

PHYSICS
AND
PSYCHICS

THE SEARCH FOR A WORLD

BEYOND THE SENSES

VICTOR J. STENGER

PROMETHEUS BOOKS

BUFFALO, NEW YORK

The Hyperspatial Nuclear Howitzer

The NRC is the operating arm of the National Academy of Sciences, the American equivalent of Britain's Royal Society. Fellowship in the Academy is awarded to the nation's most distinguished and prestigious scientists. Operating independently of government, universities, and industry, the Academy offers advice and undertakes investigations on scientific matters of national importance and public interest, and often with controversial overtones.

In 1984, the Academy was asked by the U.S. Army to examine a wide range of techniques reported to enhance human performance. If the Army could speed up its training of soldiers, it could save millions of dollars each year. The techniques proposed included sleep learning, accelerated learning, integrating hemispheric activity, biofeedback, altered mental states, neurolinguistic programming, and ESP.

In the case of ESP, popular books had appeared suggesting that psychic powers might be put to military use. For example, an enemy might read the minds of commanders, or plant ideas inside them. A battalion of "warrior monks" might be formed, who were able to leave their bodies at will, levitate, and walk through walls. Suggestions for "psychochronic" weapons included the "hyperspatial nuclear howitzer," and an "antimissile time warp" that deflected incoming ICBMs and sent them into the past to explode harmlessly among the dinosaurs.

While these claims are bizarre, to say the least, requests for funding on psychic research were being partially justified on defense grounds, with the familiar argument that the Russians were doing it (see, for example, Targ and Harary 1984).

The NRC formed a committee of fourteen psychologists, neuroscientists, and other scholars and experts to conduct the investigation. The members made an intensive study of the available literature, visited laboratories, talked to leading investigators in the various fields, and commissioned analytical studies of their own.

While some positive results were reported in the use of certain practices such as stress control, no evidence was found to support many claims that were widely promoted in self-improvement books, tapes, and high-priced motivational seminars.

Ironically, of the various techniques surveyed, significant empirical data existed only for those based on the assumption of paranormal powers. Thousands of published experiments offer evidence for psychic phenomena. But the issue is not the magnitude of the database, but rather what conclusions can be drawn from it. The Academy report concluded that "even the most solidly based arguments for the existence of paranormal phenomena fall short of currently accepted parapsychological standards." In other words,

8.

Psience

When reputable scientists correct flaws in an experiment that produced fantastic results, then fail to get those results when they repeat the test with flaws corrected, they withdraw their original claims. They do not defend them by arguing irrelevantly that the failed replication was successful in some other way, or by making intemperate attacks on whomever dares to criticize their competence.

Martin Gardner, *Science: Good, Bad and Bogus*

The Scottish Verdict

J. J. Thomson, the discoverer of the electron, joined the SPR in 1883, shortly after its creation, and served on its councils for more than thirty years. Like many scientists at that time, he thought there might be some validity to psychic phenomena. But after a half century, Thomson remained unconvinced. In his memoirs he gave telepathy "the Scottish verdict—not proven" (Thomson 1936, p. 158).

More recently, after another half century of psychic research, the National Research Council (NRC) has similarly concluded that "the best scientific evidence does not justify the conclusion that ESP—that is, gathering information about objects or thoughts without the intervention of known sensory mechanisms—exists" (Druckman 1987).

despite the huge data sample, ESP is not proven even according to criteria established by parapsychology.

The Paranormalists Fight Back

As you might expect, many promoters of psychic phenomena do not agree with this assessment (see, for example, Palmer 1989 and Alexander 1989). They complain that the committee was biased. But scientific method demands a bias in favor of the conventional explanations for a phenomenon until convincing evidence is provided for an unconventional one.

The critics of the report also complained that the committee failed to find convincing alternative nonparanormal explanations for many of the studies. But in doing so these critics ignore the scientific rule that the burden of proof lies with the proponents of a new phenomenon, not those who critically review the evidence.

