

CONSCIOUSNESS AND THE SOURCE OF REALITY by Robert G. Jahn and Brenda J. Dunne. Princeton, NJ: ICRL Press, 2011. Pp. ix-xii + 398. \$19.95 (paperback). ISBN 1-936033-03-8.

From 1979–2007, the Princeton Engineering Anomalies Research (PEAR) lab produced the most comprehensive database of controlled laboratory studies of micro-PK on random event generators (REGs) and macro-PK on mechanical, optical, and acoustical physical processes ever assembled. In addition, the lab amassed one of the largest databases of remote viewing (or as the PEAR team prefers, “remote perception”) trials, and developed new quantitative methods of evaluating correspondences between percipient-agent descriptions of target sites. Along the way, the lab established a multifaceted network of scientists, engineers, philosophers, artists, entrepreneurs, and generalists, all of whom have participated in PEAR’s research activities (either as interns or human operators) and are linked by their common conviction that the statistical results of PEAR’s research indicates that human consciousness can influence events in the physical world in ways that transcend the known sensory faculties, and the normally experienced boundaries of time and space. *Consciousness and the Source of Reality* is, according to Jahn and Dunne, intended as a sequel to their 1987 book *Margins of Reality*, and one that summarizes the complete history of PEAR’s research findings, the theoretical models developed to try to account for these findings, and their current thoughts on the scientific, philosophical, and cultural implications of their findings.

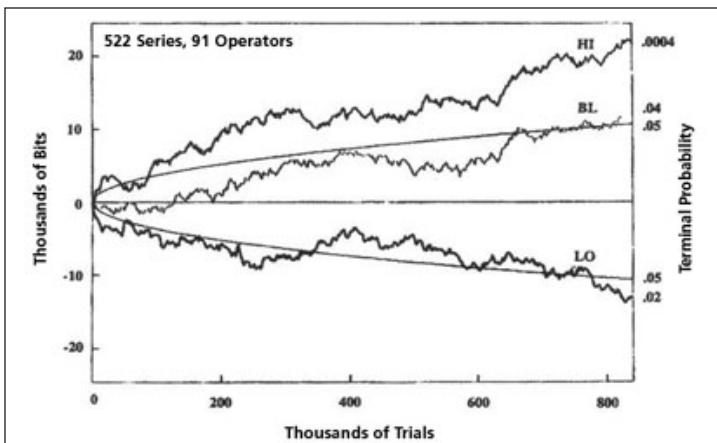
The core of the book is outlined in five sections. Due to the breadth of experiments and theories discussed, and the spatial constraints of this review, I will outline the topics discussed in each section, and then select the topics that I found the most interesting to comment on. The first section, “Venues, Vistas, and Vectors,” outlines five domains (or “vectors,” as Jahn and Dunne prefer) that, according to Jahn and Dunne (hereafter J&D), have become progressively more important in the study of consciousness over the past two decades, and for which PEAR’s findings seem to be applicable either directly or indirectly. Those domains are biology, medicine, creativity, spirituality, and information technology (IT).

While I found it interesting to see how J&D argued for a connection between the PEAR findings and these domains, it was difficult to evaluate how valid some of their interpretations are of controversial views such as neo-Lamarckianism, or alleged medical anomalies such as spontaneous remissions, prayer therapy and energy healing, placebo effects, and so forth. Unfortunately, this is often the case with nonstandard claims made about fields outside of one’s area of expertise (which in this case is physics), and therefore leads me to take these claims with a grain of salt. Also, given that this section involved applications of PEAR’s findings to different domains, I felt it would have been better for organizational purposes if discussion of these connections was left for the final section of the book, where they give

an appraisal of their findings and discuss their scientific, philosophical, and cultural implications.

