

To Be or Not to Be! A ‘Paraphysics’ for the New Millennium

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Abstract—In 1974, Brendan O’Regan and James Beal declared the emergence of a new field of science, paraphysics. The decade of the 1970s also saw the first publication of the *Journal of Paraphysics*; increasing publications and interest in parapsychology and physics of the paranormal; the entrance of physicists into parapsychology in larger numbers than ever before, resulting in new avenues of research; and the development of a secret government program for the study and application of paranormal abilities. These and related developments seemed to represent the culmination of a long evolutionary process by which normal physics was slowly coming to terms with paranormal physical phenomena; however, the acceptance of paraphysics as a legitimate field of science is yet to be accomplished nearly three decades later. In fact, at the end of the second millennium use of the word *paraphysics* has declined in spite of recent developments concerning the scientific verification of psi phenomena and a new mindset in parapsychology.

Present ambiguities in the status of paraphysics can only be understood against the background of its initial development and the continuing evolution of physics itself. As a branch of theoretical physics, paraphysics is subject to all of the subtle changes of attitude within the scientific community at large as well as individual changes within both physics and parapsychology. The same evolutionary factors which have changed the landscape of modern physics since the 1960s, spawned O’Regan’s and Beal’s announcement and subsequently pushed the birth of paraphysics into the background of science, have now opened new avenues of research, which once again demonstrates the need to establish paraphysics as a legitimate scientific endeavor. Quite frankly, there is now reason to believe that science has at last matured to a level of understanding of nature which will allow physicists and other scholars to openly and seriously discuss the role and validity of paraphysics.

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Introduction

Although parapsychology has been considered a legitimate science for several decades, the same cannot be said for paraphysics even though they share a common history and goals. Both terms originated during the late nineteenth century and both disciplines have followed a common evolutionary path. Ac-

ording to James B. Beal, the term “paraphysics” was coined by the German scientist Baron von Schrenk-Notzing (Beal, 1974, p. 426), but Pierre Macias claims that both terms were first used by Max Dessoir in 1889 (Macias, 2000, p. 1). Whichever the case might be, the term paraphysics has been both abused and misused over the years. Paraphysics has at times been no more than a dumping ground for any phenomena, real or imagined, that may seem outside the realm of normal science. Until recently, the word paraphysics has seldom been used within its proper scientific context and even today lacks a coherent definition.

In spite of these facts, both Beal and Brendan O’Regan declared the emergence of the new natural science of paraphysics in 1974, a few years after the scientific community accepted parapsychology as a true science. Yet, paraphysics has still not emerged as an independent field of scientific inquiry. Their announcement was perhaps premature. What they really foresaw was the beginning of the final stage in the evolutionary process toward a separate science of paraphysics which is much greater than just a physics of psi and the paranormal. It now seems that a true paraphysics is finally emerging from the chaos at the advancing edge of scientific inquiry.

Similarities in the evolution of both scientific studies of the paranormal, or more specifically ‘psi’ as the phenomena associated with parapsychology are often called, demonstrate a common historical development which has closely paralleled advances in physics. Parapsychology emerged before paraphysics because paraphysics has a broader as well as more fundamental (and therefore more difficulty to define) basis in physical reality. Within this context, there have been four distinct periods of scientific interest in psi phenomena. The first ‘pre-scientific’ period lasted from ancient times until 1850. The second period, the ‘early scientific’ from 1850 to 1930, incorporated the era of modern spiritualism. The next or ‘middle scientific’ period lasted from 1930 to 1970 and ended with the formal acceptance of parapsychology by the scientific community. During this time, parapsychology came of age, but not paraphysics. And finally, the ‘late scientific’ period, during which paraphysics began its own evolutionary path of separation from parapsychology, opened in 1970.

In essence, the rise of parapsychology and paraphysics can be seen as a winnowing process. Progress in scientific study of the paranormal has been characterized by the separation of superstition, supernatural and the occult from what is truly scientific and based upon fact. In this sense, the evolution of the parasciences is not all that different from the evolution of other fields of normal science which have also emerged from earlier superstitions and pseudo-scientific practices. The central problem has always been how to determine the criteria for deciding which phenomena or events are real and factual as opposed to those that are imagined. Within this context, theories of psi in general, and physical theories of psi in particular, have reflected the physics and physical problems of any given era of time, because the criteria for deciding

the factuality of events have depended upon the scientific attitudes of that period. Therefore, the physics of each era, as portrayed in the accepted physical laws at that time, has been instrumental in drawing the lines of demarcation between the paranormal and normal in science.

The 'Pre-Scientific' Period

The pre-scientific period incorporates everything from the beginning of recorded history and science, through the First Scientific Revolution to 1850. It is characterized by the lack of any formal science of the paranormal. There were only misguided speculations which attempted to relate physics to the paranormal, supernatural and occult in a very naive manner. No more than this could have been expected since this same period of history was marked by the establishment and expansion of Newtonian physics itself. The pre-scientific period was a time of discovery and application within the early Newtonian paradigm. The Newtonian laws of motion and gravitation carved out a new science of nature from the background of natural observable phenomena.

Chemistry did not emerge as a true science until about 1790, the first use of the battery which advanced electrical and magnetic research came only in 1800, Dalton's atom was first proposed about 1812, early electromagnetic theory was first developed after 1820 and it was not until the 1840s that thermodynamics emerged from the research of James Joule and others. The emergence of thermodynamics split physics from the rest of natural philosophy, at least in the form that we recognize physics today. The era before 1850 was obviously a time of flux and emergence in normal physics following upon the successes of the Newtonian worldview and ever-increasing applications of Newtonian principles. This emergence left many suspected but unverified phenomena without a normal scientific basis.

However, a few examples of early theories of the paranormal do stand out as significant. In 1671, Henry More published the *Enchiridion Metaphysicum* in which he developed the first hyperspatial or hyperdimensional theory of the paranormal. His accomplishment is all the more astonishing from the historical perspective because his book came more than a century before the development of non-Euclidean geometries and more than a decade before Newton's publication of the *Principia* (1687). Even Newton bowed to the pressure of his peers and added a 'General Scholium' to the second edition of the *Principia*. He equated his new concept of an absolute space to "the sensorium of God," establishing a precedent for both the supernatural and paranormal within science. More than a century later, Franz Anton Mesmer moved to pre-revolutionary Paris and developed a system of healing based upon his conceptions of 'animal magnetism' and 'vitalistic fluids.' At that time, electricity and magnetism were little understood by science, allowing many pseudo-scientific claims to be made regarding their properties. As the science of electricity and magnetism evolved within the Newtonian paradigm, Mesmerism lost its conceptual basis of 'animal magnetism' and became more occult. Mesmerism

then became associated with telepathy and other paranormal phenomena (Darnton, 1968, p. 156).

