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EXPANDING A SCIENCE OF CONSCIOUSNESS

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> Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of nature and therefore part of the mystery that we are trying to solve.
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> —Max Planck, *Where Is Science Going?*[1]

> There does not exist anything
> That is not dependently arisen.
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> —Nāgārjuna, *Mūlamadhyamakakārikā*[2]

A close friend told me he had recently been going through materials stored in his garage—including several boxes that had been unopened and gathering dust for decades. Deeply buried at the bottom of one of the boxes was a sheaf of letters from a one-time girlfriend. She was someone he had known closely during several months spent living in Europe, and they had kept in touch via letter for a short time after my friend returned home to the United States. That was nearly fifty years ago, and they had had no contact since. On looking through the letters, my friend's thoughts were for the first time in decades focused on his old friend. The next day, he awoke early in the morning and saw first thing that he had received a message via social media from this former girlfriend. She indicated that she had the previous day, herself, uncovered old letters exchanged between them nearly five decades ago, had looked my friend up online and found his contact information, and was reaching out to say hello. My friend told me this was the most uncanny experience he has ever had.

Another friend, now in her mid-nineties, has sporadically had what she calls "ESP experiences" since she was a teenager. For much of her life, she has avoided talking about these experiences. Only recently, in part responding to encouragement from friends, has she begun to talk and write about these occurrences. One time, she knew that a family member (living at a distance from her) had died just at the time he passed, although the death had not been expected. She had multiple detailed clairvoyant experiences (later confirmed) of significant events occurring in the lives of close relatives—primarily her children and siblings. And several times she found herself unbiddenly in "conversation" with someone who was deceased. The deceased person was sometimes someone she knew in life, and sometimes it was someone with whom she had not previously been familiar, but she was later able to verify the accuracy of material revealed in the conversation. The most vivid of these experiences occurred during a meditation retreat when an unknown woman appeared in my friend's bedtime mental reverie, speaking at length about various things. When asked, the visitant said she was the wife of the man sitting next to my friend in the retreat. My friend and this man had not spoken, and they knew nothing of one another's lives. The next day, my friend told the person leading the retreat of her experience and was informed that her description matched that of the recently deceased (three months prior) wife of the person sitting next to her. My friend's ESP experiences have several times occurred in conjunction with meditation retreats. She comes from a family of scientists and other distinguished academic scholars, and none of her family wished to hear about such experiences. On one occasion, her father, a philosophy professor, listened and then muttered, "Wishful thinking, wishful thinking."

Wishful thinking: thus we have the conventional presumed-to-be-science-based response to such stories. Experiences such as these are explained as coincidences or, moreover, merely meaningless coincidences. How many times does one think of someone and nothing happens? We recall only those events when something like what is described above takes place and forget myriad others. Or perhaps we incorrectly construct the time sequence of events afterward so that we mistakenly think our experience came before the event rather than the other way around. (For example, one learns about someone's death and then mistakenly remembers, thinking that a premonition occurred prior to when they learned about the death.) Or science does not support taking such anecdotes as reliable data. And, finally, the definitive repudiation: our science-based model of reality does not allow for the occurrence of such things in any way other than being random and meaningless coincidences or mistaken memories; simply stated, anything else is *impossible*. Or the folks are simply not telling the truth—fabricating their stories, either wittingly or unwittingly. And so on. Such are the customary dismissive rejoinders.

However, if one is scientifically honest, such responses and conclusions are but hypotheses to be considered. Another very tenable hypothesis is this: there is an interconnectivity linking minds across space and time. That is, while we humans are living beings having physical bodies composed of atoms and operating according to physical principles that have become known to us through our scientific analyses to date, we are also connected with or part of an information-carrying medium as unknown to us currently as were electromagnetic fields to keen observers of the natural world such as Aristotle, Ptolemy, Galileo, and Darwin.

This is a well-defined and testable hypothesis that is consistent with the accepted facts of orthodox biophysical science. Furthermore, such a hypothesis can account for additional observational material (anomalies) such as are described in this volume, a great many other books, and thousands of publications stretching across centuries. There is nothing here that is beyond science, only beyond what is currently explicable within the presently embraced biophysical model of the world.

Science-derived explanatory models of the world three centuries ago could not account for gravitation. It was only with the advent of Einstein's general theory of relativity in 1915 that physicists came to accept that a satisfactory explanation for gravitation had been found. Nor could science-derived models of the world from three centuries ago fathom the possibility of nearly instantaneous transmission of information (e.g., voice and images) over distances of thousands of miles or predict the precise colors generated by electrical excitation of gases. It would take the introduction of electromagnetic fields and radiation (nineteenth century) and the development of quantum physics (twentieth century), respectively, to accomplish these things.

So, where are we in the present era with respect to the power of scientific theory to account for consciousness? Let's begin with some definitions.

Science: By *science*, I mean the process of developing and organizing knowledge about the world, the universe, and nature. Science derives from the Latin *scire*, "to know." The scientific method has come to mean a process of collecting data via observation and experimentation,[3] guided by the formulation of questions and hypotheses, and further deepened by theoretical frameworks of "explanation" that endeavor to connect observations together in ever more elaborate networks. The result, we say, enhances our "understanding." While hypotheses and theories play important roles, at its foundation science is grounded in empiricism—from the Greek *empeirikos*, meaning "experience." The term originally referred to a school of ancient physicians who based their medical practice on observations and data from their own experience rather than on dogmatic theory.

Mind and *Consciousness*: By *mind*, I mean mental states consisting of thoughts, feelings, and perceptions. By *consciousness*, I mean *experience* or *awareness* of mental states. Consciousness is *irreducibly* experiential and subjective, part of *what it is like to be*. There are also mental states out of awareness, the unconscious aspects of mind. These states belong to and help constitute mind in that they have the potential to enter awareness. If that potential were not there, they would be considered not mental states but aspects of physiology that may impact our behavior but are not available to be experienced. Indeed, the vast majority of our mental life is typically not conscious, typically out of awareness. (One of the tasks of psychotherapy, as developed in Europe and the United States, is to bring unconscious mental material into conscious awareness, where it may be subjected to analysis and change. And one of the tasks of yoga, as developed in Asia, is to become ever more aware and conversant with all aspects of mind.) By these definitions, mind and consciousness have much in common, and indeed the two terms are often used interchangeably—the distinction between conscious and unconscious aspects of mind is set aside. In this chapter, I will use the terms interchangeably. The definitions stated here would be generally acceptable among scientists interested in these issues. However, others may adopt different definitions, including other authors in this volume.[4]

Also of note, these definitions of mind and consciousness are circumscribed and personal; they do not go beyond a person's own experience. However, some uses of these terms reference something more expansive—something transpersonal, transcendental, nonlocal, or universal. Is mind a phenomenon that makes sense only locally, in a very personal sense? Or is it a presence in the cosmos, perhaps even existing outside of or beyond the physical dimensions of space and time?

In this discussion of a science of mind and consciousness, we will adopt the more circumscribed, local, personal definition. Otherwise, the scientific conversation can get stuck right out of the gate. That said, the diversity of opinions concerning how to define consciousness reflects precisely the core issue paralyzing the science. That is, if one is open and honest about the empirical data, it is clear that what has been and continues to be experienced by a great many individuals over vast expanses of time goes beyond the personal as conceived within our current biophysical model of reality. This data can also include elements from the literature of a panoply of religious, shamanic, and mystical traditions—a gnosis or knowing, having many cross-cultural similarities, transcending attempts to explain it away (Grosso, 2020; Kripal, 2014, and Chapter 10 in this volume; Marshall, 2015). The empirical data point toward a consideration of mind going beyond the personal, beyond one's local brain and body and known channels of sensory information—hence

the common use of expansive qualifiers such as transpersonal, collective, transcendental, cosmic, or universal consciousness. Consciousness unbound.

In this chapter, I suggest reframing our science on the stage of a metaphysics that will enable movement toward a more powerfully explanatory science of consciousness. A central message of this volume is that a variety of metaphysical systems exist that can accommodate such an expanded science—neutral and dual-aspect and reflexive monisms and analytic idealism among them. We need not let our *assumptions* regarding metaphysical frames limit our capacity to expand a science of consciousness.

I have spent my life as a scientist and science educator. Childhood fascination with aspects of nature discovered in my suburban environment crystallized during college in the study of chemistry, physics, and mathematics. The beauty and elegance of science was an early love. By the end of college, I was also reading from the history and philosophy of science and about various spiritual, religious, and mystical traditions. One of my early scientific heroes was Albert Einstein, and I read every essay by him and biography about him that I could find. I wondered how he could sit in his room and concoct a mathematical theory describing the entire cosmos. How could anyone do that? What is the nature of the human mind, and how are we humans, as living conscious beings, related to what we take to be physical reality?

