THE ESP ENIGMA

THE SCIENTIFIC CASE FOR PSYCHIC PHENOMENA

DIANE HENNACY POWELL, M.D.

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Walker & Company
New York

Published by Walker Publishing Company, Inc., New York

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LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

Powell, Diane Hennacy.
The ESP enigma : the scientific case for psychic phenomena / Diane Hennacy Powell.
p. cm.
Includes bibliographical references and index.
eISBN: 978-0-802-71985-0
1. Consciousness. 2. Parapsychology. I. Title.
BF311.P67 2009
133.8—dc22
2008018533

Visit Walker & Company's Web site at www.walkerbooks.com

First U.S. edition 2009

1 3 5 7 9 10 8 6 4 2

Typeset by Westchester Book Group
Printed in the United States of America by Quebecor World Fairfield

To my daughter Allie,

whose presence lights up the room
and in loving memory of Nikki,
my canine companion and muse

CONTENTS

INTRODUCTION

WHETHER WE CONSIDER ourselves believers in psychic phenomena or not, many of us have had something happen to make us wonder about the subject. It could have been someone telling us that sh was just thinking about us when we called, or vice versa. It might have been a gut feeling to drive a different route from our usual one, only to discover later that a large accident occurred on the road w didn't take. Such experiences may not happen often, but they can leave us with a profound feeling tha we are interconnected, that we can know things without understanding how, and that there must be more to our universe than we detect through ordinary senses.

People have believed in psychic abilities since the beginning of recorded history. Certain individuals report more experiences with psychic phenomena than others. Since these experiences usually only occur spontaneously for most of us, many cultures developed divination aids in order to access psychic information more readily. The Dogon in West Africa toss cowrie shells into a basket and interpret the patterns. The Chinese devised the I Ching, and Egyptian priests slept in special temples in order to have prophetic dreams.

Perhaps the most famous divination practice was the Delphic oracle, who drew the rich and famous from all over the Greek world from the sixth century B.C. until the fourth century A.D. The Greek historian Herodotus claimed that the Delphic psychic spoke in a trance induced by natural gases that seeped through the rocks. This was discounted as a myth until 2001, when Jelle de Boer, a geologist a Wesleyan University in Middle-ton, Connecticut, analyzed the hydrocarbon gases emitted by the temple's nearby spring. He reported in *Geology* that he found ethylene in sufficient concentrations to have created a narcotic effect that would have been experienced as a floating or disembodied euphori state.

The most widespread form of divination is scrying, from the old word *descry*, which means "to catch sight of" and involves deep concentration on a smooth reflective surface until an image appears Ancient Greeks looked for answers in spring waters; in ancient India, warriors peered into vessels filled with water to see if they'd return from battle;Tahitians poured water into a hole at crime scenes to scry the image of the culprits. The most famous tool for scrying has been the crystal ball, which became a tool of Gypsies, among others.

The Old Testament of the Judeo-Christian Bible contains numerous accounts of prophets, but Christianity forbade all forms of prophecy except for divine revelation and astrology. As Christianity spread, many forms of prophecy declined or went underground in Christian areas, lest the practitione be accused of heresy or witchcraft. In the Middle Ages, popes still consulted astrologers to provide them with propitious dates for coronation, but after the Copernican revolution changed our understanding of planetary movements, the Catholic Church declared divine revelation to be the only acceptable form of prophecy.

Westerners' growing disbelief in psychic abilities was influenced by the development of the scientific method. During the eighteenth-century Age of Enlightenment, the universe became increasingly viewed as a mechanistic system, accurately known only through observation, calculation and reason. Anything associated with the supernatural or psychic phenomena lost credibility.

Skepticism about psychic phenomena was further fueled by scandals that linked claims of psychic

abilities with con artists who preyed upon people's vulnerabilities. Also, as the psychiatric profession arose, reports of psychic experiences were often accompanied by signs of irrational thinking and became interpreted as signs of brain pathology, rather than innate gifts or capacities.

Added to this was the belief that the mind exists solely within the brain. This is an idea that has grown since François de La Peyronie, an eighteenth-century French surgeon, observed changes in human behavior that accompanied specific brain injuries. The scientific model of the brain and consciousness that evolved in this historical context did not have to account for psychic phenomena.

The scientific model is based on these facts: The brain is a biological machine with over a hundred billion neurons, or brain cells, each of which has an average of five thousand connections to other neurons. Electrical signals pass along the neurons, causing them to release chemical messengers, such as serotonin and dopamine, from their terminal ends. These messengers land on the receptors of neurons on the other side of the synapse, or region between neurons for chemical connection. Once neurons receive enough stimulation from their connecting neurons, they send signals along their axon to other neurons. There are almost an infinite number of possible patterns of activity along the neuronal network, and specific patterns are believed to represent concepts, thoughts, or memories. Francis Crick, the late codiscoverer of DNA's structure, summarized this model when he said, "The astonishing hypothesis is that 'You,' your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules."[1]

Even though scientists, including Crick, admit that they do not know what consciousness is or how it is generated, proponents of the current model consider consciousness to be a byproduct of a brain that can access new information only by direct sensory input. The body has receptors for sound, taste, sight, touch, smell, and proprioception (detection of body movement and placement), but there is no hardware to access sensory information from distant points in space and time, let alone to send information directly from one brain to another. The current concept of consciousness cannot accommodate the existence of psychic abilities, and as rational beings, we are skeptical of that which cannot be explained scientifically.