The examples presented by More and Mesmer are far more important historically than it may at first seem, because they were early precursors to two of the main classes of physical theories of psi: the hyperspatial theories and electromagnetic theories. They also formed the foundations of later practices and concepts which evolved into the modern spiritualism movement. According to Frank Podmore, an important member of the Society for Psychical Research (the SPR) although not a scientist by training, the roots of modern spiritualism could be found in witchcraft and the "animal magnetism cult" which began in Mesmerism (Podmore, 1963, p. 34). Although his explanation was far too simple by modern historical standards, it is true that these were important factors in the evolution of modern spiritualism. However, the occult practices of groups such as the Swedenborgians and phrenologists cannot be dismissed as contributing to the evolution of modern spiritualism. It would be more accurate to say that science as a whole and physics in particular had become so successful by 1850 and reached so far toward a basic understanding of reality that science once again felt it worthwhile to consider questions regarding the relationship between mind and matter as well as the supernatural and the occult. By 1850, science began to reconsider and redefine the criteria by which phenomena were considered either normal or paranormal.

With the recent development of thermodynamics and electromagnetic theory, scientists and scholars began to think that every possible and even imaginable phenomenon would eventually fall under the spell of the Newtonian worldview. Simultaneously, common people began to take an open interest in the science that was so overwhelmingly affecting their everyday lives. The industrial revolution affected all of society, and for all of its social evils industrialization did serve to increase education and acquaint people with technology. The rapid advances in science and technology which influenced society and everyday existence placed a great deal of pressure on traditional religions which were slow to adapt to the new cultural and scientific realities. So, many people sought answers to spiritual questions outside of the normal framework of established religious institutions. The public's attitudes toward religion were also influenced by the development of the theory of uniformitarianism in geology, which directly challenged the literal interpretation of the *Bible*.

On the other hand, the worldview of the common people was also influenced by occult practices such as phrenology, Mesmerism and some older forms of the occult, such as witchcraft. These factors all came together during the middle years of the nineteenth century in the cultural and social movement that has become known as 'modern spiritualism.' Although modern spiritualism was primarily a movement of the common people, scientists could not escape the cultural influences from which it derived. Consequently, some thinkers within the scientific community began to speculate that the relationship between mind and matter which had long been aloof from scientific in-

quiry was indeed reducible as a result of the evolutionary progress of ideas both inside and outside of the scientific and academic communities.

The 'Early Scientific' Period

Michael Faraday was one of the first noteworthy scientists to respond to the occult excesses of the modern spiritualism movement. In the early 1850s, toward the end of his career, he challenged the mediums of his day and found that their tricks were just that, tricks rather than real phenomena demonstrating the human survival of death. In a very real sense, Faraday's investigations represented the first recognition of a possible scientific basis for paranormal and psychic phenomena. In other words, science began to pay attention to the modern spiritualist movement. At first, it would seem that scientific issues were being raised by the spiritualists, but it would be truer to say that issues that bordered on areas within the scientific domain were being raised by non-scientists and this was worrisome to the scientific and scholarly communities. This concern became so serious that the SPR was founded in 1882 to deal with questions and concerns stemming from the modern spiritualism movement.

The same historical factors led to publication of *The Unseen Universe* in 1875 by the physicists Peter G. Tait and Balfour Stewart. In 1859, Charles Darwin published his *Origin of Species*, informing the world of the theory of evolution. His theory further eroded public confidence in religion and the traditional religious establishment. Darwin's book and theory also added to the scientific and philosophical pressures regarding the place of mankind and the human mind in the universe which were already a growing concern in philosophical corners. Tait and Stewart (1875) addressed these concerns outside of modern spiritualism by attempting to account for life after death from the scientific principle of continuity and thermodynamic laws. These concerns showed up in still other corners of the scientific world as demonstrated by the renewed interest of scientists and scholars in the concepts of mind and consciousness.

The growing success of physics and its overwhelming influence on other areas of science and society raised questions whether physical laws were inherent in our physical world or were merely codifications of how humans perceived the physical world. Scientists such as Ernst Mach (1886) and Karl Pearson (1892) argued that the known laws of nature were products of the human mind and were not part of physical reality itself. Their publications demonstrate the changing attitude of science toward the relationship between nature and science, as well as a new concern for the relationship between the recently evolved (in geological terms) human mind and the physical environment in which it evolved and the philosophical separation of mind and matter in science. These and similar philosophical concerns were raised against a scientific background which had been overwhelmed by the newly developed theory of evolution, while evolution theory raised further concerns regarding the evolutionary development of the human mind.

Physics also had an important presence within the SPR itself, where issues more directly concerning the spiritualism movement were addressed and psychic phenomena were scientifically investigated and studied. Strangely enough, no theoretical differentiation was made between the physical and mental aspects of psychic phenomena because neither psychology nor psychiatry had yet emerged as separate fields of study with their own methods of research. Psychology or any other science of the mental aspects of the human condition were part and parcel of philosophy in general, if not the philosophy of science. Questions raised by Mach and Pearson were actually quite important in the early evolution of psychology, as were questions regarding psychic phenomena. In America, William James helped to found the American Society of Psychical Research, and his work would later become instrumental in the foundation of the science of psychology. In the end, physicists contributed directly to the spiritualism debate and study of the paranormal at the same level as scientists in other fields, but no valid theories of psi were developed.

Physical theories of psi ranged from simple private speculations which reflected individual prejudices and predilections within physics to more speculative hypotheses which were openly publicized and criticized. William Barrett believed that electromagnetism would eventually be used to explain the paranormal (Oppenheim, 1988, p. 357), William Crookes thought that an unknown force unexplainable by physics would be necessary to explain the phenomena (Oppenheim, 1988, pp. 349–350) and Sir Oliver Lodge postulated that an etheric body existed between the living body and a person's spirit (Oppenheim, 1988, pp. 384–485). All of these men were renowned and respected physicists and members of the SPR. On the other hand, J. K. F. Zoellner of Germany developed a four-dimensional theory of the paranormal (Zoellner, 1878). He believed that the magical tricks of the American showman Henry Slade were clear evidence of spirits existing in a fourth dimension of space. However, Slade's tricks were eventually proven to be faked and Zoellner's career was ruined.