The psi spokesmen disagreed with the weight placed by the NRC on the failure of psychic phenomena to replicate, arguing that replication is not a requirement in the behavioral sciences. Then so much the worse for the behavioral sciences! As I have already noted, paranormals would like to rewrite the rules of science so that their results can be admitted. That will always be vigorously resisted by most scientists.

The bottom line is simple: science is based on consensus, and at present a scientific consensus that psychic phenomena exist is still not established.

J. B. Rhine and ESP

The term "Extrasensory Perception" was coined by the central figure in psychic research in the twentieth century, Joseph Banks Rhine. For many years, Rhine headed the Duke Parapsychology Laboratory that he had founded in 1940 at Duke University.

A botanist with a strong religious background, Rhine, like his nineteenth-century predecessors, saw psychic research as a possible bridge between science and religion. Upon getting his Ph.D. in botany from the University of Chicago in 1925, he decided that psychic research, which he renamed parapsychology, offered him more exciting opportunities.

While visiting Harvard in the summer of 1926, Rhine and his wife Louisa, also a Ph.D. botanist, attended a seance conducted by the famous Boston medium Margery Crandon. The Rhines' scientific sensibilities were properly shaken by the observation of what was, to them, rather obvious trickery (Mauskopf et al. 1980, p. 76).

In 1927 J. B. Rhine went to work in the psychology department at

Duke. Two years later, he wrote a paper on the supposedly telepathic powers of a horse named Lady Wonder, stating that "only the telepathic explanation . . . seems tenable in view of the results" (Rhine 1929). Later it was discovered that the owner had been using subtle signals to control the horse's behavior (Hines 1988, p. 84).

These disappointing experiences did not discourage Rhine from continuing his psychic research, but they convinced him to change the direction of the research away from the traditional investigations of anecdotal stories, mediums, and haunted houses.

As a natural scientist trained in the methods of the laboratory, Rhine realized that the laboratory provided an environment where more careful controls could be maintained over the many extraneous factors that often confuse observations. In no time at all Rhine had results from his laboratory experiments. His 1934 book *Extrasensory Perception* presented preliminary studies that he said gave overwhelming evidence for the existence of ESP (Rhine 1934).

Rhine distinguished between three forms of ESP: (1) *telepathy* or thought transference; (2) second-sight or *clairvoyance*; and (3) looking into the future or *precognition*.

While any number of variations of experimental techniques were tried at Duke over the years, Rhine's typical experiment involved simple card-guessing. Using the now-famous Zener, or ESP, cards that contain five presumably neutral geometrical figures (a square, circle, star, cross, and three vertical wavy lines), the subject tried to guess which card would be selected from a shuffled deck typically of twenty-five cards. The subject's choices were then compared with what would be expected by chance.

Rhine reported results that were highly unlikely to have happened by chance, by odds of billions to one. This remarkable success, unprecedented in psychic research history, made him instantly famous.

Critics quickly observed, however, that the experiments were far from airtight. Although challenges of Rhine's statistical techniques were unable to explain all the data, other aspects of his experiments remained questionable. In particular, numerous opportunities for sensory clues to his subjects were shown to exist. Further, the subjects had an incentive to find ways to beat the odds. They were generally paid student help, and the successful ones kept their jobs, on the presumption that they possessed ESP abilities that should be tested further. Sometimes the subjects were paid on the basis of the number of correct responses.

In the typical experimental setup, the subject was not adequately isolated; thus opportunities for cheating could not be ruled out. Furthermore, flaws in the design of some types of ESP cards made their symbols detectable from the reverse side. Sensory detection was also possible by other means familiar to the card shark. (For a complete critique of these experi-

ments, and others that came later, see Hansel 1980.)

Rhine insisted that the results presented in *Extrasensory Perception* were only "early and minor," though they were hardly interpreted as minor by the media. In following years, he made serious attempts to develop tighter procedures. Even these procedures were often not tight enough, however, but when they were, only negative results were found.

Rather than accepting these negative results as evidence against ESP, and concluding that his preliminary results were invalid, Rhine attributed them to a "decline effect": ESP ability somehow fell off with time as subjects became bored.