College was followed by postgraduate work in physics, biology, and psychology, and for the past three decades I have taught neuroscience at the University of California, Berkeley. I am deeply rooted in the landscape of science, and I love the elegance of so many of the observational and experimental paradigms, the stunning discoveries, and the beauty and explanatory power of so many of the theories. When I teach my introduction to neuroscience class to hundreds of undergraduate students in the largest lecture hall on the Berkeley campus, I frequently say that if I had my druthers, I would commission an artist to paint a mural of the periodic table of the chemical elements (one of the most beautiful organizational frameworks ever recognized or created by the human mind) on one wall and a phospholipid bilayer membrane (the elegant molecular configuration that forms the boundary of every cell of every life-form on Earth) on the other. Science has provided us with an awesomely beautiful structure by which we organize, understand, and explain the natural world.

MIND AND BRAIN

It is not uncommon to hear scientists say things like "mind is what brain does" or "the brain is the hardware and the mind is the software" or even "mind and

brain are the same." What do such statements mean or imply? Abundant empirical evidence shows that mind (consciousness, experience) is intimately related to the physical structure and function of the body and, in particular, of the brain. The findings of nineteenth-century neurology documented correlation between the locations of brain lesions (revealed by postmortem examination) and behavioral changes exhibited by patients while they were alive. William James (1842–1910), a pioneer in the study of mind within modern science, pointed out the connection in his classic book *The Principles of Psychology*:

> If the nervous communication be cut off between the brain and other parts, the experiences of those other parts are non-existent for the mind. The eye is blind, the ear deaf, the hand insensible and motionless. And conversely, if the brain be injured, consciousness is abolished or altered, even although every other organ in the body be ready to play its normal part. (James, 1890b, Vol. 1, p. 4)

Far more is now appreciated about the correlations between mental experience and brain structure and function: damage to the brain is associated with specific changes in perceiving, thinking, and feeling; specific chemical substances (psychoactive drugs such as stimulants, sedatives, psychedelics, and so forth) that enter the brain are associated with specific effects on mind; and neural activity of the brain—as measured by imaging technologies such as electroencephalography, magnetoencephalography, functional magnetic resonance imaging, and positron emission tomography—is correlated in specific ways with perceptions, emotions, and other aspects of mental experience. That there is an intimate relationship between mind and body is unquestioned (Presti, 2016). However, how this relationship comes about—how it is that physical processes taking place among the atoms, molecules, cells, and electromagnetic fields of the brain and body relate to the subjective experiences of mind, the so-called mind–body problem—remains a deep mystery.

Throughout the twentieth century, science greatly expanded in its explanatory power. However, for much of that time and for the centuries preceding it, the study of consciousness was largely avoided. Many held that consciousness was too vague a topic to be addressed by the methods of science. Moreover, consciousness is inherently subjective, and science, it was said, is about the objective world. In particular, early twentieth-century experimental psychology, working to establish its place as a science within academia, promoted the notion that study of the human psyche ought to stick solely with investigation of objectively observable behaviors—behaviorism.[5] It would be roughly half a century before psyche (mind, consciousness, subjectivity, experience) was reintroduced into the domain of study in academic psychology, perhaps in the 1950s and 1960s via the newly forming interdisciplinary field of cognitive science. What, for the most part, has arisen since is a conception

of mind being perhaps reducible to computational processes—akin to computer algorithms—and ultimately emergent in some still completely unknown manner from the biology of the brain and body (biological naturalism). In this view, consciousness "is caused by brain processes and is itself a higher level feature of the brain" (Searle, 2000, p. 566; see also E. F. Kelly, 2007).

Confidence in this perspective has been augmented by the impressive explanatory power of molecular biology as it has developed in the decades following the discovery of the structure of DNA and the genetic code connecting sequences of DNA nucleotides to the amino acids from which proteins are constructed. What had been the great mystery of inheritance is now explained in precise molecular terms. These discoveries are regarded as pivotal events in the history of biology, catalyzing the formation of the new discipline of molecular biology and subsequent birthing of the biotechnology industry. The DNA structure and its ramifications were applauded in both scientific and popular culture as revealing something akin to "the secret of life."[6] This great success has likely contributed to the optimism that all phenomena of life—including consciousness—will ultimately yield to an understanding in terms of straightforward, albeit complex, underlying molecular properties.[7]

Physics and chemistry, and cellular and systems biology, underlie the discipline of neuroscience, and interest in this field is in part related to the idea that investigating the structure, function, and evolution of nervous systems and brains will help deepen our understanding of who we humans are as conscious living beings and how we are related to the rest of the physical universe. Thus, gradually, investigation of consciousness has become accepted as a legitimate domain of study within neuroscience. This acceptance was facilitated in part by the involvement of the eminent physicist-turned-biologist Francis Crick (1916–2004), codiscoverer of the double-helical structure of DNA and of the genetic code. Crick (1966) came to view consciousness as the great remaining mystery of biological science, and, in a paper coauthored in 1990 with his colleague Christof Koch, a program was outlined to explore consciousness by addressing its presumed neural basis:

> It is remarkable that most of the work in both cognitive science and the neurosciences makes no reference to consciousness (or "awareness"), especially as many would regard consciousness as the major puzzle confronting the neural view of the mind and indeed at the present time it appears deeply mysterious to many people. This attitude is partly a legacy of behaviorism and partly because most workers in these areas cannot see any useful way of approaching the problem. . . . We suggest that the time is now ripe for an attack on the neural basis of consciousness. Moreover, we believe that the problem of consciousness can, in the long run, be solved only by explanations at the neural level. (Crick & Koch, 1990, p. 263)

Since that time, a very large number of investigations into neural correlates of various aspects of awareness have been conducted (Koch, Massimini, Boly, & Tononi, 2016)—contributory to expanding knowledge about brain structure and function. Nonetheless, such a program, I maintain, while continuing to generate knowledge about neural correlates of mental experience, will not go beyond this—will not take us to a place of substantially expanded insight into the nature of the great mysteries of consciousness. Even Koch (2012), who continues to be a leading neuroscientist in the study of consciousness, has more recently come to something like this conclusion:

> I used to be a proponent of the idea of consciousness emerging out of complex nervous networks. . . . But over the years, my thinking has changed. Subjectivity is too radically different from anything physical for it to be an emergent phenomenon. . . . This point of view does come with a metaphysical cost many are unwilling to pay—the admission that experience, the interior perspective of a functioning brain, is something fundamentally different from the material thing causing it and that it can never be fully reduced to physical properties of the brain. . . . I believe that consciousness is a fundamental, an elementary, property of living matter. It can't be derived from anything else. (p. 119)

Implicitly adopted here is a form of panpsychic metaphysics, positing consciousness as a fundamental aspect of the world, not reducible to neural processes. Nonetheless, for most scientists interested in consciousness, work will continue to be accomplished solely via investigation of neural correlates, and in that lies what I view as a key obstruction in conceptualizing a science of consciousness more expansively. What is holding us there? Let's step back and look at the larger historical picture.

THE BACKSTORY OF CONTEMPORARY SCIENCE

Modern science began its development four centuries ago—during what has been called the first or original scientific revolution (Kuhn, 1957, 1962/1996)—in the time of Copernicus, Kepler, and Galileo. The idea developed that observed phenomena could be interpreted in terms of something akin to mechanical actions in a universe existing external to us, the observers. René Descartes (1596–1650) articulated the separation clearly, describing the domain of science to be that of the material world (*res extensa*), including the physical body. Mental phenomena (*res cogitans*)—thoughts, feelings, conscious awareness, subjective experience, the locus of the human soul (whatever that might mean)—were the domain of the spirit, falling outside the purview of physical science and perhaps within the purview of religion. This

split of mind from the world and from the body was done in part to protect the project of science from influence by religious institutions. At the time Descartes (a Frenchman living in the Netherlands and a devout Catholic) was writing on the subject, he was well aware that Galileo (another devout Catholic) was suffering censure at the hands of the Catholic Inquisition in Italy. Moreover, the early development of modern science was embedded within the culture of sixteenth- and seventeenth-century Europe, at the dawn of the so-called Age of Enlightenment. As Paul Marshall points out in Chapter 11 in this volume, this was "a transition as much social and political as intellectual."

Science enjoyed remarkable progress in the centuries that followed: astronomy, physics, chemistry, geology, and biology all flourished in their capacity to organize observations into beautifully coherent explanatory frameworks. Along the way, there have been a handful of major revolutionary turning points—occasions at which our frameworks of explanation dramatically shifted: heliocentric cosmology, wherein the sun replaced Earth as the center of our local cosmos; biological evolution, which holds that all of life on Earth is intimately related via processes of variation and selection taking place over vast stretches of time; relativity physics, in which the once static backdrop of space and time becomes malleable and subject to transformation by the relative motion of observers and the presence of mass and energy; and quantum physics, wherein the very fabric of physical reality becomes fuzzy and seemingly dependent on acts of observation, the interpretation of which continues to confound physicists a century after its development.

And there have been any number of smaller revolutions: recognition that Earth is very old, discoveries regarding the identity and stability of chemical elements and the conservation of matter, the introduction of electromagnetic fields in physics, plate tectonics and continental drift in geology, the molecular description of the exquisite information-coding capacities of living cells, and appreciation of the increasingly vast and dynamic nature of the universe.

