthey (1997), p. 14
- (4) Zizek (2006), pp. 197 and 223
- (5) von Eickstedt (1954), p. 7
- (6) Jung and Pauli (1955), p. 175
- (7) Greene (2000), pp. 145-146
- (8) Jahn and Dunne (2004), pp. 557 and 560