Thus, Rhine betrayed the same weaknesses of the believer we saw in William Crookes and Oliver Lodge, and the same credulous, trusting nature. Despite his good intentions in providing a controlled laboratory environment, Rhine showed an unwillingness to apply Occam's razor. A much more economical hypothesis for explaining the decline effect is that the phenomenon never existed in the first place, the original positive results having been spurious, and due to inadequate controls. But Rhine was not the impartial investigator, searching out the truth wherever it might lead. He believed in ESP, and set out to prove it, just like the spiritualists of the nineteenth century.

The Pearce-Pratt Experiment

The Pearce-Pratt experiment, also known as the Campus Distance Series, which was conducted from August 1933 to March 1934, is a classic in the history of parapsychology. This particular experiment was partially motivated by a comment of Einstein, who had said that he had an open mind on ESP, but would not believe it until he saw a distance effect (for a review of Einstein's statements on ESP, see Gardner 1981).

The "mental energy" radiated in ESP should fall off with distance, as does light or sound energy. Radiation that is not focused, but spreads in all directions with equal intensity, is uniformly distributed over the surface of a sphere whose area increases as the square of the distance. Thus, the signal intensity, or energy per unit area, decreases as the square of the distance from the source. Even highly focused energy, such as that of a laser beam, will spread somewhat and become less intense at greater distances.

Rhine instructed his associate J. G. Pratt to conduct experiments with one of the star performers at the Duke laboratory, divinity student Hubert Pearce. Pearce had performed well in the preliminary tests, especially when no one else was in the room. His scores tended to fall off when someone dropped by to watch, a common occurrence that parapsychologists attribute to distraction or other changes in the laboratory atmosphere. This is

known as the "observer effect." Interestingly, the observer effect is greatest when the observer is a skeptic or professional magician.

In a typical run of the Campus Distance Series, Pearce synchronized his watch with Pratt's and then was supposed to go to either of two locations, 100 and 200 yards from Pratt's office. At an agreed time, the experiment would begin.

Without looking at the cards in two shuffled decks of twenty-five cards each, Pratt placed one card face down on the desk in front of him each minute. As each card was placed on the desk, Pearce was to write down his guesses as to the symbol on the card. After fifty cards, Pratt turned the cards over and recorded the sequence. Rhine did not participate, except to collect the data sheets from the two participants and place them in a safe for later analysis.

In a total of seventy-five runs, three times Pearce achieved scores as high as thirteen of the twenty-five cards in a single deck. Since five different symbols were used, only five correct responses would be expected on the average from chance. The chance probability for thirteen or more correct guesses for twenty-five cards and five symbols is less than one in ten thousand. Other scores were lower, but the odds against Pearce's overall performance for the seventy-five runs being achieved by chance were 10^{22} to one.

Although several reports on the Pearce-Pratt experiment were published, it was not until twenty years later that a fairly full account of the experiment became available (Rhine 1954). In the meantime, the Pearce-Pratt experiment was widely touted as one of the best examples of evidence for ESP. But although the results were remarkable, they did not show the hoped-for distance effect.

Far from being discouraged by this failure to meet the Einstein criterion, ESP enthusiasts interpreted the absence of any dependence on distance as evidence for the supernatural quality of ESP: it was not bound by the laws of physics. Rhine himself always made it very clear that he believed ESP was a spiritual, that is, nonmaterial, phenomenon.

After the successful series of tests was completed, Hubert Pearce suddenly lost his powers. He was taken to greater distances and different places, but only negative results were obtained. Was this the distance effect? Apparently not, because Pearce never again demonstrated any significant ESP ability at short distances or long. For Rhine, another example of the decline effect was found. A more economical explanation is suggested by the fact that the Duke researchers gradually tightened their controls against trickery.

However, if the lack of a distance effect is an indication of the supernatural qualities of ESP, showing ESP's independence of the physical quantity of space, then the presence of the decline effect is an argument

against supernatural qualities, since they should also be independent of the physical quantity of time.