In all this, as made explicit by Descartes, the focus has been on describing a physical world as it appears to us—treating the world as if it exists objectively, independent of our experience. Within this framework, there has developed an elegant narrative, an origin story and its developmental trajectory: the cosmos originating with a Big Bang; the coalescing of the fundamental units of matter as described in the Standard Model of particle physics; the formation of hydrogen and the synthesis of the chemical elements in evolving stars and exploding supernovae; the formation of planetary solar systems around a great many stars, together with the existence of a large number of planets exhibiting conditions conducive to the production and stability of specific molecules; and the coming together of certain of these molecules into structures able to utilize energy to maintain stability, store information, and

replicate. We call this latter phenomenon *life*. All this, of course, is believed to have taken billions of years. It is a beautiful narrative—and powerfully explanatory—down even to a great many details.

After several billion more years, at least here on Earth, life changes, evolves, by processes of variation and selection, and the great diversity of living organisms (and viruses) that we now observe is the result. We humans, along with our capacities, are understood as part of this grand explanatory scenario. Although some big mysteries remain—the most notable of which are the emergence of life from nonliving matter and the emergence of sentience within life—there is confidence among many (perhaps nearly all) scientists that a complete explanation of life and mind will be found within something similar to our present metaphysical framework and its corpus of physical laws.

WHERE DOES MIND FIT IN?

In the narrative just outlined, the presence and role of mind have been ignored. Mind is considered a latecomer to the story, a capacity for experience that seems to show up well along in the process of biological evolution, appearing mysteriously as some sort of "emergent property" of complex nervous systems. Indeed, it has worked well, it seems, to ignore mind, given that the focus of scientific endeavor has been stars, planets, rocks, oceans, matter and its transformations, atomic nuclei, plants, animals, and—at least for a while—even our own bodies. However, as soon as we attempt to use scientific methodology to investigate the nature of mind, the issue becomes apparent. How can we account for subjective (mental, conscious) experience in terms of objective physical matter and energetic interactions within the brain and body? How might mind have causal effects on matter, or is mind an epiphenomenon, lacking in causal impact? These are facets of the so-called mind–body problem. All who have reflected on the mind–body relationship have concluded that it presents, to say the least, a very difficult problem (Nagel, 1974). Indeed, how subjective experience is related to brain and body physiology has been termed the "hard problem of consciousness" (Chalmers, 1995). As philosopher Thomas Nagel (1974) stated nearly fifty years ago, "Consciousness is what makes the mind–body problem really intractable" (p. 435).

What can be said as to where the limitation, the intractability, is? I maintain that it is a worldview limitation—a limitation of vision, of the playing field, of an agreement we have made about what is possible—and *not* a limitation

of science writ large. In contemporary science, we operate within a metaphysical frame—a worldview—where all of what we call "reality" is conceived as constructed from matter and its interactions as described by mathematical laws of physics. This worldview has enjoyed enormous success in accounting for what we observe—and underlies all of our modern technology and our capacity to seemingly understand and even exert control over nature (e.g., space travel, genetic engineering, antibiotics, vaccines, nuclear energy).

Within this worldview—which in philosophy is called *physicalism* or *physical materialism* or *materialism*—there is a necessity that consciousness be explained in terms of the properties of matter. For what else is there? However, within such a metaphysical framework, the mind–body relationship will always be a problem—consciousness being irreducibly subjective and experiential, very different from matter conceived as existing objectively, not in any way dependent on our experience of it. This is precisely what makes the mind–body problem hard and, some (including me, as I have come to appreciate) would say, impossible, at least within a strictly physicalist framework. If we wish to evolve our science of consciousness, it is time to stop letting metaphysical *assumptions* block its expansion.

Science has flourished over the past several centuries by focusing on organizing observations of the world—the world as it appears to us. We notice patterns and regularities, and we develop frameworks through which we understand or explain the patterns and regularities as aspects of an external, objective, "real" world—a world that is assumed to exist independently of our awareness of it. While the existence of an objective world external to us is assumed and reified, we come to know this world only via our consciousness, our experience. *All we truly know is our experience*. And from this experience, we draw conclusions about the existence of an objective world. *World exists within mind*.

Moreover, we understand the nature of our body and brain, and who we are and our place in the world, as part of a long process of physical and biological evolution governed by physical laws—Big Bang, stars and galaxies, chemical elements, solar systems, life—and then in some still mysterious manner, an experiential aspect of being also arises. Consciousness. *Mind exists within world*.

World exists within mind. Mind exists within world. There is a mutual enfolding of mind and world. This interdependence, this dependent arising, appears inextricable. Appreciating and accepting this, how might we move forward in expanding a science of mind, now within a metaphysical framework which allows that mind may be ontologically more than a derivative of matter? Nothing need be given up except our reluctance to consider the nature of consciousness more expansively and empirically (see Marshall's discussion

of Broad's Basic Limiting Principles in Chapter 11 in this volume)—thereby allowing for the possibility of consciousness unbound.

One hundred and thirty years ago, William James (1892) addressed the future development of a science of mind:

> A genuine glimpse into what it is would be *the* scientific achievement, before which all past achievements would pale. But at present psychology is in the condition of physics before Galileo and the laws of motion, of chemistry before Lavoisier and the notion that mass is preserved in all reactions. The Galileo and the Lavoisier of psychology will be famous men indeed when they come, as come they some day surely will, or past successes are no index to the future. When they do come, however, the necessities of the case will make them "metaphysical." Meanwhile the best way in which we can facilitate their advent is to understand how great is the darkness in which we grope, and never to forget that the natural-science assumptions with which we started are provisional and revisable things. (p. 468)

James anticipated that developments in the scientific exploration of mind would eventually become truly revolutionary, eclipsing all prior scientific achievements in impact—and that the program would likely entail revision of metaphysical assumptions and the known physical laws. The next really big scientific revolution may encompass both mind science and physical science, interconnecting the two domains in new and unexpected ways. One hundred and thirty years ago, James anticipated a major scientific revolution in the development of a science of mind, and his words are all the more true today. How might we operationalize ways to contribute to the orchestration of this revolution?

MOVING FORWARD WITHIN AN EXPANDED FRAMEWORK

I offer here several suggestions of ways to turn the wheel in the direction of that revolution. In summary, (1) adopt a more expansive metaphysical frame, (2) radically expand empiricism, (3) connect with fundamental physics, (4) look at mind–body medicine and expectation (placebo) effects, (5) cultivate dialogue and collaboration with spiritual traditions.

1: Adopt a More Expansive Metaphysical Frame

Recognize that mind and world may be enfolded and interdependent in ways that our current metaphysical frame simply cannot accommodate. There is no reason to believe, as an axiomatic assumption, that they can be separated, as is the case in our contemporary physicalist metaphysics—wherein mind

is explicitly split off from investigation, following the lead of founders of modern science. While this assumption of separation has worked well as long as the focus of investigation has been the outer world, there is scant reason to assume it will continue to work when the focus of investigation is mind and perhaps even the body. Indeed, such a metaphysical assumption places severe limits on our science, and these limitations are precisely in the domains relevant to developing a science of consciousness. With new metaphysical openness, there are several places within contemporary science that may constitute signposts for how to move forward.

2: Radically Expand Empiricism

Take all empirical data having direct relevance to investigation of mind seriously—a radically expanded empiricism.[8] In 1890, the same year his epic *Principles of Psychology* saw publication, James authored an essay in *Scribner's Magazine* (1887–1939), a monthly popular intellectual journal that has been compared to the modern-day *Atlantic* and *Harper's* magazines. Much of James's essay reflects on the recently published doctoral thesis of Pierre Janet (another pioneer in expanding the scientific study of mind), and James made connections between Janet's observations emerging out of nonordinary states of consciousness associated with so-called hysterical disease states and the developing "psychical research" program of Frederic Myers,[9] Edmund Gurney, and others. These kinds of studies were all believed to reveal otherwise hidden aspects of mind. A further connection highlighted by James centered on this idea: to expand a science of mind, one must take seriously the occurrence of relevant empirically verifiable phenomena that do not fit within the standard accepted explanatory paradigm—the anomalies.[10] In James's (1890a) original prose,

> "The great field for new discoveries," said a scientific friend to me the other day, "is always the Unclassified Residuum." Round about the accredited and orderly facts of every science there ever floats a sort of dust-cloud of exceptional observations, of occurrences minute and irregular, which always proves less easy to attend to than ignore. The ideal of every science is that of a closed and completed system of truth. The charm of most sciences to their more passive disciples consists in their appearing, in fact, to wear just this ideal form . . . when a consistent and organized scheme of this sort has once been comprehended and assimilated, a different scheme is unimaginable. . . . Phenomena unclassified within the system are therefore paradoxical absurdities, and must be held untrue. When, moreover, as so often happens, the reports of them are vague and indirect, when they come as mere marvels and oddities rather than as things of serious moment, one neglects or denies them with the best of scientific consciences. . . . Anyone will renovate his science who will steadily

> look after the irregular phenomena. And when the science is renewed, its new formulas often have more of the voice of the exceptions in them than of what were supposed to be the rules. (p. 361)

James was thinking of historical scientists such as Galileo and Darwin, who struggled with trying to understand observations that didn't fit the prevailing paradigms of their day. Perhaps even more startling examples were soon to come: Einstein and the anomalies that presaged both the special and the general theories of relativity and the inexplicable observations within physics and chemistry that were rendered explainable only with the advent of quantum physics.