By 1897, the modern spiritualism movement was already beginning to wane when Podmore concluded that mental or psychic phenomena such as telepathy had some scientific validity, while life after death, mediumship and contacting the "spirits" had not been demonstrated or verified by science (Podmore, 1897, pp. 266–267). His assessment came on the very eve of the Second Scientific Revolution. After 1900, the birth of quantum physics and relativity again changed the playing field upon which a science of the paranormal and psi were to be investigated. But the quantum theory and relativity were themselves developing over the next three decades, so they did not directly influence the study of psi until their own period of growth and immediate application subsided.

On the other hand, quantum theory and relativity evolved from some of the same historical forces which affected the earlier development of modern spiritualism. They combined with the successes of recent theoretical work in

physics, such as electromagnetism and Newtonian physics. In essence, electromagnetic theory came into conflict with Newtonian physics in several cases and precipitated a crisis situation in science. However, the opposite view can also be argued. The successes of science precipitated radical changes in science by identifying new areas of research and phenomena that defied explanation by the older paradigm, and thus pointed to other new avenues of research and investigations that forced the development of a new scientific paradigm.

For example, Mach (1883) presented the first successful argument against the existence of a Newtonian absolute space in *The Science of Mechanics*, the same book in which he severely criticized the hyperspatial theory of Zoellner (although not by name). He clearly chastised any and all attempts to use non-Euclidean geometries to explain “spirit” phenomena and the existence of heaven (Mach, 1883, pp. 589–591), but his overwhelming and complete backlash against all use of non-Euclidean geometries in physics may have hindered the development of physics. Both Mach’s book and his argument against absolute space influenced the thinking of a young Albert Einstein and became a factor in Einstein’s later development of the special and general theories of relativity. Yet the Newtonian concept of absolute space had only become important in physics as an indirect aid to understanding the new electromagnetic theory. Absolute space had not been needed in physics prior to electromagnetic theory since all of Newtonian mechanics had been based upon the concept of relative space alone. Electromagnetism seemed to require the existence of a luminiferous aether, which did no more than lend substance to the Newtonian absolute reference frame. Absolute space had been no more than a philosophical curiosity before the luminiferous aether was postulated as the medium for carrying electromagnetic waves across space.

The failure to detect the luminiferous aether in several different experiments precipitated the crisis conditions which later affected the development of the new theories proposed during the Second Scientific Revolution. Other late nineteenth century problems, such as blackbody radiation and the photoelectric effect, brought Maxwell’s electromagnetic theory and Newton’s laws of motion into direct conflict. In all of these cases, both the successes of science in one sense and the failures of science in another precipitated new attitudes which directly influenced the developments marking the Second Scientific Revolution. The seeds of the revolution were inherent in the same evolutionary process of scientific progress from which the sciences of the paranormal aspects of nature developed.

The Second Scientific Revolution is usually associated with the new physics of the twentieth century, but it included far more than just the science of physics. Among other changes, the revolution also brought the separation of psychology from its origins in philosophy and physics. However, the process of birth and separation altered psychology, and the new paradigm for psychology was based upon a behavioral model rather than a transpersonal model which stressed the concept of consciousness. So psychology progressed

away from its historical roots. The behaviorists adopted a statistical approach to their science which mimicked the new quantum and thermodynamic approaches to physics, and this change directly influenced the next evolutionary step for the science of parapsychology. The changes in physics were so influential over the rest of science and society that they either directly or indirectly influenced the development of new theories of psi. The unrelenting historical forces which shaped the evolution of modern spiritualism continued unabated during the 'early scientific' period, but modern spiritualism was not an end in itself. The movement did not die but slowly faded toward insignificance over the next three decades as political events and new scientific realities once again altered the criteria for deciding which phenomena were valid for scientific investigation and which were not.

The 'Middle Scientific' Period

The first implications of new changes in attitude toward scientific studies of the paranormal came during the 1920s, but truly significant changes came only after 1930. Experiments by F. Cazzamali and later by Hans Berger (1928) equated one-centimeter waves detected in the human brain to the transmission and reception of telepathic thought. Berger's theory was more precisely a classical electromagnetic theory of psi, although it utilized new advances in the science of the human brain. V. M. Bechtereve also conducted electromagnetic research into psi in the Soviet Union (Burt, 1967, p. 89), and after his death in 1927, L. L. Vasiliev continued this line of research for more than three decades (Rao, 1966, p. 142). Electromagnetic connections to psi became so popular that the novelist Upton Sinclair penned and published his book *Mental Radio* in 1930, proposing that telepathy was electromagnetic in origin. On the other hand, J. W. Dunne (1927) developed a theory of telepathy and precognition based directly upon a special relativistic model of nature (Rao, 1966, pp. 167-168). Each of these theories reflected new realities in physics but did not reflect any of the methodological changes which separated the new parapsychology from the older psychic research associated with modern spiritualism. That momentous change came with the work of J. B. Rhine.

Rhine brought scientific studies of the paranormal into the laboratory and thus transformed the psychic elements of the paranormal from the spiritualism movement into parapsychology as it is known today. He accomplished this task by isolating the subtle effects of psi evident in telepathic communication and clairvoyance and using modern statistical methods to analyze the results. He moved psychic studies from anecdote and personal experience to verifiable experiment. This fundamental change in method altered psi research and affected the development of parapsychology for the remaining decades of the twentieth century. Parapsychology thus became an objective experimental science as opposed to a subjective science based upon anecdotal evidence, which was far more susceptible to fraud and personal bias.