Yet some psychic phenomena have been measured and verified scientifically. One example is the work by Adrian Parker and Joakim Westerlund at the University of Gothenburg in Sweden. They placed the "receivers" of telepathic information in isolation and minimized their sensory input, thereby preventing any potential interference. The "senders" sat in an isolated room watching a film, while the receivers simultaneously commented upon what information came to mind. A real-time recording of the receivers' comments was then superimposed upon the transmitted film for analysis. One participant described accurately, in real time, a full sequence of events as they occurred in the film.[2]

Another example is the research at Stanford Research Institute by Russell Targ and Hal Puthoff, two laser physicists, which provided valuable information to almost every branch of the U.S. intelligence community during the Cold War with the Soviet Union. Much of their work was done on remote viewing, in which the sender went to an undisclosed location and the receiver drew a picture of it. One of their best receivers was Pat Price, a retired policeman who had helped the Berkeley police in their search for Patty Hearst. In his first attempt at remote viewing for SRI he achieved 90 percent accuracy in his psychic drawing of a swimming pool complex that included its dimensions, size, location, and the function of the pools and adjacent buildings.

Despite such experiments, the scientific community still questions the validity of psychic phenomena, demanding research data that is reproducible under tightly controlled conditions in order

to accept phenomena as true. At least on a public level, most scientists have taken the stand that something as extraordinary as psychic phenomena requires the data to be extraordinary as well.

A critical review of the laboratory data for psychic phenomena reveals cumulative data would have been sufficient evidence for other areas of research. If one wants to prove whether or not telepathy ca exist, one strong convincing case for its existence should be sufficient, because that is analogous to one living brontosaurus being proof that the species isn't extinct. William James, the late professor o psychology at Harvard, shared this same view on what is sufficient proof. He described paranormal experiences as "white crows" and said that "if you wish to upset the law that all crows are black, you must not seek to show that no crows are [black]; it is enough if you prove one single crow to be white."[3]

Applying James's analogy to the status of psychic research, there have been several sightings of white birds. Scientists haven't disputed that they are white, just whether they are crows. One has to capture the white bird, inspect it closely, and perhaps even test its DNA to prove that it is a crow. Anything short of this would be insufficient for a scientific revolution. Technology has advanced suc that we can better identify the "white bird" in psychic research, and it does appear to be a crow.

But proof of the existence of some psychic phenomena would mean we need to reconcile how they are possible given our understanding of consciousness and the brain. This would pose more of a challenge if the current model was complete and psychic phenomena were the only mystery. Instead, relatively little is known about consciousness. For example, no one has been able to answer what has been called the "hard question" of consciousness: how can something as nonmaterial as consciousnes arise from something material like the brain? The model also doesn't explain free will or our feeling that there is an "I" that has experiences. On top of that, there are reports of near-death survivors that suggest that consciousness can continue even when the brain has shut down, whereas the current scientific paradigm continues to regard consciousness as a product of brain chemistry and wiring.

A primary reason psychic phenomena are hotly contested by the scientific community is that the validity of such phenomena would mean a major scientific revolution, similar to the Copernican revolution that forced us to accept the sun as the center of the solar system. Scientific revolutions are not easy matters. Thomas Kuhn, the late physicist and professor of the history of science at MIT, compared scientific revolutions to political revolutions, with good reason. They involve a lot of politics. Some interested scientists have openly stated that they were afraid that they would lose thei credibility should they investigate psi, the technical term for psychic abilities. Partly as a result of these concerns, today there are no more than fifty scientists across the globe involved full-time in thi area of research. But it is the study of anomalies, such as psychic experiences, that will provide a better understanding of consciousness.

When a scientist has devoted his or her career to studying psychic abilities, it has usually been because of a thought-provoking personal experience. One of many examples is Hans Berger, the inventor of the electroencephalogram (EEG), which is used clinically to measure brain waves. Berge invented this device as a means of investigating telepathy after an extraordinary experience with his sister, who sent him a telegram saying she was very concerned that something bad had happened to him. Her timing was impeccable. Earlier that day he was almost killed while riding a horse. His sister's timely concern was so striking that Berger hypothesized that brains must be capable of sending signals to one another. Because this was during the time when electromagnetism was an exciting new field of inquiry, he thought that he'd find the answer by designing a machine that measures the electromagnetic activity of the brain. Although the EEG did not provide proof of telepathy, it has been of great help in advancing our understanding of the brain.

My own interest dates back to when I was thirteen years old. Through a good friend, I met a circus magician known primarily for his Houdini escapist tricks. In my friend's living room, he demonstrated something astonishing. From twenty feet across the room, the magician read, word for word, the contents of any book that I randomly chose from among hundreds on the bookshelves. There were no mirrors behind me, and I knew that these books belonged to my friend, not the magician. Even if he had memorized all of the books, he would also have needed exceptional luck to guess which pages I chose. There was no rational explanation at the time for what I observed, but it fostered a deep abiding curiosity.

I was already familiar with extraordinary mental abilities in one sense. I was a math prodigy as a child, someone who could do ninth- and tenth-grade math at seven years of age. And at age four my grandmother was a musical prodigy who could play songs accurately after hearing them only once. Much later I learned of autistic savants and other prodigies whose abilities were well documented but like psychic phenomena, were not explained by the current understanding of consciousness and the human brain.

My interest led me to study neuroscience in college and specialize in neuropsychiatry at the Johns Hopkins University School of Medicine. While on faculty at Harvard Medical School, I encountered a patient who claimed to be psychic. She then told me several accurate details about my life and made specific predictions about my future, all of which eventually came true. After this encounter, I decided to systematically investigate psychic phenomena. And over the past twenty years I have gained invaluable insight from patients who shared details of their psychic experiences.