In the second section, “Human/Machine Connections: Thinking Inside the Box?”, J&D summarize all of PEAR’s experimental work on micro-PK phenomena with REGs (though they prefer the phrase “human/machine anomalies” instead of “PK”) and macro-PK phenomena with mechanical, optical, and acoustical physical processes. They start with a summary of the basic statistical techniques (e.g., the normal distribution,  $z$  scores, effect sizes, statistical significance, etc.) used in their research program, and then go on to discuss their basic experimental strategy, their initial experiments with the so-called “tripolar” protocol, their “Benchmark database” of REG experiments, the co-operator experiments, the PEAR 200 operator competition experiment, ArtREG, the Yantra experiment, MegaREG, ProbREG, FieldREG, operator-REG resonance effects, PseudoREG, experiments with Murphy the random mechanical cascade, the REG-driven PEAR robot, the PEAR pendulum experiments, the double-slit interference experiments, the PEAR fountain experiments, the drumbeat experiment, the remote/off-time REG experiments, the observed gender performance differences, replication inconsistencies and anomalies, and their appraisal of all these findings.

In my opinion, the most compelling evidences for PK discussed in this section are the results of the tripolar protocol in the Benchmark database. To summarize, the tripolar protocol involved having a human operator direct her conscious intention in a PK-REG task in one of two directions (HI or LO), or no direction at all (Baseline, BL). The direction of conscious intention could be chosen either by instruction or the volition of the operator. For the Benchmark experiments, 522 tripolar series were carried out, comprising a total of 2,497,200 trials each of 200 binary samples and most counted at a rate of 1,000 per second. The cumulative deviation graph below, corresponding to Fig. II-4 in the book, illustrates the tripolar protocol results in the Benchmark database.



Needless to say, the statistical results here are rather striking, not simply because the HI intention efforts produced a deviation from chance expectation of 4 in 10,000, or because the LO intention efforts produced a deviation from chance of 2 in 100, but because the chance likelihood of the HI-LO separation was 7 in 100,000. Moreover, while the BL intention efforts reached marginal statistical significance (two-tailed), the calibration runs (where no operator was present while the REG was running) produced a nonsignificant outcome of two-tailed  $p = .41$  in nearly six million trials (see Table II-1 in the book). Outside the skeptical/cynical hypotheses of intentional tampering with the REGs and/or manufacturing of data, these results cannot be accounted for by the hypothetical presence of subtle electrical or mechanical biases in the REGs used by the PEAR team. Indeed, the idea that such biases could shift the REG outputs in exactly the same direction of the intention of the 91 individual operators over 12 years, in hundreds of thousands of instructed and volitional trials, would itself be a remarkable anomaly in need of explanation. Hence, for someone like myself who's open to the possibility of PK phenomena being real but does not yet believe in it, it is hard to see how one can rationally avoid the conclusion that PEAR's Benchmark database provides compelling statistical evidence for a human-REG interaction phenomenon that looks, feels, and smells exactly like what parapsychologists would call micro-PK.

Even more remarkable to me are the remote/off-time REG results, where 30 operators across 491,000 trials were apparently able to bias the laboratory-based REG outputs in the direction of their conscious intentions despite being separated from the REG by spatial distances as great as several thousand miles, and/or temporal distances of several hours or several days before or after the times of operation of the REGs. Moreover, the effect sizes in these remote conditions were actually slightly *greater* than for the local conditions (i.e., where operators were present at the same time and space location as the REG). Curiously though, for both the on-time and off-time experimental series, as well as for the combined series, only the HI intention reached statistical significance ( $p = .009$  one-tailed for on-time, and  $p = .008$  one-tailed for off-time), which seems to indicate that something about the remote conditions yields a strong preference for the HI condition.