After 1930, parapsychology progressed slowly but effectively. This new sci-

ence built a stock of statistical evidence for the existence of psi and honed its experimental skills on the criticisms of its skeptics. While the stock of statistical evidence for the existence of psi slowly accumulated, theories of psi were proposed to explain the newly discovered subtle effects attributed to psi. Many of the new theories were 'physical' in nature, but were proposed by non-physicists. In 1967, C. D. Broad proposed that time has two dimensions. Carroll B. Nash made use of a Minkowskian world-line to explain ESP, precognition and psychokinesis, and H. N. Hart (1965) used a four-dimensional cross section of a five-dimensional manifold to explain psi in 1965. J. R. Smythies' ideas ranged toward a three-dimensional physical space coupled with a three-n-dimensional psychic space. Each of these theories utilized some form of the non-Euclidean geometry made popular by Einstein's theories of relativity, but the theories were developed by non-physicists who did not completely comprehend the physics involved.

Other theories during this period suffered from the same or similar problems. In 1956, G. D. Wasserman developed a theory utilizing four new physical fields, the p-field, M-field, B-field and psi field, to explain psi. William G. Roll borrowed from Wasserman's ideas and developed his own brand of psi-field. Roll's model also had characteristics in common with Ninian Marshall's 1960 model of "eidopoic influences" which was a semi-physical theory of psi. His eidopoic forces were related to physical causes, but were not physical in the ordinary sense of the word. The field theories of Wasserman and Roll suffer from their extremely *ad hoc* nature and could boast no real scientific value beyond their value as "interesting speculation" (Rao, 1966, p. 169). In 1965, H. A. C. Dobbs proposed a 'quasi-field' theory which shared some characteristics with quantum theory (Rush, 1986, p. 281). He developed the concept of psi-trons, particles associated with a two-dimensional time.

Meanwhile, another approach was taken by various scientists who developed biofield and other fluid/plasma models of psi, the conceptual heirs to Mesmer's 'animal magnetism' and early vitalistic theories of life. In 1935, Burt and Northrop proposed that bioelectric fields could influence the pattern and development of organisms. W. Elsasser later postulated 'biotonic laws' inherent in living beings "and drawing upon accumulated quantum-mechanical and information-theoretic uncertainties" (Chari, 1972, p. 203). As recently as 1968, Inyushin and his colleagues worked with a 'bioplasmic interaction' to explain psi. They thought the 'bioplasm' was a 'fourth state of matter' (Schroeder and Ostrander, 1971, p. 217). C. T. K. Chari criticized all such speculations and hypotheses by stating that a " 'bioplasm' or 'psychoplasm' with totally unknown properties cannot claim to be a rightful link between physics and psi phenomena" (Chari, 1977, p. 812). Yet the issue of a link between physics, biology and psi was growing, and many scientists still believe that it may be an inevitable outcome of future research.

Only two scientists trained as physicists worked as parapsychologists during this period, Joseph Rush and Robert A. McConnell, and neither of these men

proposed a specific theory of psi. A few physicists, such as Henry Margenau, openly supported the work of parapsychologists, but such open support was the exception rather than the rule. After 1930, quantum mechanics became entrenched as the primary working hypothesis and focus in both theoretical physics and research. The quantum worldview came to dominate the scientific community for both practical and philosophical considerations at the expense of the relativistic approach to reality. Physicists busied themselves with other pursuits and paid little if any attention to the paranormal, more-or-less surrendering the physical study of psi to scientists in other disciplines as well as non-scientists. However, attitudes again began to change in the 1960s, resulting in a new focus on the physics of psi a decade later.

In 1951, David Bohm reopened the debate whether quantum mechanics offered a complete picture of reality. Bohm's arguments against the strict quantum mechanical view of physical reality resulted in the development of the concept of 'hidden variables.' His work, in turn, inspired John S. Bell's theoretical work and the 1964 development of Bell's theorem. Bell demonstrated the difference between the local and non-local aspects of physical interactions. Their combined efforts renewed the links between philosophy and practical physics especially in the experimental arena. It slowly became acceptable to question the philosophical basis of quantum theory as long as the physical/experimental results were not tampered with or otherwise challenged. Over the ensuing years, Bohm's continuing critical analyses opened physics to a greater and more pervasive questioning of the predominant quantum paradigm, as earlier expressed by the Copenhagen Interpretation of quantum mechanics. More scientists and scholars began to look at and rethink the Einstein-Podolsky-Rosen paradox (EPR) and raise questions about the logical basis of quantum theory (Einstein et al., 1935).

As early as 1927, Einstein's views on quantum theory had come into direct conflict with the views of the majority of scientists, and he became something of a philosophical pariah within the scientific community. EPR was Einstein's greatest effort to refute the most popular interpretation of the quantum aspects of physical reality. At roughly the same time, Einstein concentrated all of his scientific efforts toward his search for a 'unified field theory' even though his general theory of relativity was relegated to the background of scientific inquiry. Most physicists worked in areas related directly to quantum mechanics and nuclear physics, essentially ignoring general relativity whose effects at the sub-microscopic level of the quantum were infinitesimally small and thus inconsequential.

Renewed interest in the relativistic worldview only came in the late 1950s when practical applications of general relativity became a reality. The space program of the 1960s also influenced the direction in which physics progressed next (Heywood, 1967, p. 57), and science became more global in perspective and thought. These changes in scientific attitude were enhanced and amplified by the concept of 'holism' and traditional Eastern philosophies

which were becoming popular in the West. These factors worked to open science to alternative pictures of reality as well as broaden the perspective of physicists, interesting more physicists in the study of psi. And finally, more than three decades of research on psi was rewarded when the Parapsychology Association was accepted into the American Association for the Advancement of Science in 1969, outwardly legitimizing parapsychology as a true science. With parapsychology coming of age, the time was ripe for parapsysics to enter the stage and begin its own ascent to legitimacy.

The 'Late Scientific' Period

Those few physicists who had earlier studied psi, worked in the field of parapsychology rather than parapsysics. It was only when physicists began to conduct psi research in greater numbers after 1969 that scientists began to think of themselves as working in the field of parapsysics rather than parapsychology. These events reflected the changes of attitude within the physics community that began in the 1960s. The "emergence of parapsysics" as a new natural science was announced in articles by Beal and O'Regan in Edgar Mitchell's 1974 book *Psychic Exploration*. While the book was technical in nature and covered several physical aspects of current psi research, one whole section of the book was dedicated to parapsysics, the newly emerging natural science. Other publications further emphasized the newly recognized relationship between physics and psi.