The ESP Enigma presents a summary of the research on the four basic psychic abilities: telepathy (the ability to access someone else's consciousness), psychokinesis (the ability for one's conscious intention to directly act upon physical matter), clairvoyance (the ability to see something remote in space or time), and precognition (the ability to access the future). Some studies looked at large groups of individuals with the hypothesis that psychic abilities may be an innate capacity in all of us. Others have researched individuals who seem to possess these abilities to an extraordinary degree.

The book also addresses another question: how could psychic phenomena be possible? There have been enough advances in science over the last twenty years to now propose an acceptable mechanism by which psychic phenomena could occur. This new model for the brain and consciousness has the potential to reshape not just our attitudes toward psychic phenomena but also our understanding of our own minds.

Chapter 1

CONSCIOUSNESS AND THE BRAIN

The highest activities of consciousness have their origins in the physical occurrences of the brain, just as the loveliest melodies are not too sublime to be expressed by notes.

—W. Somerset Maugham

WE ALL EXPERIENCE consciousness, yet it remains one of life's greatest mysteries. People even disagree on the most fundamental questions: What is consciousness? What is it made of? No one can say for sure, other than to define it as the stream of thoughts and feelings we experience while awake That definition leaves unanswered the primary question of its essence. Our thoughts are as ephemeral as fairy dust. They bubble out of our deep pool of consciousness, but is that pool a form of energy, something material, another force of nature, or something else?

Other hotly debated questions are: Does the brain actually create consciousness? Or does it merely process it, or transmute it into its myriad forms? And how does our inner experience of the world, shaped by our brains, actually relate to external reality? Our sensory organs and brain limit us to a narrow slice of the full spectrum of sounds and sights, but do they limit us in other, unknown ways?

Philosophers and theologians have asked these questions for millennia, initially in the context of paradigms that made psychic phenomena possible. But during the past century, the questions have le neuroscientists to develop a paradigm that deemed psychic phenomena impossible. Yet over the past century there also have been discoveries in subatomic physics that have made possible a conceptual framework for psychic phenomena, even though many scholars of consciousness have not incorporated these discoveries into their thinking.

Questions about consciousness are the foundation for this book, and the theories behind their answers largely determine how easy or hard it is to accept psychic phenomena. When one analyzes th evolution of theories, one sees that facts usually drive theories, but theories often drive what is accepted as a fact. Ideally, theories and facts evolve together, and new models arise that include facts derived under old assumptions while discarding ideas outdated by new information. But people can have difficulty separating assumptions from facts. As you read this book, think about what you really know and how you know it. Some beliefs might turn out to be something that you just assume.

MONISM VERSUS DUALISM

Philosophers divide ways of looking at consciousness into two basic categories: monism and dualism Almost every academic devoted to the study of consciousness aligns him- or herself into one of these camps.

In monism, one universal and unified set of laws underlies nature. The mental and physical realms cannot be separated because they are one and the same. Mentalism, the most ancient form of monism regards the mind as the only thing that is real. Mentalism dates back thousands of years to the earlies

Eastern philosophers. They studied consciousness by meditative techniques that enabled direct experience of various levels of consciousness. The Hindu and Buddhist belief that everything is pure consciousness results from mystical experiences that are so powerful they feel like they reveal the "real reality." According to this view, our usual perception of the world is illusory and everything is really "one," or inseparable.[1] This perspective doesn't just allow for psychic phenomena; it makes them very likely because there is no difference or separation between one's internal and external reality. Everything is simply a product of our mind, and therefore everything is possible.

In dualism, the mental and physical are separate and radically different from each other. Like the relationship of monism to Eastern religions, dualism has been a component of Western religions. Bo Plato and Aristotle were dualists with a large influence on Western religion. Plato was among the firs to propose that we have souls trapped in our bodies.

René Descartes is another famous dualist. In 1641 he formulated a mind-brain distinction that drev upon the qualitative differences between conscious experience and physical matter. Consciousness does seem nonmaterial and unlike anything in the physical world. Also, during conscious experience we have the compelling feeling that there is an "I" that exists, witnesses, and acts upon our thoughts. We also feel that there is a separate and external world, and that we have free will to act within it.

Descartes identified the pineal gland as the place in the brain where the soul, or mind, could meet and affect the physical.[2] Descartes' dualism is highly compatible with psychic phenomena and the many reports of psychics that their consciousness leaves their body in order to either access information or influence the physical world. His dualistic theory endured for centuries because it meshed comfortably with many religious perspectives.

But within science,Descartes' dualism had a major deficiency. Descartes' theory was sarcastically referred to as the "ghost in the machine" in 1949 by the British philosopher Gilbert Ryle. In his book *The Concept of Mind*, Ryle argued that dualist systems like Descartes' were absurd because there was no means for the body and mind to interact. To Ryle,Descartes' theory implied that the body was a biological machine magically controlled by a soul, or "ghost."

William James was another prominent dualist. He personally experimented with nitrous oxide, or laughing gas, which induced experiences that felt like his consciousness left his body. These led him to publicly wonder in 1898 whether the brain actually produced consciousness. In the following statement he proposed that the brain could just be a means for transmitting consciousness:

> Just as a prism alters incoming white light to form the characteristic colored spectrum, but is not the source of the light; and just as the lengths of the pipes of an organ determine how the inflowing air yields certain tones and not others, but are not, themselves, the source of the air, so too the brain may serve a permissive, transmissive, or expressive function, rather than solely a productive one, in terms of the thoughts, images, feelings, and other experiences it allows.[3]

Aldous Huxley said almost the same thing in 1954.[4] He was another dualist who considered the brain to be a filter that primarily blocks out consciousness rather than actually generating it. He saw the brain as only allowing us to register and express a narrow range of reality, which could be broadened during states of altered consciousness, such as meditation and dreams.