James (1890a) then draws specific attention to some of the topics of the present book:

> No part of the unclassified residuum has usually been treated with a more contemptuous scientific disregard than the mass of phenomena generally called *mystical*. Physiology will have nothing to do with them. Orthodox psychology turns its back on them. Medicine sweeps them out; or, at most, when in an anecdotal vein, records a few of them as "effects of the imagination," a phrase of mere dismissal whose meaning, in this connection, it is impossible to make precise. All the while, however, the phenomena are there, lying broadcast over the surface of history. (pp. 361–362)

He referred to the unclassified, perhaps mystical,[11] residuum as "wild facts" (p. 362). A few years later, he would even more poetically reference them as among the "wild beasts of the philosophical desert" (James, 1909, p. 330). Among other terms that have been applied to the wild facts in the time since James are "anomalous," "rogue," "irregular," "paranormal," "psychical," and "excluded." I never cease to be amazed at how insightful James was in articulating what was important—*essential*, actually—to expanding a science of mind. We would do well to simply take his words as a guide and pick up right where he left off more than a century ago.[12]

Thus, more study of what James categorized as the wild facts is essential. While often assumed to be infrequent in occurrence, it is likely they are common though frequently not attended to—broadcast over the surface of present history as well, and paranormal only by virtue of their being beyond our capacity to explain within our current framework of biophysical science (Cardeña, 2018; McLuhan, 2010/2019; Radin, 1997; Sheldrake, 2012; Wargo, 2018). Laboratory studies of phenomena like telepathy, clairvoyance, psychokinesis, and precognition are helpful and may be revealing, but the most robust examples of these phenomena tend to be spontaneous occurrences, often associated with death, near-death, and other emotionally powerful (often traumatic) events (the examples that opened this chapter; Kelly

et al., 2007; Kripal, 2019; Presti, 2018; Greyson, Chapter 1 in this volume; Tucker, Chapter 2 in this volume). Here we must take what is given by nature, for such emotionally evocative circumstances simply cannot be created in laboratories or other well-controlled settings.

Such a program also opens space to accommodate things known from our most sophisticated religious, spiritual, and mystical traditions. Stories of seemingly miraculous happenings of various sorts, blurred by fuzziness of historical report and conditioned by the cultures from which they emerged, may nonetheless be based on experiential fact (Grosso, 2016, 2020; Kripal, 2014). Transformational technologies drawn from shamanic cultures, contemplative practices such as are found in the mystical branches of many religious traditions (Tantric Buddhism and Hinduism, Islamic Sufism, Judaic Kabbalah, and so on), and powerful nonordinary states of consciousness associated with psychedelic plants, fungi, and molecules may provide ways of entering this territory in more predictable ways (Harner, 1980, 2013; Kelly & Locke, 1981/2009; Luke, 2020; Presti, 2017; Vieten et al., 2018).

With the reopening of clinical and basic scientific research with psychedelics (Lattin, 2017; Pollan, 2018), there will be opportunities to investigate how these powerful medicines reveal aspects of mind not generally accessible. Indeed, the word "psychedelic"—coined in 1956 by psychiatrist Humphry Osmond (1957)—means "mind revealing," specifically highlighting this property of these powerful medicines. In manifesting otherwise hidden aspects of mind, psychedelics offer doorways to other ways of knowing, ways that may provide access to wild facts. This is certainly how many indigenous shamans describe their work with psychedelically active plants and fungi (Furst, 1972; Harner, 1973; Schultes, Hofmann, & Rätsch, 1979/2001).

At present, scientific research with psychedelics is focused largely on quantitatively establishing their clinical efficacy in the treatment of depression, anxiety, addiction, and posttraumatic stress disorder; on using brain-imaging technologies to measure neural correlates of psychedelically occasioned states of consciousness; and on in vitro and nonhuman animal investigations of molecular and cellular actions in the nervous system. These latter types of neuroscientific investigations are things we know how to do. However, in studying only neural correlates and biochemical actions, we run the risk of engendering an illusion of understanding—a belief that we understand more about the actions of these powerful substances than we actually do. Our scientific investigation of psychedelics is very new; however, a great deal of knowledge about the use of these substances comes to us via far older and well-developed shamanic traditions having worldviews very different from our own—often worldviews within which the existence of what James called the wild facts is accepted.

William James spoke frequently about mystical experiences and other nonordinary states of consciousness as important sources of information regarding the nature of mind. His thinking in this domain was influenced by his experience with nitrous oxide, a psychotropic gas (having psychedelic properties) that came to his attention in the 1870s. James (1882) described his personal experience in an essay published in the philosophy journal *Mind*:

> The keynote of the experience is the tremendously exciting sense of an intense metaphysical illumination. Truth lies open to the view in depth beneath depth of almost blinding evidence. The mind sees all the logical relations of being with an apparent subtlety and instantaneity to which its normal consciousness offers no parallel. (p. 206)

Twenty years later, when James delivered the Gifford Lectures at the University of Edinburgh, his experiences with nitrous oxide remained of great importance. His comments at that time are among the most eloquent and frequently cited passages ever written about nonordinary states of consciousness:

> One conclusion was forced upon my mind at that time, and my impression of its truth has ever since remained unshaken. It is that our normal waking consciousness, rational consciousness as we call it, is but one special type of consciousness, while all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different. We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are there in all their completeness, definite types of mentality which probably somewhere have their application and adaptation. No account of the universe in its totality can be final which leaves these other forms of consciousness quite disregarded. How to regard them is the question,—for they are so discontinuous with ordinary consciousness. Yet they may determine attitudes though they cannot furnish formulas, and open a region though they fail to give a map. At any rate, they forbid a premature closing of our accounts with reality. (James, 1902, p. 388)

During James's lifetime, a schism developed between those (such as himself) who believed that investigation of anomalous experience was essential to a science of mind and other influential figures in American psychology who feared that associating the study of psychical phenomena (the wild facts) with the study of "normal" human behavior ("the accredited and orderly facts") would damage the acceptability of their field as a legitimate science within academic institutions (Sommer, 2012). The opposition in academia continues to this day and is often voiced with hostile emotional intensity—dogmatic dismissiveness from members of the scientific community and sometimes from the academic humanities as well (Kripal, 2019, and Chapter 10 in this volume; Leary, 2011).

What are some of these criticisms, and how can they be addressed? One is that the study of anomalous cognition (the wild facts) is not "real science"; rather, it is so-called pseudoscience, an endeavor that masquerades as science but does not adhere to normal standards of scientific investigation. Such criticisms generally come from individuals who have not taken the time to actually look into the parapsychological literature. If one does, one cannot help but be impressed by the extent and quality of this body of work. Case reports are often rich in detail, and they are documented and verified to the greatest degree possible. Parapsychological researchers may well be among the best experimentalists in human behavioral science "because they know that they must design more sophisticated, bias-proof studies than scientists in other fields in order to be believed" (Leary, 2011, p. 276). Statistical analyses, when possible to conduct, often equal or surpass in significance many results from investigations of conventionally accepted phenomena. Here is Jessica Utts (2016) in her presidential address to the American Statistical Association several years ago:

> The data in support of precognition and possibly other related phenomena are quite strong statistically, and would be widely accepted if they pertained to something more mundane. Yet, most scientists reject the possible reality of these abilities without ever looking at data! . . . I have asked the debunkers if there is any amount of data that could convince them, and they generally have responded by saying, "probably not." I ask them what original research they have read, and they mostly admit that they haven't read any! Now there is a definition of pseudoscience—basing conclusions on belief, rather than data! (p. 1379)

Another important factor behind the intensity of the distress evoked by investigation of anomalous cognition is that mechanisms by which such phenomena might come about are not in any way understood. Science is in part driven by the development of underlying theories that provide an appealing reductionistic narrative—an explanation or understanding—of observed phenomena. This appears to provide a sense of security—supporting a belief that we actually understand the nature of reality—and endowing that reality with a kind of solidity, stability, and predictability.

This is despite the fact that quantum physics, the most fundamental description of the physical world we have, paints a variegated, fuzzy, and indeterminate picture of an underlying reality—abstract energy fields coalescing into particles, fluctuating spacetime quantum foams, virtual particles appearing and disappearing from empty space filled with vacuum energy, and mathematical stringlike structures vibrating in spaces of ten or more dimensions. Physicists speculate and argue about what happened during the first trillionth of a second after the Big Bang and are comfortably intrigued by what appears

to be five times as much undetectable "dark matter" in the universe as there is ordinary matter from which we—and the world of our everyday experience—are made. Going to great lengths to look for the enigmatic dark matter, they wonder whether it is composed of hypothetical WIMPs (weakly interacting massive particles), axions, or some other as-yet-unimagined form of material particle—or whether something else completely different and unanticipated is going on. And then there is the mysterious accelerated expansion of the cosmos, which has led to accepting that 70 percent of the universe's energy content consists of so-called dark energy.

