

# AT THE FRINGES OF SCIENCE

MICHAEL W. FRIEDLANDER

With a New Epilogue

RF.  
111-124



A Member of the Perseus Books Group

## 9

### Pscience

The general label *paranormal* covers a vast range of phenomena. An idea of their extent and variety can be gained from a listing of some of the chapters in Terrence Hines's *Pseudoscience and the Paranormal*.<sup>1</sup> In addition to many of the topics I have already described (for example, Velikovsky, polywater, astrology, UFOs), Hines covered psychic phenomena, life after death, laboratory parapsychology, psychoanalysis, faith healing, and health quackery, with variations under each heading.

The phenomena that are the subject of this chapter constitute what the parapsychologists call psi, including extrasensory perception (ESP) and psychokinesis (PK). ESP covers three main areas: clairvoyance, telepathy, and precognition. Telepathy is the paranormal power some people claim to use to communicate by means not otherwise known; clairvoyance is the ability of a single person to receive information, such as knowledge of distant or hidden objects; precognition is the power to foretell the future; and PK involves the movement or deformation of objects without direct physical contact. Based on intensely personal experiences, many reports contain claims for the demonstration of paranormal occurrences or of the intervention of hitherto unrecognized forces or enhanced personal abilities. These reports have been the objects of extensive scrutiny with (it is often claimed) confirmation. In ways somewhat similar to the situation with UFO reports, these claims have been vigorously contested to the satisfaction of one side or the other but not of both. Each year reports of these phenomena, well worn and new, are described and redescribed in a never-ending stream of books. Hines provides thirty pages of references after over 300 pages of text. Your local library probably has shelves devoted to books on the paranormal; in the typical shopping-mall bookstore, there is probably a section devoted to "New Age" (which may well have some other generic label by the time you read this).

Underlying all of these is the claim or belief that there are forces that humans can experience or exert, with varying degrees of conscious control, that are not part of the already well-known forces of nature. Some of the investigators believe that confirmation of their research results might well require a revision of our

knowledge of the behavior of forces or of the transmission of energy. For example, the effects of all known forces diminish rapidly over distance, but a striking feature of the strength of many of the psi phenomena is their apparent indifference to distance. There is a sharp division between the firm believers in the reality of the claimed phenomena and those who deny it totally. (In the trade these are often known as sheep and goats, respectively.) In between is a relatively small group willing, in varying degrees, to examine the claims and undertake tests. But this third group seems itself to be divided. One subgroup is very skeptical but willing to investigate while applying strict scientific controls in their tests. They remain open-minded but to date have come up empty-handed. Their mirror-image subgroup has increasingly made use of modern scientific techniques but seems more sympathetically disposed to accept paranormal phenomena, more charitable toward the subjects of their tests, and more tolerant of their failures.<sup>2</sup>

There was no single defining episode as a starting point for psi studies. With polywater we had the papers of Fedyakin and Deryagin; with Velikovsky public awareness is well dated to the appearance of *Worlds in Collision*; with cold fusion we had the press conference in Utah. But ESP claims have been known for ages, and the literature is diffuse. The modern phase has its roots in nineteenth-century spiritualism but has since become professionalized in response to criticism both sympathetic and hostile.

In its attempts to demonstrate the reality of the phenomena, the parapsychological community organized itself as long ago as 1882, when the Society for Psychological Research (SPR) was formed in England. A similar society was formed in the United States soon afterward. One of the founding members of the British society was Lord Rayleigh, one of the giants of nineteenth-century physics. His 1919 presidential address shows a very cautious approach, stressing the need for further study. The Parapsychological Association (PA) was formed in the United States in 1957 with the purpose of promoting improved standards in parapsychological research. Each of these societies publishes a professional journal, using referees as do the better-accepted disciplines.

In 1969 the AAAS accepted the Parapsychological Association into membership in the same way that it allowed mainstream professional societies to affiliate. This action was not universally popular. In 1979 John Wheeler suggested that the PA membership be revoked. Wheeler, a physicist long respected for his many contributions to nuclear and relativity theory, noted that even ten years after affiliation parapsychology had yet to produce any scientific results. What, Wheeler asked, was a science without results? The PA, however, remains a member of the AAAS.