Around the same time as Descartes, a second form of monism, neutral monism, was proposed by th philosopher Baruch de Spinoza. It regards both the mental and physical as reducible to some third

entity, which was called “God” or “nature” during Spinoza’s time. Because neutral monism describes the abstract mystery of consciousness in terms of another abstract mystery, it is unsatisfactory to those who want concrete answers. As for psychic phenomena, the theory is neither compatible nor incompatible with them. It doesn’t rule them in or out.

The third and most recent monism is the perspective most neuroscientists share. Materialism assumes that only the physical world is real and that the mind can be reduced to or equated with something physical. Materialists agree with W. Somerset Maugham that our brains produce the streams of consciousness that can take us to an imaginary tropical island or vividly recall Thanksgiving at Grandma’s house when we were eleven years old. In *The Astonishing Hypothesis*, Francis Crick expressed this belief that our consciousness and sense of self result strictly from chemical and electrical brain processes. Because materialism is not consonant with many nonscientists’ beliefs, Crick called it an “astonishing hypothesis.” Psychic phenomena are not possib in materialism, because there is no mechanism for consciousness within one brain to communicate remotely with the consciousness of another. Materialism also doesn’t allow one to see the future or t influence the physical world solely by conscious intention.

THE ASCENT OF MATERIALISM

Materialism became the primary academic model for consciousness because of compelling evidence that linked the brain to consciousness. Damage to the brain can cause consciousness to be lost. Stroke in the brainstem can render someone comatose. Also, grand mal seizures lead to a temporary loss of consciousness that is always accompanied by specific changes in a person’s EEG.

Very discrete injuries to the brain lead to specific alterations of conscious experience. For example a tiny stroke in the area of the visual cortex that processes color (V4) leads to vision where our world looks like we’ve entered a black-and-white movie. The neurologist Oliver Sacks wrote about a patien whose damage to V4 caused him to lose interest in sex because his wife’s skin appeared to be gray to him, as though she were dead. Food became unappealing because it was gray, a color we naturally associate with decay.

A stroke in the cortical area called MT specifically eliminates the ability to see motion. As a result any moving object is seen as a series of static images, and the person with an MT stroke cannot gaug how quickly something is moving. The neurologist V. S. Ramachandran described the ways this impacts one’s life. A patient with an MT stroke became afraid to cross the street if any cars were driving on it, and her glass overflowed when she poured herself a drink.

Some brain structures are intimately involved with the content of our conscious thoughts. For example, the hippocampi are necessary to consolidate long-term memory. If both hippocampi are damaged, a person becomes frozen in time. Although he is able to remember everything that happene prior to the time of damage, he is unable to form new memories. He can appear normal at first, but if you ask him about something from just a few minutes before, he has no memory of it. He won’t tell you that he forgot, because these patients confabulate, or make something up, to answer your questions. They aren’t liars. Their brains create information that they actually believe. It is like our brains’ automatic filling in of blind spots in our field of vision, rather than letting us see areas of black. When a patient is living in a continuously growing time gap, his brain will confabulate as a wa of preserving his sense that his stream of consciousness is continuous.

Other evidence for the brain’s connection to consciousness is the replication of specific conscious

experiences by direct electrical stimulation of brain areas. During the 1940s and 1950s the Canadian neurosurgeon Wilder Penfield mapped out large sections of the brain by applying direct electrical stimulation to brain cells in the operating room before he removed diseased brain tissue. Because the brain doesn't have pain receptors, he could keep patients awake and ask them about their experiences during the stimulation. Among other findings, Penfield outlined the regions called the homunculi, or "little men," which lie centrally along both sides of the brain. The posterior set of homunculi receive sensory input (touch, pain, vibration, position sense, temperature) from the body, and the anterior set is involved in motor, or muscular, output.[5]

When neurosurgeons repeatedly stimulate a specific brain area in the same patient, they always evoke the same exact memory, such as a song by Led Zeppelin. Neurosurgeons have also used recording electrodes to look at conditions under which brain cells will show electrical activity, or "fire." Single neurons in the hippocampus will fire when a patient is shown a specific face, such as Bill Clinton's or Jennifer Aniston's. The neuron appears to be committed to a specific face and will not fire for any other visual stimuli. Even more astonishing, it will fire when the subject is shown pictures from various angles or time periods, as long as they are of the same person. It is as though th brain cell is part of a network that has a concept of "Bill Clinton" or "Jennifer Aniston."

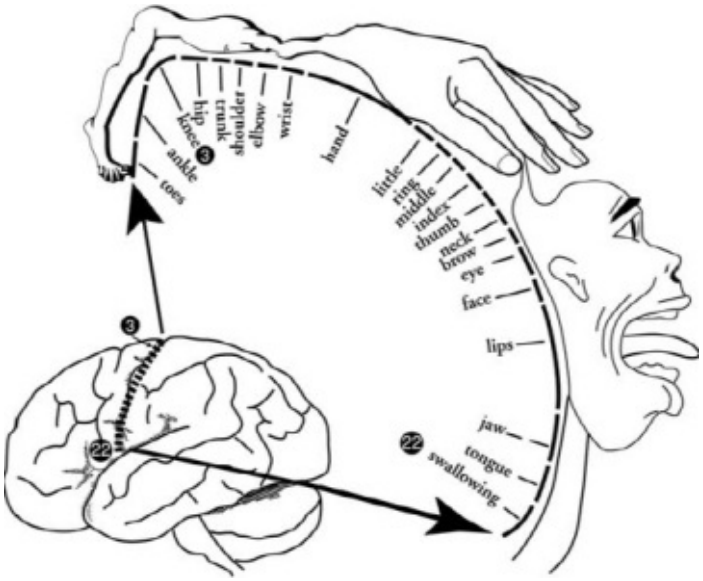

Figure 1. The homunculus, based on Penfield's diagram. Locations on the brain correspond to parts the body such as the knee (3), and also to motor acts such as swallowing (22).