All these exemplify deep mysteries about the nature of physical reality, and they intrigue and engage the scientific community, resulting in innovative and collaborative investigational projects. Beautiful science. Thousands of scientists and billions of dollars are devoted to looking for signs of vibrating stringlike structures, virtual particles, Higgs bosons, WIMPs, and measures of the expansion of the cosmos. And yet all these phenomena—as fundamental as they are to our understanding of physical reality—are so far removed from the daily experience of most of humanity that discovery or nondiscovery related to any of these things means very little to most of the population. That is, whatever the uncertainty implied here about the nature of physical reality, it is too distant and abstract to be potentially upsetting. Furthermore, there is an implicit belief that eventually, with more investigation, science as we currently conduct it will figure it out—that it will be understandable in terms of a mathematically elegant physical theory. There is something about knowing that the mathematical framework is there or potentially there—even if it is beyond most people's (including most scientists') capacity to grasp—that provides something that feels like a comforting grip on reality, even though that reality may come down to mathematical abstractions describing fuzzy, nonlocalizable field-particle stringlike vibrations.

However, experiences of anomalous phenomena (telepathy, precognition, clairvoyance, synchronicities) fall within the realm of one's personal life. If the material universe is enfolded with mind, this idea comes very close to home—as close as it possibly could: our consciousness. This is not a distant abstraction, like dark matter, dark energy, and Higgs bosons. The wild facts really matter on a very personal level. They threaten our worldview. They shake us up. If one is able to expand one's worldview to accommodate such new data, this experience can be liberating. However, if one remains attached to and constrained by a seemingly inadequate and rigid physicalist framework, the result can be discomfort and fear. This may be one of the more salient factors in the resistance to and exclusion of the wild facts.

In our current physicalist worldview, there is no place for a mind that really matters—and there is fear in letting go into a worldview where mind

is a more central aspect of reality, where what we think may matter more than what we presently believe could be the case. Not that the fear isn't warranted, for this can be tricky and even dangerous terrain. Sorcery occurs within the world's shamanic traditions (Harner, 2013; Kelly & Locke, 1981/2009). And the disabling condition of psychosis may in some circumstances be conceptualized as inhabiting precisely that terrain in which the enfolding of mind and world is experienced, but experienced in a way that is destabilizing and detrimental to an individual's well-being. In such a psychosis, there is insufficient psychological grounding (lack of inherent stability stemming from a variety of factors: biological, developmental, and unknown)[13] to contain the experience, and distress and suffering are the result rather than freedom from distress. Sometimes psychosis is a lifelong condition limiting one's capacity to function in society, sometimes it is transient, and some transient cases can be conceptualized as *spiritual emergencies*—a shaking up of worldview accompanied by mental distress and behavioral dysfunction that is ultimately negotiated and resolved to yield degrees of liberation (including increases in measures of positive emotion, compassion, and connection with others) (Grof, 2019, especially Vol. 1, pp. 313–354; Grof & Grof, 1989; Lukoff, 2019).

As a society, we may need to undergo—or perhaps are already undergoing—a collective spiritual emergency to catalyze the transformation of the physicalist worldview to one that will allow for an expanded science of consciousness. There is something to be said for the idea that humanity is at present in the midst of a collective psychosis—a massive and disabling confusion concerning what is "real." The way forward is to cultivate the ground—our sources of stability and strength—and I argue that the framework and methods of science are, in fact, a central aspect of this ground. We only need expand our metaphysical perspective to better accommodate the study of mind.

3: Connect with Fundamental Physics

Much of our experience of the world in daily life is interpretable in terms of classical (Newtonian) physics. However, at the beginning of the twentieth century, classical physics proved unable to account for the observed interactions of electromagnetic radiation with matter as well as for the stability of atoms, and a new set of physical principles had to be developed. This new physics, quantum physics, is now universally accepted as the most comprehensive known description of the behavior of matter and energy. And quantum physics indicates that the behavior of matter and energy is very weird indeed. For example, a particle of matter, such as an electron, seemingly exists in many states and places simultaneously—a situation described by a quantum-mechanical

wave function, a mathematical construct assigning probabilities to various alternative possibilities. Nonetheless, we experience reality as actualities, not potentialities—electrons, protons, atoms, and molecules, for example, having actual locations in space and time. How this transition from potential to actual comes about is called the *measurement problem* in quantum physics. It is vigorously debated among physicists interested in the foundations of quantum physics—what physics has to say about the nature of an objective physical reality and our ability, through experiment and observation, to acquire knowledge about it. There are many opinions among physicists, some strongly held, but there is no consensus save for an appreciation that a deep mystery of interpretation exists. Furthermore, it is a compelling hypothesis that the participatory experiential role of the observer/experimenter *cannot* be removed from understanding what quantum physics says about the world (Presti, 2019; Rosenblum & Kuttner, 2006/2011; Stapp, 1993/2009, 2007/2011). That is, the measurement problem in quantum physics may be another sign—now appearing within a well-established domain of fundamental physics—indicating interdependent enfolding of mind and world.

The issue of measurement was appreciated early on in quantum physics and debated among some of the founders—particularly Einstein and Bohr. It required a few more years before Einstein and colleagues proposed an experiment that presented another profound weirdness—that a measurement performed on one member of a pair of particles that had previously interacted and then gone their separate ways will instantaneously impact the state of the other member of the pair, no matter how far distant the two particles may be when the measurement is made (Einstein, Podolsky, & Rosen, 1935). This phenomenon came to be called "entanglement," a term coined by Erwin Schrödinger (1935) a few months later. Several decades passed before it was possible to experimentally test for entanglement, but it has now been empirically established as another deeply weird aspect of quantum physics. Einstein's 1935 paper is now so frequently referenced that it is often abbreviated simply as EPR. Entanglement may represent another signpost marking the interdependent enfolding of mind and world.

There is also the widely discussed "incompleteness" of physics in that there is a disconnect between the two powerful theoretical frameworks of quantum physics and general relativity. For many decades, attempts have been made to bring them into correspondence with one another; yet so far this has not happened in a broadly accepted manner (Holt, 2006). Many of these attempts involve speculation about the existence of additional dimensions beyond the usual three dimensions of space and one dimension of time (Randall, 2005). Additional dimensions, if they are to be granted any physical reality, may offer the basis for an explanatory framework for all kinds of otherwise

inexplicable phenomena, including some or even all of the wild facts (Carr, 2008, 2015; Smythies, 1967, 2012).

And then there is the nature of time and how our concept of time is very much contingent on our experience of the world—our consciousness—and yet is also seen as a principal structural feature in physical theory. Here again, this situation likely represents another interdependent aspect of mind and world. Some physicists working at the frontier of their discipline are beginning to question the limitations of the present physical concept of time. Consider these statements by Roger Penrose:

> It is *only* consciousness that requires us to think in terms of a flowing time at all. According to relativity, one has just a static four-dimensional space-time, with no flowing about it. The space-time is just there and time flows no more than does space. It is only consciousness that seems to need the flow of time, so we should not be surprised if the relationship between consciousness and time is strange in other ways too. (Penrose, 1994, p. 384)

> It is my opinion that our present picture of physical reality, particularly in relation to the nature of *time*, is due for a grand shake up—even greater, perhaps, than that which has already been provided by present-day relativity and quantum mechanics. (Penrose, 1989, p. 371)

And here is Nobel laureate physicist Anthony Leggett (2020) addressing the future supplanting of quantum mechanics by a yet-to-be-developed more comprehensive theory:

> I do not know when; I do not know how; I just know that it [quantum mechanics] will break down. For what it is worth, my entirely untutored prejudice would be that the breakdown, when it comes, will in some way or another involve also a radical revision of our ideas concerning the one pillar of our "common sense" view of the world which has been left untouched by all the past major revolutions in physics—the notion that the past can affect the present and the present the future, but not vice versa. It may or may not also involve a radical revision of our current notions concerning the relation between "mind" and "matter." . . . In my view, the way forward is quite simply to think of more and more ingenious ways to probe the experimental predictions of quantum theory and push them closer and closer to our own experience. (pp. 29–30)

Perhaps only through a grand shaking up of the role of time in our most fundamental physical theories will the wild facts of precognition be accommodated (Rosenberg, Chapter 3 in this volume).