For the first time, books which either focused on the physics of psi or contained specific articles covering the topic began to appear. Andrija Puharich published *Beyond Telepathy* in 1972. His book represented an individual effort to develop a physical theory of psi by reinventing modern physics. His intent was good, but the method of changing all of physics to suit psi was not acceptable. In 1979, Puharich edited and published another book, this time a collection of articles titled *The Iceland Papers*. These papers had been presented earlier in a conference which specifically addressed the most recent theoretical and practical work in the physics of psi. Jack Sarfatti's comments on the physics of consciousness appeared in Jeffrey Mishlove's 1975 book *The Roots of Consciousness* (Sarfatti, 1975a). He also made numerous comments to Bob Toben's *Space-Time and Beyond* (Sarfatti, 1975b). Toben's book was the result of earlier conversations with physicists Sarfatti and Fred Wolf. The year 1977 saw a book by John White and Stanley Krippner, *Future Science: Life Energies and the Physics of Paranormal Phenomena*, as well as *Mind Reach* by Targ and Puthoff (1977). Puthoff and Targ's book summarized their recent work in remote viewing, while further articles on this subject appeared in *Mind at Large*, a collection of essays representing papers presented at yet another conference and edited by Tart and colleagues (1979).

The team of Puthoff and Targ also had the sole distinction of publishing articles summarizing their research in the more orthodox scientific journals *Nature* and *Science*. More to the point, parapsysics seemed ready to join the

ranks of other sciences with the appearance of a refereed scholarly journal in England, *The Journal of Paraphysics*. The development of a specialized journal as an outlet for the dissemination of basic research is an important step in the evolution of any field of science. Such publications give any field of science an air of credibility that could not be found elsewhere. Although first published in the late 1960s, the journal was more a product of the 1970s when other books and articles on the physics of psi began to appear.

Even the parapsychology community recognized the need for a physics of psi. An international conference on quantum physics and parapsychology was held in Switzerland in 1974 (Oteri, 1975) and collected works on parapsychology, such as Benjamin Wolman's (1997) *Handbook of Parapsychology*, contained sections devoted to the subject. Still other influences emerged from a wholly new and unsuspected direction and pushed the envelope of science further toward the acceptance of a paraphysics. In 1970, Lynn Schroeder and Sheila Ostrander published the extremely popular and controversial book *Psychic Discoveries behind the Iron Curtain*. Allegations that various Soviet countries were using psi as a tool for espionage brought reciprocal actions by the American intelligence community. The Defense Department could no longer afford to ignore the seriousness of this situation which came just as physicists such as Puthoff and Targ were beginning new research into the physical aspects of psi. In 1972, the government awarded a secret contract to Stanford Research Institute to study the feasibility of 'remote viewing' as a source of military intelligence, and this study grew into the top secret Stargate project. The existence of Stargate, representing a *de facto* recognition of psi phenomena by the U.S. government, did not become public knowledge until the 1990s when a report on the project by the CIA was released through the Freedom of Information Act. Further evidence of the U.S. government's concern with physical developments behind the Iron Curtain were clearly demonstrated by the Defense Intelligence Agency's 1978 report "Paraphysics R&D—Warsaw Pact," which was also released to the public several years ago.

In 1979, Robert Jahn, then Dean of the School of Engineering and Applied Science, established the Princeton Engineering Anomalies Research (PEAR) program. His purpose was to "pursue rigorous scientific study of the interaction of human consciousness with sensitive physical devices, systems, and processes common to contemporary engineering practice" (PEAR, 2000). But the word 'anomalies' was used to describe those subtle effects which had earlier been attributed to psi. The word 'anomalies' and its derivatives were thought to be less tainted from a philosophical perspective and became quite popular in the following years. The use of 'anomalous' to describe the physics of psi marked a turn away from paraphysics. 'Anomalous' physics was surely perceived as less irritating to the rest of the scientific community than paraphysics.

The evolution toward a separate science of paraphysics seems to have slowed during the 1980s, although the impetus to develop a physics of psi re-

mained as strong as ever. Use of the word parapsysics declined among the few scientists who were publishing articles in the discipline and the *Journal of Parapsysics* ceased publication. The word parapsysics came to be used and abused by 'New Age' advocates rather than practitioners within the physics and scientific communities, but the idea of an independent science of parapsysics did not disappear and new influences emerged from other directions which acted to affect the further development of parapsysics.

The source of this apparent retreat in progress toward a parapsysics is not that difficult to find. In his foreword to Mitchell's *Psychic Explorations*, the physicist Gerald Feinberg strongly implied that physicists would not be persuaded to accept psi until a theoretical basis for psi was found. He stated that scientists must isolate and identify the physical properties of psi before any real progress could be made (Feinberg, 1974, p. 24). To do so is a necessary first step for developing any legitimate scientific theory. During the 1970s, the emergence of a complete physical theory of psi was thought to be imminent. There was hope that such an event would precipitate the birth of parapsysics. However, no acceptable theories of psi appeared. All that appeared were unsubstantiated theories and unsupported hypotheses. So the development of an independent science of parapsysics was set back.

The theories suggested in the last decades of the twentieth century belong to five major categories: electromagnetic theories, continuity theories comprising the use of fields/plasmas/fluids, hyperspatial or extra-dimensional theories, quantum-based theories and miscellaneous or hybrid theories which utilize traits of two or more other categories. These classifications reflect the dominant paradigms and concerns of twentieth century physics. The first three categories denote the continuous aspects of physical reality in one manner or another while the quantum theories represent the discrete worldview of nature.

The new attempts to resolve old problems with the electromagnetic theories were quite unique, reflecting the latest advances in science. I. M. Kogan of Russia combined electromagnetic theory with information theory in the late 1960s and early 1970s. In 1979, Michael Persinger added another new element to the electromagnetic controversy by relating the information transmitted as psi to naturally concurring ELF (extremely low frequency) waves. Gerald Feinberg and I. J. Good (Good, 1965, p. 152) suggested that the 'advanced' absorbers, the portion of electromagnetic waves traveling back in time, are not all canceled or otherwise lost and could act as the carriers of information during precognitive psi events. Puthoff and Targ suggested a similar model based upon the space-time structure of special relativity. They proposed that "significant events create a perturbation in the space-time in which they occur, and this disturbance propagates forward and, to some small degree, backward in time" (Puthoff and Targ, 1974, p. 526). M. Ruderfer put a different twist on the electromagnetic concept of psi in 1973. He suggested that neutrinos and tachyons could interact with normal electromagnetic waves in such a manner to carry psi signals across the barrier established by the speed of light. Similar

ideas were advanced by Igor Shishkin, a physicist in the Soviet Union, in the late 1960s. So it would seem that the electromagnetic theories of psi had survived into this latest era of progress.