Reinforcement of the materialist view that the brain creates consciousness comes from brain imaging studies that reveal the brain areas activated during certain tasks.[6] Brain sections activated during addition are different from those used when conjuring up several words that begin with *r*. Brains also display different patterns when recalling something than when making it up, or lying. In fact, functional MRIs (fMRIs) have been proposed for lie detection. One can experience imaginary things as though they are real, and studies show that this activates the same brain areas as when we actually experience it. Brain imaging also has a characteristic pattern for being in a normal mood, depressed, manic, on illegal drugs, or sad.

The brain plays a primary role in shaping our conscious experiences, but that is different from saying that it creates consciousness, although the materialist paradigm assumes it does. The philosophy professor David Chalmers called the inability to understand how something as nonmaterial as consciousness could arise from the brain "the hard problem of consciousness." The lack of any answe to the hard problem creates a missing link in the materialism paradigm.

The first approach to finding this link has been to look for something about the brain that is unique different from other organs, so as to enable it to be the sole creator of consciousness. But brain cells have more in common with other cells than not. All mammalian cells have nuclei that contain the same genetic material as brain cells. Mammalian cells, except for sperm, have mitochondria that giv them energy; they all have membranes that keep their interior contents intact while interfacing with other cells; and most have floating around in their membranes receptors for chemicals that influence cellular activity. In fact, many cells outside of the brain have receptors for neurotransmitters such as serotonin, the chemical messenger made famous by Prozac.

So what makes the brain different from other parts of the body? Brain cells differ from others by having electrical activity, called an action potential, that travels along their axons, which are the thin extensions that radiate out from the brain cell's body to form their connections with other cells. The only cells outside of the nervous system that operate by electrical activity are heart cells, which coordinate their activity with each other to create the muscular contraction of the heart. Unlike heart cells, brain cells are insulated from each other by fat to conduct electricity faster and to be more selective about which electrical activity affects them. If brain cells fire in a wavelike fashion, as hear cells do, this abnormal activity causes a seizure.

Another difference between brain and heart cells is that heart cells generate their electric current without stimulation, whereas brain cells require stimulation. A single heart cell isolated in a laboratory dish will have its own pulse, whereas a brain cell has electrical activity only in response to outside stimulation, such as an electric probe or another brain cell.

The majority of brain cell stimulation comes from other brain cells, but some comes from their interface with sensory systems. Unlike cells in most body organs, which connect only with adjacent cells, brain cells can have a variety of connections. For example, neurons in the front of the brain can connect with their neighbors, neurons in the back of the brain, and several neurons in between.

Because of differences in connectivity among brain cells, each cell has its own identity, analogous to people for whom a large part of their sense of self is derived from their relationships with others. There may be a huge overlap between the friends that I share with my best friend, but there are also differences between us in whom we know and how much we communicate with them.

Unlike cells in other organs, the connections between brain cells can undergo significant change. New connections are formed when we learn new things. Damage can also alter connections. If someone goes blind, some of the cells in the visual cortex can become recruited by another sense, such as touch, and they can strengthen that other sense beyond its usual capacity.

Whatever the source of human consciousness, it has to be complex. The brain certainly fits that bil Most of its complexity comes from the enormous number of potential connections among brain cells The brain has approximately 100 billion neurons, each of which has between 1,000 and 10,000 connections with other neurons at junctures called synapses. The calculated number of possible permutations, or combinations of brain activity, along this network exceeds the number of elementar particles in the universe.[7]

Another source of complexity is the tremendous variability in brain cells' connections with each other. Some brain cells connect through a direct electrical synapse, but the major means is through neurotransmitters, the chemical messengers that cross over from one brain cell to another at chemical synapses. There are more than a hundred neurotransmitters and multiple receptor subtypes for each neurotransmitter. Serotonin, norepinephrine, and dopamine are the most commonly discussed neurotransmitters because they are influenced by antidepressants, but they are not the most abundant. Among the most ubiquitous neurotransmitters are GABA and glutamate. GABA decreases the likelihood that a connecting cell will fire, whereas glutamate is excitatory and increases the next cell's potential for firing.

The brain is a network of numerous on and off switches. In response to the cumulative input from other neurons, either neurons fire or they don't. A threshold has to be reached for a neuron to fire, but when it fires the output doesn't vary. It doesn't matter if the threshold was exceeded to a greater or lesser extent. That all-or-nothing process reminded computer scientists of their binary computer code, which is written in 0's (off) and 1's (on). This led cognitive psychology to develop and embrace a "computational theory of mind" that regards the brain as functioning like a biological digital computer.

The computational theory of mind works well for understanding some functional aspects of the brain, but it does not do a good job of accounting for the experiential aspect of consciousness. In other words, it doesn't address how we can experience the tastes, smells, sights, or sounds of the world around us. How do we experience the color fuchsia, the smell of honeysuckle, or the taste of garlic bread? Where does the "I" that has those sensations come from or reside? How do our brains take separate sensory inputs of a multisensory experience and combine them so that we experience them as an external world, rather than as something occurring inside our heads?

One major difference is that computers can make decisions according to logic, but they can't have the experience of free will or the feeling of control over decisions about what to do next. They act out of a preset algorithm. Even if randomness is built into the algorithm to give it some unpredictability, it is not the same as free will. The concept of the brain as a biological network that operates like a computer suggests that we are just "zombies," or automatons, which is one of the model's major shortcomings.