Physicists sometimes speak of achieving a "theory of everything." However, there is not going to be a "theory of everything" that does not include mind and consciousness. Quoting philosopher Thomas Nagel (2012),

> Certainly the mind–body problem is difficult enough that we should be suspicious of attempts to solve it with the concepts and methods developed to account for very different kinds of things [namely, an "external" and "objective" physical world]. Instead, we should expect theoretical progress in this area to require a major conceptual revolution at least as radical as relativity theory, the introduction of electromagnetic fields into physics—or the original scientific revolution itself [the era of Copernicus, Galileo, and Descartes], which, because of its built-in restrictions [to wit, the removal of subjectivity], can't result in a "theory of everything," but must be seen as a stage on the way to a more general form of understanding. (p. 42)

All this suggests that the next really big thing in physics will incorporate a central role for consciousness within the context of physical science. Just as we look to experiments in high-energy particle physics and to observations in cosmology and astrophysics to catalyze new ideas in fundamental physics, so might it be that investigations of the nature of mind (and perhaps even life) will lead to unexpected new ideas in physics. With respect to the study of life, this notion was advanced many years ago by physicists Niels Bohr (1933), Max Delbrück (1986), and Erwin Schrödinger (1944) and contributed to the emergence of the discipline of molecular biology. No revolutionary new physical theory has thus far been required, perhaps because the focus of investigation has continued to avoid the issue of mind and consciousness (Stent, 1968). Maybe now the time has come.

4: Explore Mind–Body Medicine and Expectation (Placebo) Effects

As stated, it has been possible to ignore mind and still achieve great scientific progress as long as the focus has been on an "outer world" described by astronomy, chemistry, geology, physics (at least prior to quantum physics), and biology (until we look closely at our own bodies). Even psychology has endeavored to split mind off, as the impressive elegance of cellular and molecular explanations has inclined many to imagine that a straightforward physicalist understanding of all of human behavior is forthcoming. Memory, emotion, perception, mathematical genius, mental illnesses, and consciousness as well—in the view of such subscribers—will be elegantly explained in terms of neurotransmitters, synaptic plasticity, neural circuits, oscillations of cerebral electrical activity, and the like.

However, once we begin to look closely and with open-minded empiricism at the impact of mind on body, there is a wealth of material that resists attempts of reduction to physical mechanisms. "Volition in general—whether of the sort that we take for granted (such as raising an arm) or rarer phenomena that more clearly challenge the currently prevailing view of mind–body rela-

tions (such as raising a blister)—remain a challenging mystery" (E. W. Kelly, 2007b, p. 237). Emily Kelly (2007b) in *Irreducible Mind* provides a detailed compendium and analysis of such psychophysical mysteries.

Consider the clinical practice of modern Western medicine, an endeavor that has developed in tandem with contemporary science in Europe over the past several centuries. Western medicine is based on our biophysical model of the world, now applied to our own bodies, and medical interventions have a logical coherence within that explanatory biophysical framework. Infection is demonstrably bad, so kill the source of the infection if possible. A malignant tumor appears to be the result of an invasive process alien to normal body function, so kill the tumor with chemotherapy or surgically remove it. Cardiac symptoms (including lack of exercise stamina, chest pain, and risk of heart attack) are associated with reduced blood supply to cardiac muscle resulting from atherosclerotic blockage in the coronary arteries, so surgically graft in new blood vessels or implant stents in the arteries to open them up, thereby increasing the flow of blood. Depressed mood, we are told, is related to hypofunction in brain neural pathways utilizing the neurotransmitter serotonin, so mood can be improved by administering antidepressant drugs (selective serotonin reuptake inhibitors) that block the reuptake of serotonin following its release, thereby increasing the availability of serotonin and countering the presumed hypofunction. And so on. In sum, there are compelling reductionist narratives underlying the understanding of these conditions and their associated clinical interventions.

Other cultures embracing differing worldviews, having radically differing explanatory frameworks, have developed different practices of clinical medicine. Chinese medicine, Tibetan medicine, and Indian Ayurvedic medicine are examples of systems differing from Western medicine. And there are many other traditional frameworks of healing in cultures around the world. A shaman from Africa or South America might say that "spirits" are involved in diseases and their treatments—sentient entities the presence of which cause physical and mental diseases and sentient entities that accomplish the healing. The practice of medicine—doctoring—is about knowing how to work with the spirits. In various Asian medical traditions, diseases are caused by imbalances in the flow of "subtle energy"—*qi* (Chinese), *lung* (Tibetan), *prāna* (Sanskrit)—through the body's "energy channels" and "energy centers" (Sanskrit *cakras*). Acupuncture, various yoga practices, and qigong, for example, are believed to be therapeutic due to their balancing effects on these subtle energies. Something shared among all these non-Western medical traditions is that health and illness are viewed in a strongly psychophysical manner. Mind is understood to very much influence bodily processes—there is no schism between body and mind. And there is frequently no way of understanding any

of the resulting interventions within our biomedical framework other than to attribute them to "effects of the imagination."

Importantly, I am not proposing here any sort of noncritical endorsement of so-called alternative medical systems. Any such system or practice may be approached and investigated with scientific rigor. Indeed, the U.S. National Institutes of Health has for more than twenty years maintained a center—the National Center for Complementary and Integrative Health—that promotes and funds basic science and clinical research of nonstandard medical ideas and interventions. Moreover, there is much of great value that comes from modern Western medicine. Antibiotics are very effective in reversing the course of many infections, resulting in relief from suffering and death. Vaccines derived from our knowledge of the body's immune system have been successful in countering the deadly impacts of multiple infectious diseases. Medications for conditions ranging from seizures to Parkinson's disease to hypertension have provided much relief from suffering and decreases in mortality—and much more. And at the same time, there remain many mysteries related to interactions of mind and body in the context of health and illness.

One such mystery is the so-called placebo effect. It is widely appreciated that hope, expectation, meaning, belief, and imagination affect how patients view their prospects of recovery from illness or injury. Beginning more than two centuries ago, the word "placebo" (Latin for "I shall please") was introduced into the Western medical lexicon to describe treatments given to appease a patient rather than because the treatments were based on a sound medical logic. Placebos often came to be associated with medical fraud and quackery, and their effectiveness was even believed to be inversely related to patient intelligence (de Craen, Kaptchuk, Tijssen, & Kleijnen, 1999). By the mid-twentieth century, it was appreciated that the therapeutic efficacy of placebo medicines in pharmacology is often quite substantial, sometimes equal to or greater than that of the "actual" medicine. Placebo effects thus came to be seen as a threat to the growing arena of science-based pharmaceutical medicine, and the randomized double-blind placebo-controlled clinical trial was introduced as the standard for demonstrating the efficacy of a putative "real" medicine beyond that of a placebo (Harrington, 2006, 2008; Kaptchuk, 1998).

All drugs may evoke some degree of placebo effect. For example, caffeine as a stimulant has a small placebo effect. Opioid analgesics can have moderate placebo effects. And contemporary pharmaceutical antidepressants have very large placebo effects, surpassing any specific effects of the drugs themselves (Kirsch, 2010; Kirsch et al., 2008). Even certain surgical procedures (only a few procedures have been investigated for this) and coronary artery interventions have robust placebo effects (Al-Lamee et al., 2018; Hamblin, 2017;

Probst et al., 2016). The impact of hope, expectation, meaning, belief, and imagination on physical aspects of the body can clearly be profound.

In the case of psychiatric medications, reliance on neurobiological research to reveal mechanisms of and interventions for mental distress has led to little progress in understanding mechanisms and designing better treatments. Furthermore, it has contributed to a pharmaceutical industry of design and marketing of medications to address mental distress based on poorly supported mechanistic narratives, with little to show for all this beyond billions of dollars in research expenditures (funded largely by taxpayers) and billions of dollars of corporate profit from the sale of pharmaceuticals to treat mental distress (Harrington, 2019). To quote Thomas Insel, who directed the U.S. National Institute for Mental Health (NIMH) from 2002 until 2015,

> I spent 13 years at NIMH really pushing on the neuroscience and genetics of mental disorders, and when I look back on that I realize that while I think I succeeded at getting lots of really cool papers published by cool scientists at fairly large costs—I think $20 billion—I don't think we moved the needle in reducing suicide, reducing hospitalizations, improving recovery for the tens of millions of people who have mental illness. I hold myself accountable for that. (quoted in Rogers, 2017)

Mental suffering continues unabated—in fact, it is ever increasing.

Similarly, the prevailing direction of research regarding placebo effects focuses on neural correlates, with the anticipation of explaining any and all therapeutic properties of placebos in terms of molecular, cellular, and neural systems processes in the brain (Ashar, Chang, & Wager, 2017; Benedetti, 2014). However, it may also be that this interface between mind and body offers another opportunity to explore the hypothesis that something more expansive is indicated here—that is, might this be another signpost pointing to an enfolding and interdependence of mind and world, where in this case world is our own body? In addition to contributing to expanding a science of mind, this situation would benefit our understanding of health and disease in ways that directly—and perhaps relatively quickly—contribute to relief of human suffering.