The earliest center devoted to psi studies was the Parapsychological Laboratory set up at Duke University in 1927 by William McDougall and J. B. Rhine. Though trained as a botanist, Rhine did much to establish the scientific approach in parapsychological research. Rhine's 1934 book *Extrasensory Perception* is a milestone in psi research. The analysis of his test data stimulated the interest of statisticians, and in 1937 the Institute of Mathematical Statistics announced its agreement with

the appropriateness of the statistical methods that Rhine had used. Rhine also looked for but found no difference in the strength of psi effects when carried out over a distance as great as 250 miles.

Psi differs from the subjects I treated in earlier chapters in an important way: The phenomena it encompasses often seem to be similar to (even if more intense than) experiences of a great many ordinary people. In contrast, most people do not have personal experiences of nuclear fusion or colliding comets. In psi there is a degree of personal identification that is absent from all other pseudoscientific phenomena, perhaps excepting UFO abductions. For example, many people have had intensely vivid impressions of friends or relatives who were either distant or long dead. Most of us have had the experience of thinking of someone and soon thereafter receiving a phone call or letter from or about that person. We sometimes anticipate what someone else will say. Some coincidences seem too strange to be truly unrelated, to be the results of chance alone.

This sort of coincidence is probably the closest that most of us come to a paranormal experience, but a reasonable explanation can account for it. It is often claimed that the chance of some remarkable coincidence is only one in a billion or a trillion or some other large number and therefore one must look for less conventional causes. The weakness of this argument lies in the treacherous nature of the statistical calculation. First, it may well be true that there is only a one-in-a-million chance, but this is also true of success in a lottery, yet someone in the end does win, no matter how remote the individual chance. Second, where probabilities are small but the number of tests is large, the actual number of coincidences may not be small. This was best described by the physicist Luis Alvarez.<sup>3</sup> He showed how one can make a simple calculation of the chance of a purely coincidental recollection of a friend within a few minutes of learning of that person's death. Making very reasonable assumptions and pointing out that there are over 100 million adults in the United States, Alvarez calculated that nationwide one would expect there to be about ten such "remarkable" coincidences every day. This is not a line of argument that is going to persuade people who have no background in statistics, but it does point to the need to ask critical questions. Can there be a normal though unusual explanation? How well have the statistical odds been calculated? In fact, are the circumstances sufficiently well defined for it even to be possible to make a correct calculation of the probability? At the same time, modern parapsychologists have become more sophisticated in their experimenting, but most people are not aware of these methodological improvements. Personal experience, so widely encountered and so naively interpreted, provides a reason for the continuing public allure of part of ESP studies.

Sometimes the course of cataclysmic events provides a fertile basis for widespread personal reactions. This has been noted as a cause underlying the surge of interest in spiritualism after World War I, when many bereaved families groped for means of communicating with those who had lost their lives. What is notable is the absence of any similar effect after World War II, despite equally large losses

of life. Indeed, as far as I know, there has been no widespread interest in this suggested means of communication in the Jewish communities, despite the terrible experience of the Holocaust.

How, then, does one test a person for enhanced powers? Rhine devised a special set of cards to be used in tests where the subject was asked to guess the identification of a card selected at random and placed face down. Success at rates statistically well above chance levels was reported. In a different test of psi, termed remote viewing, a target scene or object is viewed by one person, and the remote and isolated subject then describes the target. For precognition, tests are run in which the subject predicts a number that is being generated by a computer or, in PK, attempts to influence a coming number to be higher or lower. A feature of many ESP experiments has been an initial score well above that expected by chance, followed by a decline as testing continues. Many of the modern tests, such as those by Robert Jahn and Charles Honorton, to be described later, use electronic devices so that subjects obtain no sensory clues from the test apparatus and the selection of targets follows a random pattern based on a computer or the detection of the random arrival of cosmic-ray particles.

In a celebrated test of remote viewing, unusual in that it was reported in a refereed paper in *Nature*, Russell Targ and Harold Puthoff, two scientists then at the Stanford Research Institute (SRI), tested Uri Geller's clairvoyant ability to describe distant scenes.<sup>4</sup> The investigating scientists went to test sites hundreds of miles from Geller. At a predetermined time Geller was asked to sketch or describe the surroundings of the distant observer, whose location had not been revealed to him. Geller produced sketches that, it was claimed, were close to correct more often than not. Puthoff and Targ devised a system to score Geller's descriptions. These identifications have been challenged and the experimental procedures also criticized.