The fluid theories were not as popular as in previous years, but did retain some of their past glory. The fluid theories seem to have evolved into field theories, or at least they have been associated with field theories as of late. Toben described a biogravitational field in conjunction with a hyperspatial model of psi and consciousness, but this was not the only utilization of such a fluid or similar ideas. Biogravity was first suggested in 1973 by Alexander P. Dubrov, a biophysicist, as a “field-energy system” (Dubrov, 1977, p. 231), and other scientists, particularly in Eastern Europe, still believe that biofields are the sources of both life and psi.

Meanwhile, the use of extra dimensions of the space-time continuum proved as popular as ever. In 1972, Gertrude Schmeidler (who is not a physicist) offered the first hyperspatial theory of psi of this period. She used a model of ‘topological folding’ based upon an embedded space-time geometry. The arguments supporting a hyperspatial theory of psi were given further support by Karl Brunstein in his 1979 book *Beyond the Four Dimensions: Reconciling Physics, Parapsychology and UFOs*. He essentially offered philosophical support for a five-dimensional explanation of psi but linked psi to the observation of UFOs, a subject which is not necessarily a matter of psi research. Two other hyperdimensional theories are especially worthy of note. These were proposed by Elizabeth Rauscher in 1977 and Puthoff, Targ and Edwin May in 1979, all of whom are physicists. Rauscher’s theory is both simple and elegant, as well as mathematically supported as was the other theory. In both cases, four new dimensions were added to our normal four-dimensional space-time continuum, rendering an eight-dimensional manifold. More recently, Saul Paul Sirag noted that consciousness can be represented by a mathematical structure known as a “reflection space.” While mathematical reasoning cannot choose between the many different reflection spaces that can be used to represent the “universal consciousness,” physics can (Sirag, 1994, p. 341), so Sirag developed a highly mathematical and complex hyperdimensional model. Toben and Wolf took yet another path to relating hyperspace and consciousness. In their simple model, living beings generate “biogravitational” fields which allow them to manipulate space-time curvature in a hyperdimensional manifold to various ends. It is through this manipulation, carried out by consciousness, that paranormal and psi phenomena are manifested.

The fact that consciousness must take a role in future theories of psi is far easier to demonstrate in the case of quantum theories where consciousness seems to play a central role in the act of ‘measurement.’ Both Evan Harris Walker and Helmut Schmidt had developed quantum theories by 1974. Schmidt utilized a novel mathematical model of psi “which permits a logically consistent discussion of a world with psi” (Schmidt, 1975, p. 302) rather than establishing a physical theory explaining the nature of psi. By a process of

eliminating the normal forces of nature as candidates for carrying psi, Walker (1974) concluded that Schrödinger's psi function is the only physical quantity which can link consciousness and the physical world. He then linked the suspected properties of Bohm's 'hidden variables' with all of the different aspects and forms of psi. The Danish physicist Richard Mattuck expanded upon Walker's work, although his theory differed from Walker's in that he emphasized the sources of energy needed to accomplish the action of psi.

W. von Lucadou and K. Kornwachs of Germany have also suggested a quantum model based upon an interaction of consciousness and the wave function, by adding a new linear factor representing consciousness to the normal psi function of quantum theory (Lucadou & Kornwachs, 1976). This model bears some resemblance to Jahn and Dunne's approach to explaining psychokinesis (PK). In the 1987 book *Margins of Reality*, they reasoned that if consciousness "finds wave mechanics a useful complement to particulate physics" then "consciousness may also find a wave-mechanical metaphor to be conceptually and functionally useful for representing itself." So Jahn and Dunne postulated a "probability-of-experience" wave to be associated with consciousness (Jahn & Dunne, 1987, p. 219). On the other hand, Sarfatti favors a concept of 'back action' at the quantum level to describe both consciousness and non-local interactions as well as psi. Sarfatti's model follows from the most basic concepts of physics and utilizes a Bohmian model of physical reality.

The French physicist O. Costa de Beauregard has come to a similar conclusion through an entirely different evolution of thought. His own personal changes in attitude began as early as 1951, but he felt it unwise to voice his "rational conversion" to a belief in psi until 1975. Once again, this reflects the changing attitudes of the scientific community in general and the physics community in particular prior to and during the decade of the 1970s. He contends that human "conscious awareness" has "two faces," or rather our conscious knowledge of reality springs from two procedures, "decoding a message (that is, an ordered structure) and emitting a message (that is, producing order) by means of one's *information* . . ." These quantities (or qualities) are commonly known as cognition and volition (or will), respectively. Consciousness, an "attention to life," is comprised of both cognition and volition, in a broad sense, which is "tightly bound to corresponding symmetries in the real world" (Costa de Beauregard, 1979, p. 177-278).

Contrary to the classical worldview, Bohm concluded that the various quantities representing physical reality are organized by the whole of reality as represented by a "quantum potential field." The very existence of the quantum potential implies an unsuspected 'wholeness' in the universe. This idea solidified the non-local interconnectedness of individual material particles in a manner which had not been predicted by either quantum mechanics or classical physics. Bohm's new views were offered to the scientific community in the book *Wholeness and the Implicate Order* in 1980. Bohm also developed the concept of a 'holomovement' to describe the flux of 'enfolding' and 'unfold-

ing' within the 'implicate' and 'explicate' orders. The 'holomovement' accounted for the dynamic progression of our physical reality in time. The application of Bohm's theory to psi phenomena has been documented in Michael Talbot's popular book *The Holographic Universe* (1991) among other publications. Other physicists, such as Targ and Sarfatti, believe that Bohm's theory of the 'implicate' order offers the best chance for science and physics to explain psi. Josephson and the Greek physicist Fotini Pallikari-Viras recently authored a paper on the "Biological Utilisation of Quantum Nonlocality" (Josephson & Pallikari-Viras, 1991), firmly committing themselves to a physical explanation of psi. Bohm's theory of the implicate order explains just such non-local actions as can be used to represent psi, and Josephson has indicated that he believes Bohm's concepts could represent the actual case of physical reality (Josephson, 1992, p. 2).

