1 The Ancient Riddle of Consciousness

The Problem at Hand

Science has been very successful at explaining the world around us. Only a few hundred years ago our daily lives were full of mysteries: Where do the stars reside? How does life continue from generation to generation? What makes water different from fire? One by one these questions and countless others have been answered in the most explicit detail. The mysteries of our everyday existence are virtually gone. Science is now concerned with problems that are extremely obscure and far beyond our normal experience, such things as the curvature of space-time and the composition of subatomic particles. For instance, suppose that Galileo Galilei, the great 17th century scientist, had written down a list of his 100 top questions about the world. It is likely that all 100 questions could be answered today, at least to Galileo's ability to understand.

Well, almost. There is one question in our everyday lives that has seemed defiant of a satisfactory explanation, being as much a mystery at the beginning of this new millennium as it was in the day of Galileo. It is a question that has been argued by philosophers and scientists since the dawn of man. And that question is this: *What is consciousness*?

We have all had the experience of waking from a deep dreamless sleep. In the first few seconds we realize that something new has been brought into the universe, something that did not exist the moment before. A conscious mind has come into being. It is our thoughts and feelings. It is what allows us to perceive the world around us, and move our bodies to interact in the world. It is the embodiment of our free-will, the ability

to think and act in the way that we choose. It is who we are at the most personal and private level, the thing we identify as *ourselves*. This is how we see consciousness from the inside, the way we perceive our own minds by introspection.

The problem is, science can see none of these things. Neurosurgeons have opened the skulls of living humans for decades, and in every case they have found a *brain*, not thoughts, feelings, free-will, or anything of the like. While we do not fully understand how the brain operates, it is now abundantly clear that it is a computational machine, one that is capable of producing the behaviors we see in humans. From the view of science, it is the brain that allows us to recognize our grandmother's face, cry out in pain, and kiss a young child's hand. As seen from the outside, consciousness and the mind are nothing more than the machine-like activity of the neural tissues within our skulls.

But how can this be? How is it possible that the mind appears as one kind of thing from the inside, but a totally different kind of thing from the outside? This discrepancy is known in philosophy as the **mind-body problem**. It is a classic paradox, two points of view that should agree, couldn't disagree more. And when scientists and philosophers have tried to force them together in some way, the results are unsatisfying, and often in conflict with established knowledge. Something seems to be missing, a fact, an explanation, a property, or something else that provides understanding and unification. This dilemma is presented to us each second of our waking lives. We see the redness of a rose, smell its fragrance, and appreciate its beauty. We contemplate the meaning of life, and freely decide how to think and act. How can these things be nothing but electro-chemical activity in nerve cells? As put by the American Philosopher Patricia Churchland,[1] "*How do you get awareness out of meat?*"

1. The Computational Brain, Patricia S. Churchland, 1994, MIT press, 560 pages. Neuroscience view of the brain.

Surprisingly, not all scientists agree that there is a problem here. For much of the 20th century the topic of consciousness was virtually banned from the scientific arena, and much of this sentiment can still be seen today. Young college professors are counseled to find other specializations, medical textbooks have little or no mention of the topic, and government funds are not granted for research. Since consciousness is something that can only be *subjectively* observed, many feel it has no place in the *objective* world of science.

Nevertheless, the scientific attitude toward consciousness has changed significantly in the last two decades. The primary reason is that new brain scanners have been developed that can observe the neural activity in the living human brain. These go by such technical names as: Functional Magnetic Resonance Imaging (fMRI), Positron Emission Tomography (PET), and Magneto-Encephalography (MEG). Human subjects are placed in these machines and brought into specific conscious states. For instance, a subject might be asked to perform mathematical calculations, recognize faces, listen to a symphony, or some other task. The brain scanner then identifies the regions of the brain that are active, the precise neural tissues associated with the mental state of the subject.