These and many more tests, demonstrations, and anecdotes have as yet yielded no positive result of remote viewing that skeptics have accepted, and there are innumerable instances where it is impossible to reach a definitive conclusion. Critics who have analyzed experiments ranging from Rhine's earliest work through today's psi studies using more sophisticated experimental regimes repeatedly raise the same issues: the possibility of cheating, either by the subject alone or by the subject and experimenter together; the sensing of cues given unwittingly by the experimenter; systematic departures from randomness in the selection of targets; inaccuracy of recording data; and disagreement over the statistical analysis. Close scrutiny by unsympathetic observers has in turn often been blamed as a cause of failure to achieve or sustain significant scores.

Before a valid theory can be constructed to draw together and provide an understanding of a range of these phenomena, if real, there must be a general acceptance of the reality of the effects, preferably extending beyond the parapsychological community. To progress beyond the hunting-gathering stage requires repeatable experiments and sufficient awareness to be able to reduce the number of

variables and then concentrate on the essentials. This has proven to be extremely difficult in psi research, just as was historically the case with physics and chemistry, where progress could not be made until basic and controlled experimenting had been achieved. The biological sciences made the transition later, and in the social and behavioral sciences it is often still a problem. It is far worse in psi for two reasons. First, there is the intrusion of unconscious deception or even outright fraud. Deception is a danger that also lurks in regular science, and we always have to be watchful against the temptation to trim our results, "improve" them, or discard wayward data. Fraud is a very different matter, and I devote the next chapter to a discussion of this unhappy distortion of mainstream science. In my research I normally do not have to guard against someone's adjusting my apparatus or sneaking more cosmic rays through the counters, but the history of psi is littered with discredited experiments of earnest investigators exploited by ruthless opportunists whose skills as magicians passed for paranormal powers. In his book *Flim-Flam!* James Randi has described, in often hilarious detail, the failed attempts of various psychics to sneak something past him.<sup>5</sup>

A contested case in point is that of Geller, who has given numberless demonstrations of his ability to bend metal objects through the remote exercise of his remarkable powers under apparently controlled conditions. Geller was able to satisfy some scientists as to the reality of his powers, but a number of magicians, including Randi, have observed him closely and consider him to be nothing more than a very skilled magician. Randi claims to be able to reproduce all of Geller's demonstrations and to have observed Geller cheating on at least some occasions. In return, Geller has sued Randi for defamation but not yet succeeded in winning any judgment.

The most damaging exposures, however, did not involve performers such as Geller or less talented amateurs but rather implicated two researchers respected within the parapsychological community. Dr. S. G. Soal in England had studied the ability of subjects to identify cards that were drawn at random from a deck. His results showed success rates significantly better than chance. Unfortunately, in 1960 it was found that Soal had adjusted some of his test results.<sup>6</sup> In 1974, Dr. Walter J. Levy, who had followed Rhine as director of the Institute for Parapsychology at Duke University, was observed by two members of his research group to have tampered with his research data. He admitted it and resigned.<sup>7</sup>

An equally serious problem may be unsolvable within the boundaries of accepted science. It has often been asserted in psi studies that the attitude of the experimenter or observer can so affect the paranormal abilities of the subject as to make success rare or impossible. Under different circumstances this effect is well established in physics. As a component of quantum mechanics, the Heisenberg uncertainty principle shows how at the atomic level the very act of measurement influences the result. In some types of observations, it is impossible to measure simultaneously certain quantities to better than a limited precision. This limitation is far below any detectable level on the scale of everyday phenomena, and it hinges

on the energy and momentum involved in making an actual measurement. It does not include the attitude or sympathy of the experimenter. But in spite of this uncertainty when dealing with an individual atomic particle, we are able to make exceptionally accurate predictions for the averages of many measurements. Nevertheless, there are allusions to the Heisenberg principle and quantum mechanics in attempts to explain the failure of various paranormal tests. To me, these excuses seem like displays of smoke and mirrors. But the point remains: If these paranormal phenomena and abilities are so sensitive that an unsympathetic investigator can induce failures or prevent successes, then we have a basic denial of the usually important requirement for reproducibility, and we would require a reformulation to include the role and attitude of the experimenter. It has been suggested that our definition of science might have to be changed to cope with these new phenomena. Most scientists are unwilling to do this—yet. Should the alleged paranormal effects come to be generally confirmed and should a change in our definition of science be the only way to achieve acceptance, then we would indeed have a major methodological problem.