The apparent lack of attention paid to these theories by a very conservative scientific community only serves to prove that the only way to get the attention of all scientists and convince the skeptics is to demonstrate that 'psi emerges naturally from physics' or rather that 'psi evolves as a consequence of the physics of reality' which is a much stronger statement than even Feinberg was willing to make. Such an occurrence could only follow a fundamental change in the philosophical basis of physics itself, and this change would suggest a broader and more comprehensive meaning for parapsychics than just a physics of the paranormal, as has been the case in previous years. Yet this is not such a farfetched notion.

The Emergence of Parapsychics

New historical trends in both general science and physics seem to indicate that such a fundamental change is in the offing. At the instigation of parapsychology's severest critics and detractors, a meta-analysis of all the experimental data collected over the past six decades was conducted by Jessica Utts in 1991, and the existence of a subtle but significant psi effect was established. This statistical analysis has helped to interest a new generation of scientists in psi research. Jahn's group at PEAR has also confirmed a very subtle effect of consciousness on mechanical devices that cannot be explained within the present paradigm of physics. And finally, Dean Radin's experiments in precognition (presentiment) have also demonstrated the subtle but real physical influences of psi.

From still another direction, psychological studies and research shifted toward the transpersonal aspects of the human condition during the 1970s, and the psychology of consciousness finally emerged from the oblivion of scientific and academic chaos to which it was condemned shortly after the turn of the century. Robert Ornstein's 1972 book, *The Psychology of Consciousness*, was an early product of this momentous change and he directly related consciousness to the paranormal. A more direct approach was taken by the psychologist Lawrence LeShan (1975), who compared the philosophical and psy-

chological worldviews of scientists and non-scientists in his book *The Medium, The Mystic and the Physicist*. The publication and popularity of these books illustrates the similarities between the psychological and physical worldviews as well as an early convergence of ideas related to consciousness which has become a torrent in the last decade.

The new consciousness studies are both interdisciplinary and international in scope. Within this context, the emergence of an interest in the physics of consciousness has offered a backdoor to the study of psi and related phenomena. On the one hand, recent experiments in pure physics by Alain Aspect and others have demonstrated the non-locality of interactions at the quantum level of physical reality. Yet it also seems that consciousness is necessary at some level in quantum theory for 'collapsing the wave packet' or otherwise interrupting the infinite number of possible states in a quantum dynamical system to create a single quantum state which can be measured. Putting these two items together, it would seem that the possibility of consciousness acting non-locally has become a reality and this is just another way of demonstrating the existence of psi and explaining how psi acts in our material world.

The close relationship between the physics of psi and the physics of consciousness has been demonstrated many times. For example, a selected symposium on "The Role of Consciousness in the Physical World" was held at the 1979 American Association for the Advancement of Science (AAAS) annual meeting in Houston. This symposium was held under the auspices of the section on the history and philosophy of science, but was actually a thinly disguised discourse on physics and psi rather than the more general topic of physics and consciousness. The meeting did not proceed without controversy and one participant, John Archibald Wheeler, protested the direction taken by the meeting. Jahn published the proceedings of the meeting two years later under the same title (Jahn, 1981). Such a close association between the physical studies of psi and consciousness means that physicists no longer need fear the severe reprisals of their peers that were evident in the past. Scientists can now speak openly of the physics of consciousness and not refer directly to psi even though they are discussing the same paranormal phenomena that have been associated with psi. A new group of physicists who would not have otherwise entered the field of psi studies has begun to study psi indirectly through independent studies of consciousness, without even acknowledging any connection to psi and parapsysics.

New paranormal phenomena such as Near Death Experiences (NDEs) have also been discovered (or rediscovered), documented and investigated. The NDEs imply that individual consciousness exists past the moment of death (Gough and Shacklett, 2000, p. 129) which raises new questions regarding the nature of reality for physicists and other scientists to answer. New concepts in mathematics have emerged which seem to fit the requisites for explaining and understanding some of the ineffable and unmeasurable human qualities associated with psi. In particular, a mathematical system known as chaos theory

has evolved in the past few decades. Specific elements within chaos theory, such as complexity and emergence, seem likely to provide the mathematical tools necessary to explain complex qualitative concepts such as mind and consciousness even though these qualities have traditionally escaped all attempts at physical reduction.

Another new concept which may prove essential to any new theoretical explanation of reality, entanglement, has recently evolved within quantum theory itself. Entanglement represents the closest concept to a statement of simple relativity that quantum theorists have yet developed. They still have not overcome the intricacies of unifying special relativity and the quantum, but entanglement is a step in the right direction. These trends may or may not seem related at first glance, but each has influenced the recent development of a physics of psi and thus provides an important step toward the new parapsysics.

Recognition of these trends and their influence on the evolution of science begs the question whether they foretell the establishment of a new science of parapsysics. The answer to that question must be a resounding yes. On one hand, a Kuhnian pre-paradigm period has been identified and it seems to have reached a level of completion denoting the development of a new paradigm. This alone implies that science as a whole is on the verge of a new paradigm which necessitates an explanation of anomalous phenomena associated with psi. On the other hand, overall attitudes in the physics community have changed dramatically, as have the fundamental philosophical approaches to physics as a whole. These changes provide an opening for parapsysics to develop independent of any questions regarding the validity of the paranormal.

Within the study of pure physics, a recent shift has occurred toward an 'Einstein-like' program whose goal is a single concept to explain all of physical reality. Since the 1980s, it has become acceptable to talk about developing a 'theory of everything' or TOE. By its very nature, a true TOE must either explain psi or demonstrate the physical impossibility of psi. Although quantum mechanics was considered the basis of physical reality in the recent past, it cannot be assumed that the quantum paradigm will automatically be the basis for a future TOE. Before the 1960s, scientists and scholars considered quantum mechanics complete and the quantum limited our scientific knowledge of physical reality according to the Copenhagen interpretation. However, newer interpretations of the quantum have opened the debate to other perspectives of reality. Quite simply, the quantum paradigm need no longer be considered the only alternative to developing a TOE. There may exist some deeper and more fundamental element to our common reality and the discovery of this deeper basis of reality would solve the psi question.