If explaining how the material brain can create an apparently nonmaterial consciousness is the "hard problem," what is the easy problem? Scientists feel fairly confident that they'll locate the brain regions responsible for conscious experience, as opposed to the brain regions whose activity remains unconscious. The temporal lobes were once proposed as the sites for conscious awareness because of their association with symbolism, which is important for much of our thinking. However, this can't be correct, because people whose temporal lobes were removed because of tumors or epilepsy still appear to be fully conscious beings. Another area of the brain was proposed by Francis Crick as a possibility primarily because its function is still unknown, but assigning function by default is unsatisfactory. So where conscious experience actually happens is still a very open question.

The easy question became more complicated when British and Belgian scientists studied the brain of a woman who had suffered severe brain damage in a car accident.[9] She was in a vegetative state, in which she could open her eyes but did not physically respond to sights, sounds, or being poked. Nonetheless, a functional MRI of her brain showed the same patterns as a normal person when she was asked to imagine playing tennis: the regions that were activated were those involved in movement. The areas associated with navigating space and recognizing places became more active when she was asked to imagine visiting rooms at her house. Prior to this study, people in a vegetative state were no

thought to be conscious. Now scientists are revisiting their definition of consciousness.

THE NEXT STEP TO UNDERSTANDING CONSCIOUSNESS

Consider the following analogy: On one level we understand both music and consciousness by experiencing them. But trying to understand consciousness by investigating the gray matter in our skulls is like trying to comprehend music by dismantling CD players and analyzing their parts. This i why some neuroscientists are now collaborating with experienced meditators who have devoted their lives to deepening their experience of consciousness.

If what we want to understand is how CD players can play music, we need to know about physics, including that of lasers and computers. I believe that it is similarly impossible to understand the relationship between the brain and consciousness without looking to modern physics, which studies the essence of matter and energy and their interactions at the atomic and subatomic levels.

The brain is composed of atoms, and therefore the principles of quantum physics are operating in our brains, though most neuroscientists have yet to give significance to quantum principles. But a model that recognizes that quantum physics also operates in our brains might explain many of consciousness' unsolved mysteries. In other words, quantum physics just might provide the missing link that explains the relationship between something as nonmaterial as consciousness and something as material as the brain.

Most neurologists and psychiatrists are accustomed to interpreting fairly bizarre syndromes as a result of brain dysfunction, and many syndromes that are now accepted as genuine were at first misunderstood and often dismissed. I predict that psychic phenomena will eventually gain their acceptance as well if there are sufficient data. And if psychic phenomena are proven valid, these phenomena may serve as both clues to, and confirmation of, this developing model of brain function.

Chapter 2

DO YOU SEE WHAT I SEE? AN EXAMINATION OF THE EVIDENCE FOR TELEPATHY

Another dream-determinant that deserves mention is telepathy. The authenticity of this phenomenon can no longer be disputed today. It is, of course, very simple to deny its existence without examining the evidence, but that is an unscientific procedure which is unworthy of notice. I have found by experience that telepathy does in fact influence dreams, as has been asserted since ancient times. Certain people are particularly sensitive in this respect. . . . The phenomenon undoubtedly exists, but the theory of it does not seem to me to be so simple.

—C. G. Jung in *The Practical Use ofDream Analysis* (1934)

THE TERM *telepathy* comes from the Greek *tele-*, meaning "distant," and *pathos*, meaning "feeling Telepathy is the ability to feel from a distance and involves the communication from one mind to another without a visual, tactile, or auditory means. Sometimes it is referred to as "thought transference."

Telepathy has been reported to be more common in people who have a close social bond and high level of intimacy. This implies that the barriers people erect to intimacy may also be barriers to telepathy. One intimate relationship where the barriers are down is that between mothers and their newborns. In fact, mothers often report a sense of telepathic connection with their young children, especially infants who are too young to have formed their own sense of identity or personal boundaries.

The most common situations that evoke spontaneous telepathic communication appear to be when there is a threat to a member of the intimate relationship. The psychiatrist Ian Stevenson reported tha 50 to 80 percent of such communications occur during a serious crisis.[1] Another common source is when there is a secret or something that the other is attempting to hide. There are many anecdotes of mothers knowing when their children are up to no good and of spouses who correctly develop suspicions when their partners cheat on them. But is this telepathy, or intuition, or the detection of subtle cues?

In a close-knit family, knowing the other's thoughts can happen even in mundane matters. Berthol Schwarz, a psychiatrist, kept a diary about coincidences that resembled telepathy within his family and wrote about them in a book, *Parent-Child Telepathy*.[2] One type of coincidence was when his children blurted out a comment as though in direct response to what the parent was silently thinking.

Many of us can relate to the above examples, but they don't get reported to telepathy researchers because they are not dramatic or clear-cut examples of telepathy. Of the reported spontaneous telepathic experiences, approximately 65 percent have occurred in dreams.[3] This suggested that the

dreaming state may be conducive to receiving telepathic information, so telepathic dreams have played an important historical role in the investigation of telepathy.

The correlation between dreams and psychic phenomena has been noted for thousands of years. Ancient Eastern cultures believed that our consciousness traveled outside our bodies during dreams, thereby accessing information from other locations and realms. Many Jungian psychoanalysts believ in telepathy and regard dreams as symbol-laden clues to our unconscious mind, which is a portal for telepathic information.[4] Either way, telepathy's correlation with dreaming results from the shift awa from normal waking consciousness. Dreams explore the usually inaccessible world of our unconscious, a world rich with contents of mysterious origin.