5: Cultivate Dialogue and Collaboration with Spiritual Traditions

A variety of spiritual and religious traditions pervade human societies, touching in one way or another every person on Earth. All such traditions (as far as I am aware) are practiced within worldviews that conceive of reality as more than merely matter. Some traditions have very well-developed philosophies

that reflect deeply on the nature of mind and world. There is frequently interest in many of the same issues as are addressed in this volume—namely, who are we as conscious living beings, and how do we conceive of ourselves in relation to the world? Moreover, for some of these traditions, interest extends to how insight into these questions might inform one's state of mind and one's behavior, ideally inclining behavior toward serving the greater good.

Spiritual and religious traditions have a powerful impact on humanity and the state of the planet. So, too, does the scientific tradition. Given this fact, it would be beneficial to explore the common ground of interest, especially so in that this common ground is directly related to mind. Importantly, this can be accomplished without advocating any uncritical adoption of existing religious worldviews or elements thereof (see also Kelly, "Background and Overview" in this volume).

While such dialogue and collaboration could potentially take place between science and any spiritual or religious tradition, I have personal familiarity with the ongoing conversation between Tibetan Buddhism and the scientific community—a conversation and collaboration cultivated by the Dalai Lama for nearly four decades (Dalai Lama, 2005; Presti, 2020). Buddhism has a rich history extending over more than two thousand years of investigation of the nature of mind and reality. The present engagement with science has been amplified by robust interest over the past two decades in the demonstrated benefits of contemplative practices (often pared down to basic mindfulness) on mental and physical health. Also of interest is the measurement of neural and other body-physiology correlates of such practices—what is going on in the brain during meditative contemplation and what sorts of changes in the structure and function of the brain might be seen after periods of sustained practice. These are things we know how to measure—the objective correlates of mental practices.

Contemplative practices often include highly refined ways of exploring subjective experience—an investigative process that has not been well developed in contemporary science with its focus on an objective world. An expanded science of consciousness will be well served by incorporating processes for exploring subjective experience with rigor (Wallace, 2000). And combining such investigations of mental experience with neurobiological measurements of correlated activity may provide particularly fertile territory (Goleman & Davidson, 2017; Varela, 1996; Varela & Shear, 1999).

That said, another hugely important aspect of the collaborative conversation between science and Buddhism is the engagement of very different perspectives on the relationship of mind and world. In some prominent schools of Buddhist philosophy, mind and world are seen as enfolded, as dependently arising—an excellent framework within which to expand a science of con-

sciousness. Thus, the project of this volume may be served by continued cultivation and deepening of the collaborative conversation with Buddhism already under way (Hasenkamp & White, 2017; Presti, 2018; Wallace, 2003). However, thus far, this dialogue has avoided coming to grips with the profound differences between Buddhist metaphysics and Western physicalism. As Edward Kelly and I have emphasized, it is precisely at those points of conflict that the best opportunities for theoretical progress lie waiting, still mostly untouched (Presti, 2018, pp. xiii–xxii).

CODA

I am a scientist and an educator. My primary audience is the scientific community and the public collective (including university students), who, although they may not be professional scientists, nonetheless have interest in science and perhaps take seriously the perspectives of science in guiding one's actions in the world. The value of the scientific method and respect for its findings is especially important at the present time as we collectively struggle with how to address issues like anthropogenic climate change, the impact of diet on health, and viral pandemics. Problems are further exacerbated these days by virtue of our living in a world that has unprecedented informational connectivity and at the same time is awash with attention-grabbing and often misleading advertising and other forms of widely disseminated misinformation.

The mission, as I would like to frame it, is to develop a science that can investigate—in an expanded empirical manner—all the sources and mechanisms by which mind experiences the world. A central message of this series of volumes is that a variety of metaphysical frameworks exist that can accommodate such an expanded science. None of these frameworks serve to "explain" consciousness, but they all give us a stage on which to push the empirical science forward into new territory—terrain assumed not to exist within our currently more restricted set of metaphysical assumptions.[14] It's rather like ancient beliefs about Earth's geography—there was a time when it was not considered possible that Earth might have a spherical shape, that the oceans might be finite in extent, and that sailing west from Europe might lead to Asia (let alone to other inhabited continents). The playing field of ideas about future knowledge and possibility was simply too restricted. This is where we are today in relation to the impasse around expanding a science of consciousness. Thus, let us take empiricism as our guide and with a sense of adventure set forth to investigate and discover.

The newly adopted metaphysics would appreciate that mind and world are deeply enfolded and interdependent. We deduce the presence of a material

world via our consciousness, and we place our consciousness—and the brain and body through which we experience—within this world. As Max Velmans states in Chapter 5 in this volume, "Through the evolution of matter, consciousness is given *form*. And through consciousness, the universe is *real-ized*."

This chapter opened with a quotation from Max Planck (1933), one of the founders of quantum physics: "Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of nature and therefore part of the mystery that we are trying to solve" (p. 217). Planck's view of science was correct in that it was and still largely is carried out as a set of practices designed to investigate and understand an objective world "out there," independent of our mind. Planck appears to appreciate the difficulty posed by turning those methods toward studying the human mind and its irreducible subjectivity. Quantum physics had already provided indications of weirdness associated with acts of measurement—a capacity to change the physical reality of the world through observing it. And 1933 was still several years before EPR would introduce entanglement and a new domain of weirdness.

As to whether science will ever "solve" the ultimate mystery of nature, I offer no speculation. However, I do maintain that by shifting our metaphysical framework, appreciating that the subjectivity of experience can be investigated with rigor, and letting an expanded empiricism be our guide, great progress can be accomplished in deepening our insights into mind and how we as conscious living beings are related to the world and cosmos.

All our science to date points to a deeper and more nuanced connectivity and interdependence in the biophysical world. All life on Earth not only is deeply interconnected but also interacts with other planetary processes—ocean dynamics, climate, and geology. Plants, even of differing species, communicate with one another via airborne molecules, root systems, and vast underground mycorrhizal networks. The symbiotic relationship we have with trillions of microorganisms living on and within our bodies far surpasses anything previously imagined. There is deep interconnectivity and interdependence everywhere we look.

Nearly two thousand years ago, Nāgārjuna, an influential architect of Mahāyāna Buddhist philosophy, stated, "There does not exist anything that is not dependently arisen" (Garfield, 1995, p. 69; 2015, p. 64). In other words, everything is deeply interconnected and interdependent. Everything depends on everything else. And Nāgārjuna was not referring only to what we call the physical world—the objects of our perception. He was referring to consciousness as well.[15]

This idea is in line with the contemporary data, viewed now within an expanded metaphysical framework and from an expanded empirical perspective. That is, consciousness, though manifest through personal experience, is inter-

dependently connected with everything—truly, consciousness unbound. The task now is to see where such an expanded perspective takes us empirically. And all this is completely in accord with the historical trajectory of modern science as it has evolved over the centuries to accommodate new domains of investigation. A scientific revolution is nigh.

How we choose to define and understand mind has a powerful impact on our lives at every level. It influences our biomedical science—and how we relate to our bodies in health and disease. It influences our relationship with technology and the environment, our concepts of past and future, and our connections with ancestors and descendants. Questions about the nature of mind naturally evoke notions of spirit, soul, and even God and the many different definitions, connotations, and emotional reactions people have in relation to these terms. Investigation of who we are and how we relate to the rest of the universe can bring one into what is generally considered the territory of religion and, some maintain, outside the domain of science. This can be unsettling—to individuals in either camp. Indeed, this very concern was a major factor for why mind was removed from the playing field of scientific investigation in Europe several centuries ago. Nonetheless, questions regarding the nature of reality and of mind—who we are and how we understand our place in the world—*are* of interest both to science and to religious and spiritual traditions. This situation can provide opportunities for dialogue that is increasingly essential in the contemporary world—a world in which the speed and intensity of dissemination of everything from information to technology to viral infection make the impact of our actions (or nonactions) all the more powerful.

That we may be poised for truly revolutionary developments in a science of mind is exciting to contemplate. And that these developments may have a profound impact on the way we navigate the world individually and collectively is especially exciting. May the revolution come about, and may it come about in such a manner that humanity benefits collectively—and sooner rather than later.

NOTES

1. Planck (1933, p. 217). Max Planck (1858–1947) was one of the architects of quantum physics and the first to put forth (in 1900) the notion of what came to be called energy quanta.

2. Garfield (1995, p. 69; 2015, p. 64). Nāgārjuna (ca. second century CE) is considered the founder of the Madhyamaka school of Mahāyāna Buddhist philosophy. Quoted from Nāgārjuna's *Mūlamadhyamakakārikā*, 24.19, translated by J. L. Garfield.

3. Some branches of science, such as chemistry and physics, are very experimentally oriented. Others, such as astronomy and geology, are mainly observational.