This is immensely important work, and will eventually lead to a full and detailed understanding of the human brain. It will also tell us something very interesting about the mind-body problem, what brain researchers call the **neural correlates of consciousness**. This is the brain activity that is necessary and sufficient for a person to be conscious. For instance, imagine being strapped into a brain scanner one day in the distance future. After a few moments, the operator will tell you what you are thinking and feeling. He may say that you are deciding what to have for lunch, enduring the pain of a toothache, or feeling proud of your children. And he will be right; he will know the contents of your consciousness by looking at the neural patterns in your brain. Although a little frightening,

there is every reason to believe that science may one day have this type of capability.

However, does knowing everything about the structure and function of the brain also mean that we know everything about consciousness? Many claim that the answer is no; there is still something missing. How can the blueness of blue or the terrible feeling of pain be reduced to mere neural activity? How can human free-will or the meaning of our thoughts be created by something so dissimilar as brain tissue? In short, it is a common belief that "mind stuff" is different from "brain stuff," and one cannot be used to explain the other. It is said that consciousness must entail something above and beyond the operation of the brain. But if these assertions are true, we are left with an even bigger mystery, why is there not the slightest scientific evidence that this "mind stuff" really exists?

Organization of this Book

The goal of this book is extremely ambitious, nothing less than providing a scientific explanation of consciousness, a solution to the mind-body problem. This intention is not to be taken lightly, or without due reverence for the work that has gone before. The journey to grasp the mind has been long and rocky, enduring centuries with little or no progress. First and foremost, this is a book of science, adhering to the rigorous methodology and skepticism that have brought us our current knowledge of the universe. As such, it invites and welcomes the most critical scrutiny. Even more, it demands it.

This book is organized into three sections. In the first, **Defining the Problem**, we examine the foundations of the consciousness paradox, examining in detail why the mind-body problem is such a mystery. Our task is to precisely identify the problem, and just as important, outline what would count as a solution. The findings of this section are absolutely critical to the overall theory. Properly defining the question takes us more than halfway to the answer.

The second section is entitled **The Information-Limited Subreality**. This refers to a strange situation that could exist in our universe, where an observer is trapped within an artificial world. We explore this idea by using the theory's namesake, *The Inner Light*, an episode from the popular television series *Star Trek: The Next Generation*. This leads us to a key property of how we observe and understand reality, what we will name the *Principle of Relative Reduction.* It is within this principle that we find the solution to the mind-body problem, as we defined it in section one. But there are consequences to this solution, requiring us to change the way we view reality and ourselves. The scientific evidence for these startling assertions is examined, from the origin and function of the human brain, to the strange world of our dreams.

In the third section, **Consciousness as a Limitation**, we focus on how the mind is connected to the physical universe. Why does consciousness seem so disconnected from the material things around us? Could a computer ever become conscious? Is there any way to bridge the gap between the human mind and the physical world? In short, we are searching for the place that consciousness holds in the universe, and where the human mind sits in relation.

The Strangeness of Modern Science

Many readers will find the ideas in this book bizarre, something more akin to science fiction than science. But science itself has become increasingly strange during the last one hundred years. In the early part of the 20th century, Albert Einstein and his colleagues developed two new fields of physics, **Quantum Mechanics** and **General Relativity**. The first of these, Quantum Mechanics, deals with the very small, such as the physical laws that hold atoms together. In contrast, General Relativity deals with the very large, such as the structure of the entire universe. Neither of these can be understood from the events we experience in our daily lives. In

fact, they grossly violate our everyday beliefs of how things should behave. For instance, Quantum Mechanics tells us that waves can collapse into particles, while General Relativity describes space and time being distorted by gravity. These laws of nature are more than unexpected; they defy commonsense. And there is no question that they are true; they have been verified in the finest detail. We will look at a few of these strange results in later sections of this book.

The point is, something is not false just because we find it bizarre or in disagreement with our everyday experience. Indeed, the Inner Light Theory is tame compared to other areas of modern science that are accepted as fact. In the end, science has little use for our desires and expectations; the only thing that matters is the evidence and where it leads. Science is about keeping the method and procedures pure, and then accepting whatever consequences result. What we end up believing is not important; our justification for believing it is everything. This is the way of science.

And on this note we begin the development of the Inner Light Theory, starting with the foundation and working upward. Brick by brick we will construct the answer to the ancient question: *What is consciousness*?