TELEPATH IC DREAMS

"Crisis telepathy" is one of the most commonly reported and well-documented categories of telepath dreams, occurring when the sleeping person dreams of someone who is awake and in danger. In a "farewell dream" the loved one actually died when the dreamer simultaneously dreamed about the death. The explorer Henry Stanley had one of history's best-known farewell dreams. While in captivity during the American Civil War, he dreamed in detail of the unexpected death of his aunt in Wales. He later learned that she died at the same time of his dream.

Anecdotes such as Stanley's were an impetus to begin a serious scientific study of telepathy, so the Society for Psychical Research (SPR) was founded in 1882. SPR reported research findings from 149 cases of dream telepathy in the historic work *Phantasms of the Living.* One typical story from the boo is the following dream, which coincided with the time of the actual event and agreed with it in great detail:

> I saw father driving in a sledge, followed in another by my brother. They had to pass across a road on which another traveler was driving very fast, also in a sledge with one horse. Father seemed to drive on without observing the other fellow, who . . . made his horse rear. . . . I saw my father drive under the hoofs of the horse. Every moment I expected the horse to fall down and crush him. I called out, "Father! Father!" and awoke in great fright.[5]

Although many of the 149 case reports were compelling, the SPR research did not have an influential impact on the scientific community, primarily because case reports are anecdotal and don happen under controlled conditions. They also aren't the type of phenomenon that one could reliably reproduce. Nonetheless, the following SPR conclusions are worth noting. Over half of the telepathic dreams concerned death, and another high number concerned an emergency. In most cases the dreamer and subject of the dream were related or friends. None of the dreamers had a history of psychic abilities before or after the dreams. And the dreamers were not prone to nightmares about others, so the dreams stood out as particularly disturbing. The combined findings led the researchers to question whether or not we all share this capacity for telepathic dreams, perhaps as an adaptive survival mechanism.

One question raised by the SPR research is whether dreams about the death of someone are commo enough that statistically one would expect at least some dreams to coincide with an actual crisis or death. The SPR researchers attempted to address this question by sending out questionnaires to 5,360 people to ask them if they had had a vivid dream of the death of someone known to them within the

last twelve years. Fewer than 4 percent of respondents reported that they had such a dream over the entire period of 4,380 days. Given the low frequency of such dreams, the researchers concluded that the odds of a farewell dream on the actual night of that person's death were against it being due to chance.

Another type of telepathic dream, the "shared dream," was heavily investigated by Hornell Hart.[6] Hart defined this as a dream "in which two or more dreamers dream of each other in a common space time situation, and independently remember more or less of their surroundings, their conversation, and their interactions within the dream." How often shared dreams occur spontaneously is unanswerable because dreams are usually forgotten or are not discussed, particularly if they were not alarming.

People have actively tried to cultivate shared dreams. Sixteenth-century Sufi mystics, isolated in a monastery on the island of Rhodes, went to great lengths to have shared dreams as part of their spiritual practice. The Sufi master and his disciples recited a secret formula together and underwent group purification of their bodies, minds, and spirits before they slept in an enormous bed shared by everyone. Under these ritualistic conditions, they had the same dreams. But since what we do before sleep often becomes incorporated into our dreams, their shared dreams may have been due to their identical experiences prior to sleep rather than telepathy.

More convincing of telepathy are the spontaneous reports of shared dreams, such as the following: Dr. Adele Gleason dreamed of being deserted in a very dark wood. She was suddenly terrified that a man she knew would suddenly arrive and shake a tree next to her, an action which would cause the leaves to burst into flames. The dream occurred between 2 a.m. and 3 a.m. on January 26, 1892. Four days later she ran into the man who was in her dream. She wanted to tell him about her dream, but he interrupted and insisted on telling her about his dream, which he was certain was the same as hers. Indeed, at around 3 a.m. the same morning, he had dreamed that he had approached her in a dark wood, shaken a tree, and its leaves had fallen and burst into flames.

Because the context for the reported dreams was not included, one cannot say whether they were entirely independent from shared circumstances. However, the dreams are heavily symbolic and the parallels are very striking. Another interesting example comes from a couple that I met before I ever read about shared dreams. When Bob and Sally met, they recognized each other instantly, having bee lovers in a series of shared dreams that they had had over a period of ten years before meeting. They married within three months after meeting in person.

LABORATORY RESEARCH ON TELE PATH IC DREAMS

After SPR's research, the next logical step was for research on dream telepathy to move to the laboratory for study under controlled conditions. The invention of the EEG, which measures brainwaves, and electro-oculogram (EOG), which measures eye movements, allowed researchers to know when someone was dreaming, because rapid eye movement (REM) sleep has distinct brainwav and eye movements. Most laboratory work on dream telepathy was done at the Maimonides Dream Laboratory in New York by Montague Ullman, M.D., and Stanley Krippner, M.D., during the 1970s and 1980s.[8]

Their largest telepathic dream experiment was done in 1971. [9] Ullman and Krippner asked two thousand attendees at a Grateful Dead concert to telepathically transmit a picture on display to Malcolm Besant, who was sleeping forty-five miles away in the Maimonides Dream Laboratory. The

picture was of someone in the lotus position with brightly colored chakras, or energy centers, in alignment along his spine. Besant, a very successful English psychic and the grandson of a founder o the Theosophical Society, dreamed about a man "suspended in midair." He also saw "light from the sun . . . the spinal column."

Ullman and Krippner also did a series of experiments in which an "agent" in another room or building concentrated on a randomly chosen painting and attempted to transmit it to a dreaming subject. The subjects were awoken when the electrical recordings showed that they were dreaming. Their dream content was then compared to the painting. Often their dreams had a theme or content very similar to that of the painting. For example, if the painting was *The Last Supper*, it was counted as a positive result if the dreamer reported a dream about a feast or a dream about Jesus. The investigators declared an accuracy of 83.5 percent for those twelve experiments, but the criteria for a positive result were not very strict.