In fact, there are some rather serious philosophical problems with quantum theory as a whole which must be addressed before the quantum perspective can be used as a basis for a more fundamental theory of physical reality presented by a TOE. Some have argued that the quantum theory consists of different loosely connected theories having no central doctrine, in spite of the successes

of the quantum approach to nature. There has also been a definite and pronounced failure of the quantum approach to unify gravity with the other basic forces of nature. This failure has caused some concern within the scientific community and that concern has been emphasized by the success of the Kaluza theory to unify gravity and electromagnetism within a five-dimensional geometrical structure. The major problem of unifying gravity with the other forces can be identified with the differences between the discrete view of reality exemplified by the quantum and the continuous nature of reality proposed by relativity. Mendel Sachs has argued for years that quantum theory and relativity are mutually incompatible because the discrete and continuous perspectives of physical reality are both philosophical and practical opposites. His arguments are slowly gaining recognition by other scientists (Greene, 1999, p. 3), but very few real solutions to the dilemma have been proposed. Going even further than Sachs, it would be safe to say that the whole concept of a 'quantum field,' which is the basis of several attempts to develop a TOE, is a philosophical oxymoron.

Quantum theorists have classified and castigated relativity theory as 'classical' for several decades, as if it were an aberration in modern physics that has somehow survived from the past. This conclusion is based upon the fact that relativity theory is deterministic as well as an illogical bias that determinism is somehow counter-productive to the progress of modern physics, while quantum theory is non-deterministic which is assumed good for the further development of physics. Yet quantum theory itself depends upon as many if not more 'classical' concepts than relativity theory. For example, quantum theory uses a classical concept of mass while general relativity proposes to recast mass as space-time curvature. The Heisenberg uncertainty principle also separates space and time (Beichler, 1996) even though they were unified within a common space-time framework by the special theory of relativity.

Since quantum theory carries at least as much classical baggage as relativity theory, neither quantum mechanics nor relativity theory can go beyond or even transcend the present paradigms of physics. Both quantum theory and relativity are 'semi-classical' theories. Alternately, any new theory must account for the successes of both theories as well as electromagnetism and all of the previous successful applications of classical physics. General relativity and the quantum theories are actually 'bridges' between Newtonian concepts and parapsysics. The seeds of the next revolution in science can be found within the pre-revolutionary, or present paradigms of 'normal' physics. In this case, the seeds are the philosophical problems between the relativistic and quantum perspectives of physical reality. Once solved, problems caused by the differences between the discrete and continuous approaches to physical reality will lead to a 'para' physics, just as problems between electromagnetism and Newtonian mechanics led to 'modern' physics. The new parapsysics will explain psi, but that explanation will emerge from the physics rather than following the past practices of reformulating psi to fit our present paradigm of

physics or inventing new physical entities to explain psi. So, relativity theory and continuity should be treated on an equal basis with quantum theory and the discrete nature of physical reality when considering the basis for a possible TOE.

Taken together, these trends indicate that the emergence of parapsysics 'must' be an integral part of the coming revolution. Science is clearly moving toward a parapsysics or 'something like it.' In other words, parapsysics or 'something like it' would need to be 'invented' if parapsysics did not already exist. But this line of reasoning raises the question of why a 'parapsysics' is justified or necessary rather than another revolutionary advance in 'normal' physics. In reply, several suggestions could be made. The argument—what is now considered paranormal will become normal in a future post-revolutionary physics—is nonsense because the coming changes will be so profound and fundamental that the name physics will not be sufficient to describe the new paradigm of physical reality. It will take such a revolutionary approach to understanding and representing the nature of physical reality to overcome the differences between the discrete and continuous aspects of nature. Physics itself must evolve or progress 'beyond' the present fundamental tenets upon which it has traditionally been based.

'Normal' physics can be regarded as either 'nature' or an explanation of the 'nature' of reality. The events and phenomena described by a future parapsysics will still be considered 'natural' although very subtle, but they will go beyond any explanation of 'nature' as 'matter in motion' as has been the case in traditional physics. So psi will never be reduced to 'normal' physics. Any future theory of psi will reflect the changes that a new revolution in physics will bring, just as earlier theories of psi have reflected the physical paradigm of the period in which they were suggested. Physics has always been a logical study of the world around us which is conducted by reducing all events and natural phenomena to their most fundamental elements. These elements are 'matter,' 'motion,' and 'matter in motion' as understood against the background of our common space-time framework.

The title 'anomalous' physics is also inappropriate to describe either a physics of psi or any future 'normal' physics simply because what is now 'anomalous' will become normal when the anomalous is explained. Even before a future physics evolves, there is no guarantee that what is now considered 'anomalous' cannot be explained within the present paradigm of physics. The coming revolution in science will bring a new form of 'physics' which has lost the meaning but not the spirit of our original form of 'physics,' as is evident when 'physics' and 'parapsysics' are properly defined.

The program of developing a science of physics upon 'matter in motion' began before Aristotle and has continued without interruption until the present. So, any theory which attempts to explain the nature of physical reality in terms which are more fundamental than 'matter in motion' must go 'beyond' physics and thus constitute a parapsysics. The future parapsysics will not be a physics of psi alone, but a physics of anything and everything in nature whose

explanation transcends the concept of 'matter in motion.' Paraphysics will depend upon the reduction of 'matter' and 'motion' themselves to a more fundamental and universal quantity. So, a future paraphysics will be physical but not material in the present sense of the word, and from this an explanation and understanding of psi will emerge which will completely change how humans think and deal with each other and their physical surroundings. 'Normal' physics will continue to base its explanation of nature on 'matter in motion' even after the birth of paraphysics, just as Newtonian physics has been used to describe our common world in spite of the development of modern physics.

Recognizing these and similar problems demonstrates a new maturity of thought within the scientific community. The willingness of scientists and scholars to question quantum theory for its shortcomings, in spite of its tremendous successes, is healthy and portends a coming change in physics. This change is a direct result of recent theoretical influences within the quantum domain just as the Second Scientific Revolution was a product of evolutionary trends in physics at the end of the nineteenth century. It certainly seems that history is beginning to repeat itself, implying that a new revolution in science looms just over the horizon. At the very least, the conditions for a revolution are present in science today and all that is needed to precipitate the revolution is the proper catalyst, which could easily be supplied by recent physical researchers on psi and its relation to consciousness.

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