4. Defining mind and consciousness can be tricky, as various authors use them in different ways and often in service of promoting particular philosophical stances. I am adopting, at least for the purposes of getting a scientific discussion under way, definitions that I believe would be found acceptable to the majority of folks within the biophysical-psychological scientific community. However, as will become clear in this chapter, I also believe that the physicalist perspective currently embraced by this community cannot undergird the expansion of a science of consciousness. Thus, I have no wish to reify these definitions. For consciousness, like Paul Marshall (Chapter 11 in this volume), I am comfortable with a definition that is synonymous with experience, subjectivity, phenomenal feel, sentience, and what it is like to be. However, a definition for mind remains a work in progress for me. How much more expansive might mind be than what is available—or even potentially available—to phenomenal consciousness? This is addressed by Max Velmans (Chapter 5 in this volume), by Roderick Main (Chapter 4 in this volume) regarding Carl Jung, by Paul Marshall in his comprehensive survey of the metaphysical landscape (Chapter 11 in this volume), and also by Kelly et al. (2007) in *Irreducible Mind*, especially with respect to the ideas of Frederic Myers and William James. Importantly, these additional definitional considerations don't impact the main thrust of the present chapter in the least.

5. The behaviorist agenda did away with introspection and other ways of investigating subjectivity—considering it no longer helpful or proper to discuss things such as consciousness, mental imagery, thoughts, feelings, or anything else having to do with experience. The vision was for a psychology concerned only with the study of stimuli and responses—a discipline that would become "a purely objective experimental branch of natural science" (Watson, 1913, p. 158).

6. In *The Double Helix*, James Watson's (1968) candid autobiographical description of the discovery of the structure of DNA, codiscoverer Watson refers multiple times to the DNA structure as the "secret of life."

7. This notion has been called "promissory materialism" by philosopher of science Karl Popper (1902–1994), and the concept was further elaborated in collaboration with Nobel laureate neurobiologist John Eccles (1903–1997). According to Popper, promissory materialism "offers us the promise of a better world, a world in which mental terms will have disappeared from our language, and in which materialism will be victorious. The victory is to come about as follows. With the progress of brain research, the language of the physiologists is likely to penetrate more and more into ordinary language and to change our picture of the universe, including that of common sense. So we shall be talking less and less about experiences, perceptions, thoughts, beliefs, purposes and aims; and more and more about brain processes, about dispositions to behave, and about overt behaviour. In this way, mentalist language will go out of fashion and be used only in historical reports, or metaphorically, or ironically. When this stage has been reached, mentalism will be stone dead, and the problem of mind and its relation to the body will have solved itself" (Popper & Eccles, 1977, p. 97). Several years later, Eccles stated that "we regard promissory materialism as a superstition without a rational foundation. The more we discover about the brain, the more clearly do we distinguish between the brain events and the mental phenomena, and the more wonderful do both the brain events and the mental phenomena become. Promissory materialism is simply a religious belief held by dogmatic materialists.

. . . It has all the features of a messianic prophecy—the promise of a future freed of all problems, a kind of Nirvana for our unfortunate successors. . . . In contrast the true scientific attitude as described by Popper is that scientific problems are unending in providing challenges to attain an ever wider and deeper understanding of nature and of ourselves" (Eccles & Robinson, 1984, pp. 35–36).

8. This radical expansion of empiricism is not what James termed late in his career as the doctrine of "radical empiricism," although it is easy to conflate these notions.

9. For an in-depth discussion of the visionary contributions of Frederic Myers (1843–1901) to scientific psychology, see E. W. Kelly (2007a).

10. Note that James's insights were many years before Thomas Kuhn (1922–1996) in his classic book *The Structure of Scientific Revolutions*, first published in 1962, drew attention to the important role of anomalies in catalyzing revolutionary reconfigurations (paradigm shifts) of scientific knowledge. Kuhn (1962/1996) characterized anomalies as phenomena "whose characteristic feature is their stubborn refusal to be assimilated to existing paradigms" (p. 97).

11. James uses "mystical" very broadly in this essay, referencing "divinations, inspirations, demoniacal possessions, apparitions, trances, ecstasies, miraculous healings and productions of disease," occult powers, mediumship, and various charismata. More recent usage of the term is often not so broadly inclusive.

12. This message runs throughout previous volumes in this series as well, especially *Irreducible Mind* (Kelly et al., 2007).

13. I use "grounding" to mean foundation, stability, strength, rootedness, solidity, or equanimity—analogous to connection to the palpable firmness of the literal ground of Earth. In shamanic practices, reference is made to grounding rituals and grounding plant medicines, such as tobacco. In Ayurvedic medicine, there are grounding foods and plant medicines.

14. Such metaphysical assumptions are deeply embedded in culture and largely out of our awareness. Most scientists believe they conduct their work without any bias, simply open to the data the world presents. However, such is not the case. Metaphysical assumptions are pervasive and severely constrain the playing field of scientific investigation. And physicalism is not the only such cultural assumption. At the time of the writing of this chapter—as the world is immersed in a coronavirus pandemic—the United States is additionally embroiled in long-overdue activities bringing increased awareness to the extent of systemic racism and oppression at both conscious and unconscious levels. It is worth noting that the reification of physicalism and the notion of objective reality emerged from "European enlightenment epistemology" with its "presumed neutrality"; this is the same "European enlightenment epistemology" that reified assumptions about white skin versus dark skin—validating and elevating "positivistic, White Eurocentric knowledge over non-White, Indigenous, and non-European knowledges" (Sensoy & DiAngelo, 2017, p. 561).

15. Nāgārjuna and the Madhyamaka school of Mahāyāna Buddhism equate interdependence or dependent arising with the notion of "emptiness"—a concept often misunderstood. Emptiness is not nothingness, but rather the absence of an intrinsic nature. "Because all phenomena are dependently arisen, they lack, or are empty of, an intrinsic nature characterized by independence and autonomy" (Buswell & Lopez, 2014, p. 872). The notion of the emptiness of all phenomena was further

explicated several centuries after Nāgārjuna in the famous *Heart Sutra* (Buswell & Lopez, 2014, p. 657). A new translation of the *Heart Sutra* accompanied by commentaries on the text—emphasizing emptiness as meaning profound interdependence—is by Thich Nhat Hanh (2017).

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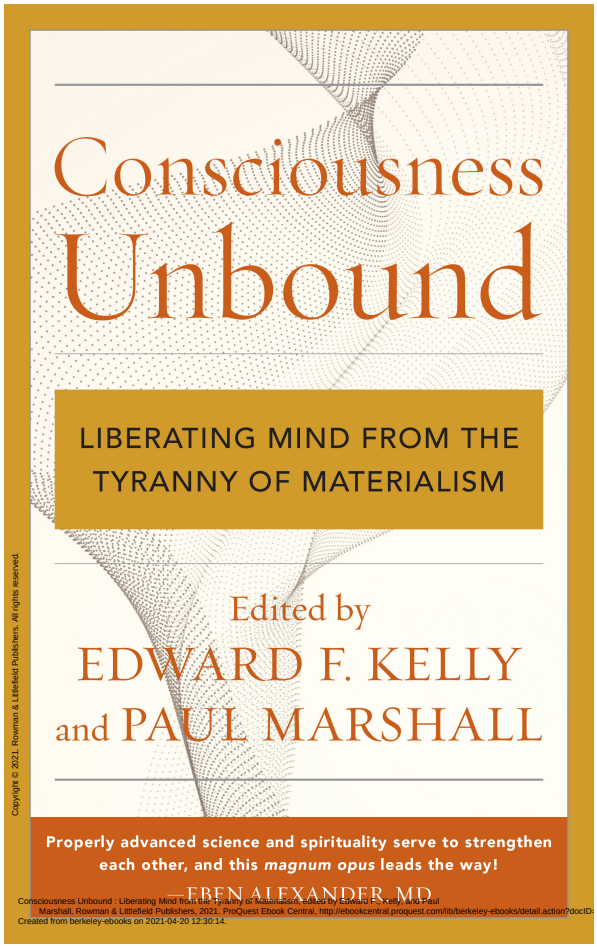

Published by Rowman & Littlefield
An imprint of The Rowman & Littlefield Publishing Group, Inc.
4501 Forbes Boulevard, Suite 200, Lanham, Maryland 20706
www.rowman.com

6 Tinworth Street, London SE11 5AL, United Kingdom

British Library Cataloguing in Publication Information Available

Library of Congress Cataloging-in-Publication Data

Names: Kelly, Edward F., editor. | Marshall, Paul (Paul David), editor.
Title: Consciousness unbound : liberating mind from the tyranny of materialism / edited by Edward F. Kelly and Paul Marshall.
Description: Lanham : Rowman & Littlefield, [2021] | Includes bibliographical references and index. | Summary: "Building on the groundbreaking research of previous books, Edward Kelly and Paul Marshall gather a cohort of leading scholars to address the most recent advances in the psychology of consciousness"— Provided by publisher.
Identifiers: LCCN 2020047783 (print) | LCCN 2020047784 (ebook) | ISBN 9781538139424 (cloth) | ISBN 9781538139431 (epub)
Subjects: LCSH: Consciousness.
Classification: LCC BF311 .C6565 2021 (print) | LCC BF311 (ebook) | DDC 153—dc23
LC record available at https://lccn.loc.gov/2020047783
LC ebook record available at https://lccn.loc.gov/2020047784

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI/NISO Z39.48-1992.

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