Over time the Maimonides procedure was revised. One protocol had the dreamers view between eight and twelve pictures after being awoken. They were asked to rank the pictures in order of relevance to their dream's content. It was counted as a hit if the "transmitted" picture was in the top half of the ranking and a miss if it was in the bottom half. This made statistical analysis of the data easier, but it also made the data less compelling than if they had been forced to choose one of the pictures. The changes in protocol over the years made it more difficult to do an overall analysis of their 450 trials than if they had kept the same format. However, a combined review, or meta-analysis was done and it concluded that the overall success rate was 63 percent versus the chance rate of 50 percent; the odds were 75 million to 1 against the data being due to chance or guessing.[10]

Some of the most fascinating results in the Maimonides trials had to be counted as errors in the statistical analysis. For example, Alan Vaughn described a case where the dreamer picked up something from a staff member other than the sender.[11] Sol Feldstein was in charge of monitoring th equipment while the sender was concentrating on an art picture and the dreamer was asleep. The reported dream was about statues of women with their breasts exposed, which did not relate to the target picture. However, when Feldstein heard the results, he revealed that he had been reading an illustrated *Life* magazine article about topless bathing suits at the time.

In another example from the Maimonides research, the dreamer dreamed about the Northwest Mounted Police, which had nothing to do with the target picture. When the staff were discussing the results, the night monitor became embarrassed and confessed that he had fallen asleep on the job and had a dream about the Northwest Mounted Police.

Personal information about the researchers also sometimes contaminated dream content. Robert Van de Castle was a professor of psychiatry at the University of Virginia Medical School and was considered by Ullman and Krippner to be one of the best telepathic dreamers. He dreamed that Krippner's expense account statements showed him to be $25 short. When he and Krippner discussed the dream the next day, Krippner confirmed that he had not been reimbursed $25 of a business trip's expenses.

After the Maimonides research ended, forty-seven telepathic dream studies were conducted that differed primarily from their predecessors in that they allowed the dreamers to sleep at home rather than in the laboratory. This was considerably cheaper to conduct and allowed more trials, but it mean that the dreamers were not awoken immediately from their dreams or monitored by EEG/EOG. A meta-analysis was done of these 1,270 trials by British psychologists Simon Sherwood and Chris Roe from University College Northampton, England.[12] There was a hit rate of 59.1 percent, which was 9.1

percent over the chance rate of 50 percent. It is not surprising that the hit rate was lower than in the Maimonides trials because dreams are less likely to be remembered when subjects are not immediately awoken from them. However, because there were almost three times as many trials as in the laboratory and 9.1 percent was not that much lower than the 13 percent in the Maimonides trials, the odds ratio that the home studies were not a result of chance ended up higher than the laboratory odds ratio, at 22 billion to 1.

RESEARCH DURING ALTERED STATES OTHER THAN DREAMING

Altered states of consciousness have also been explored to see if they facilitate telepathic communication. One method of inducing an altered state is the ganzfeld procedure, which was named after a German word meaning "whole field," as in a whole field of consciousness. It involved a mild form of sensory deprivation that was originally developed in 1964 by psychologists Mario Bertini, Helen Lewis, and Herman Witkin to study altered states of consciousness.[13]

Charles Honorton, William Braud, and Adrian Parker applied this technique to the study of psychic abilities so that their subjects could focus their attention without competing external stimulation. They produced the ganzfeld state by affixing ping-pong ball halves over the receiver's eyes, which looked into a red light, and reducing auditory input by pink noise, which is white noise with the high-frequency components filtered out. A comfortable recliner and hypnotic-like suggestions relaxed the receiver. A sender looked at a picture and attempted to mentally transmit it over to the receiver while he or she was in the ganzfeld state. Afterward, the receiver was shown four pictures to choose the target from.

From 1974 to 2004, eighty-eight ganzfeld experiments were conducted, and 1,008 of the 3,145 trials were hits. Dean Radin, an experimental parapsychologist at the Institute of Noetic Sciences (IONS), reported in his book *Entangled Minds* that the combined hit rate was 32 percent, which is 7 percent higher than the 25 percent expected by chance.[14] Radin states that the odds against these results being due strictly to chance are astronomical: 29 quintillion (29,000,000,000,000,000,000) to 1.

The ganzfeld work was later refined by Adrian Parker and Joakim Westerlund. In these experiments one person views a film and telepathically sends the imagery to a person in the ganzfeld state. The precise time is kept track of so that the subject's reports from the ganzfeld state can be compared to what happens at that exact time in the film. The recordings of the reports are later superimposed upon the film in real time, as though the person is narrating the film. This allows for a second-by-second comparison of what was being "sent" and what was being "seen." One example of a hit was when the participant said, "Looks like something is being lifted, a tong, which holds something." The simultaneous five-second sequence in the film showed a handicapped man lifting an object using a type of tongs.[15] These results combine the compelling specificity found in the anecdotes with the controlled conditions of a laboratory, a combination that makes them an important contribution to the body of research.

Telepathic research was also done on people who could place themselves into a special meditative state. Some of the earliest research of this type came from an unlikely source: Upton Sin-clair, the famous social activist and writer who exposed the horrific conditions of Chicago's meatpacking houses in his book *The Jungle* (1906), and who won the Pulitzer Prize for *Dragon'sTeeth* (1942), a book about the rise of the Nazis in Germany. He became convinced of clairvoyance and telepathy