The ESP Craze

With the astounding successes of Rhine and his collaborators at Duke, ESP became a craze rivaling the spiritualism of almost a century earlier. Spurred on by John Campbell, the publisher of the pulp magazine *Astounding Science Fiction*, few science fiction writers in the following decades failed to include mind-to-mind communication in their fantastic visions of the future. In more recent times, the movie and TV hits *Star Wars* and "Star Trek" have relied heavily on plot lines involving ESP. With this impetus from the mass media, most people today still assume that telepathy is a scientifically verified phenomenon.

Attempts to Repeat

With the attention given to the Duke lab, others jumped on the bandwagon and repeated the Rhine experiments. In the period 1934 to 1940, at least thirty-six experimental reports appeared in various journals. Some positive results were reported, but most came up empty. For example, six independent researchers with 500 subjects in a half-million trials obtained nothing but chance effects (Zusne 1982).

In a 1939 review of experimental results from 1934 to 1938, J. L. Kennedy concluded that only three positive experiments could not be explained by insufficient controls such as sensory clues and recording errors. These were the Pearce-Pratt and Pratt-Woodruff experiments at Duke, and an experiment of S. G. Soal in England (Kennedy 1939). Much later, Rhine himself concurred, saying that these were among the best three or four experiments prior to 1965.

Often skeptics are criticized for setting up straw men, criticizing weak claims that even parapsychologists disown. I agree it is only fair and proper to focus on those experiments that the experts in a field single out as definitive. This is the case for the experiments discussed in this chapter. All have been held by the parapsychological community, at one time or another, to be unassailable paragons of their field as primary evidence for the psi phenomenon.

Throughout the forties and fifties, it was widely believed, even in the scientific community, that evidence for ESP had been found. Although the three experiments mentioned were about the only ones regarded as "solid," so many other marginal positive effects were reported that parapsychology

seemed primed for acceptance as a legitimate science. Surely the next generation of experiments, with improved techniques, would open up this marvelous new world beyond the senses.

Feeling that the existence of psi was pretty much established, parapsychologists directed their experiments toward studying the detailed properties of the phenomenon. Rhine and his colleagues in the U.S. and abroad began experiments to distinguish between the three forms of ESP (telepathy, clairvoyance, and precognition) and a fourth purported power of the mind, psychokinesis (PK): the ability to move objects mentally, that is, the power of mind over matter. Despite the enthusiasm, effects reported by experimenters were rarely confirmed by others and many skeptics remained unconvinced.

Hansel Shoots Down Pearce-Pratt

In 1960, C. E. M. Hansel of Manchester, England, visited Duke to take a hard look at the laboratory's experimental procedures, including those used for the Pearce-Pratt experiment, which had been performed over a quarter century earlier. As mentioned, the details of Pearce-Pratt did not appear in print until twenty years after the experiment was conducted, during which time Rhine and company had repeatedly asked the world to take their word that the experiment had been foolproof.

However, when Hansel examined the details of the Pearce-Pratt experiment and surveyed the site where it was conducted, he discovered a number of glaring deficiencies. These he expounded in an excellent book, *ESP: A Scientific Evaluation* (Hansel 1966; updated in *ESP and Parapsychology: A Critical Reevaluation*, Hansel 1980. For a later edition see *The Search for Psychic Power: ESP and Parapsychology Revisited*, Hansel 1989.)

Hansel points out that the subject, Hubert Pearce, had not been watched during the experiment. During the series of runs of the experiment, no checks were apparently made on his movements; no independent evidence was ever presented that he actually made all his guesses at the times and places specified in the experimental protocol.

Further, Hansel discovered that Pratt's desk could have been visible from outside the room in a number of plausible ways: from the corridor through the clear glass transom above the door, through the transom of the room across the hall, through the window in back of the desk, and through a trap door in the attic above that could have had a peep hole. Replicating the experiment, Hansel was able to achieve twenty-two correct responses for twenty-five cards by looking through the crack at the top of a door in an adjacent room, while an unsuspecting Duke staffer went through the identical procedure Pratt had used, overturning the cards