Serious parapsychologists have long recognized the problems of fraud and inadvertent cues and have moved to meet them by trying to adopt stricter procedures, building in more precautions against being deceived. There remain differences between modern parapsychologists and their critics, such as Randi, in their estimates of the effectiveness of the precautions and the care actually taken and in their evaluation of the significance of their results.

Individual scientists, sometimes but not always affiliated with the SPR or the PA, have conducted their own investigations into these tantalizing reports of paranormal occurrences because they believe that there are surely too many and persistent reports for all to be bogus. (One response is, "Where there's smoke, there's smoke.") I have already mentioned Puthoff and Targ of SRI. John G. Taylor, a theoretical physicist, looked into Geller's abilities and was convinced; the result was his 1975 book *Superminds*.<sup>8</sup> Following Randi's exposure of Geller and his own further studies, Taylor completely reversed his opinion, as he described in *Science and the Supernatural*, concluding that "ESP is dead. . . . I started my investigation with an open mind; the scales were not loaded on behalf of science. On the evidence presented in this book, science has won."<sup>9</sup>

The experiments carried out by Honorton at the Maimonides Medical Center in New York and at the Psychophysical Research Laboratories in New Jersey and by Jahn and his collaborators at the Princeton Engineering Anomalies Research Laboratory stand out for their large statistical bases, their claims for achieving highly significant success rates (statistically). Jahn, for many years dean of the School of Engineering and Applied Science at Princeton University, designed and used electronic apparatus for his large-scale testing of abilities to influence the result of the automated and random selection of numbers.<sup>10</sup> Subjects were asked to try to make the selected numbers increase or decrease. Jahn produced results that are puzzling and not universally accepted. The effects are small in absolute terms

but seem to have statistical significance because of the large number of trials, though no single subject demonstrated any dramatic ability. For example, in 55,000 trials where the expected average should be 100.00, one subject was able to average 100.082 when trying to increase the score and 99.986 when trying to get a lower score. To explain his observations, Jahn has put forward a theoretical model based on quantum theory.<sup>11</sup>

As is usually the case, the critics have examined Jahn's experimental protocols and statistical analyses in minute detail and expressed their reservations.<sup>12</sup> Among the critics has been Jessica Utts, statistical editor of the *Journal of the Society for Psychological Research*.<sup>13</sup> In strictly statistical terms results such as Jahn's may seem significant *iffree from systematic bias*. Small systematic effects can lead to the observed deviations from the control experiment values; it is often extremely difficult to locate and eliminate such systematic effects. Jahn has also conducted remote-viewing experiments, and these, too, have been criticized in sufficiently robust terms ("some of the poorest quality ESP experiments published in many years")<sup>14</sup> that they have drawn a corresponding response ("polemical generalizations and ad hominem assaults").<sup>15</sup>

One of my departmental colleagues, Peter Phillips, with financial support from the late James S. McDonnell (of McDonnell-Douglas Aircraft), also carried out psi studies for a number of years but found himself the object of a sting operation organized by Randi. Two young men who seemed to possess paranormal powers were able to deceive one of Phillips's associates, even though his team had been instructed in Randi's protocols to detect or avoid cheating. When suspicions arose and the procedures were tightened, the effects went away, and Randi made public his scam as a warning to overly trusting scientists.

It is legitimate to ask about these scientists who have ventured into psi research. As with the scientists involved in the cold fusion and polywater cases, they were neither cranks nor pseudoscientists. Phillips is a knowledgeable physicist. Taylor, well known for his many books that have brought current physics to the public, holds a chair at King's College in London. Jahn is an engineering professor at one of our finest universities. We need to recognize, I think, that to these and some other scientists, the paranormal initially seems to hold out the prospect of being a solvable problem, with the possibility of using modern laboratory methods to establish a major new field (as cold fusion and polywater also at first appeared—with a similar lack of success).

It takes professional courage and not necessarily misjudgment to get into this research, though most of us consider the paranormal an empty field. But it is one of the aspects of tenure and academic freedom that tenured faculty should be free to choose their research topics (within reasonable constraints such as lab space) no matter how unpopular that research might be. Having said this, I would be less than honest if I did not go on to point out that it is highly unlikely that a junior faculty member would gain tenure through paranormal research. What counts when being reviewed for tenure are results and not courageous attempts, but this