For a physicist, these remote/off-time REG findings appear to be impossible to explain with known classical physical theories, as one would expect a distance-dependent drop-off in effect size magnitude. It is even difficult to see how these effects could be explained within standard quantum mechanics, or any of the extant alternative formulations and interpretations. J&D speculate that the remote REG effects seem reminiscent of quantum entanglement, and that quantum entanglement might end up playing an explanatory role for these effects. On the one hand, this is not an unreasonable speculation, given that quantum entanglement seems to be the closest thing in known physical theories that resembles

these remote/off-time PK effects. On the other hand, there seem to be some obvious difficulties with any putative explanation based on quantum entanglement. For one thing, how exactly can a macroscopic, highly thermalized environment such as the human brain maintain coherent quantum states for long enough that they could in principle get entangled with the quantum states of a spatially separated system like an REG? Even if there was a plausible mechanism, how exactly could the operator's quantum brain states get entangled with the quantum states of the REG, when they never interact directly in the ways known to be necessary in order for two systems to get quantum mechanically entangled in the first place? And even if there is a plausible mechanism for this, how exactly can the quantum brain states of the operator being entangled with the quantum states of the REG bias the output of the REG in such a way that would seem to indicate information transfer between the operator and the REG, knowing that quantum entanglement, as is allowed in standard quantum theory, and even under the vast majority of circumstances in alternative formulations and interpretations, doesn't allow for information transfer?

These questions aren't intended as criticisms of J&D's speculation, but rather to illustrate the immense difficulties for any attempt at a brain-based quantum mechanical explanation of these apparent remote/off-time REG effects. Concurrently, such difficulties should, in my opinion, be viewed not with despair for the physicalist, but rather excitement for the fields of physics and consciousness studies. If these effects are real (and the PEAR data doesn't seem to be flawed in any noticeable way), then they imply the need for profound revisions of existing physical theories and existing scientific and philosophical theories of consciousness, arguably of a magnitude as great or greater than any past paradigm shift in these fields. Of course, one would first want to ensure that these remote REG effects can be or have been replicated in independent experiments; but if that happens, it would seem pertinent for physicists and consciousness researchers to then undertake a massive collaborative research effort in trying to understand how these effects are physically possible.

In the third section, "Remote Perception: Information and Uncertainty," J&D summarize the results of PEAR's precognitive remote perception (PRP) work, which was composed of four databases—*ex post facto*, *ab initio*, FIDO, and distributive scoring. They also give several striking examples of matches between percipient transcripts and the targets they describe. One of the most significant innovations to come out of this work was the development of a standardized set of binary "descriptor" questions that were used in place of human judges, thereby making the judging process of percipient impressions to targets more quantitative than in earlier remote viewing studies. The *ex post facto* trials (where the lab staff encoded the trial results into descriptors after the experiments) and the *ab initio* trials (where participants encoded trial results into descriptors at the time of the trials) composed 336 "formal trials" with an overall medium

effect size of .347 and overall  $z = 6.355$ . And for the total database of 653 trials, which includes FIDO and distributive scoring, both of which involved the use of more complex descriptor encoding strategies, an overall small effect size of .212 and  $z = 5.418$  was obtained, along with a highly significant decline effect across the four databases (the first database, *ex post facto*, produced an overall effect size of .754, while the last, distributive scoring, produced a chance overall effect size of -.009).

However, one complication with these results is the fact that in the formal trials, 211 of them were operated in the volitional mode (meaning outbound agents could freely choose any targets they liked), while 125 were in the instructed mode (meaning the targets were randomly selected by a well-calibrated REG). Utts, Hansen, and Markwick (1992) argued (in my opinion persuasively) that the overall effect size and significance level calculated for the volitional trials are problematic because, by not having targets randomly selected, there is no theoretical or empirical baseline distribution to which the observed data can be compared. Dobyns, Dunne, Jahn, and Nelson (1992) retorted that, nevertheless, the instructed trials produced an overall large effect size of .516 with overall  $z = 5.77$ . However, another major complication Utts et al. (1992) point out is that both the volitional and instructed trials used sampling of targets without replacement. Sampling without replacement is well known to lead to violations of statistical independence between trials, which the PEAR analyses did not take into account, and which can lead to  $p$  values incorrect by several orders of magnitude. Dobyns et al. responded to this critique with detailed statistical analyses to demonstrate that, on the whole, sampling without replacement could not be used to invalidate the overall effect size and statistical significance of their database. For me, the difficulty with PEAR's response is that unless someone takes the time to work through their analyses and is personally convinced of their conclusions, it is difficult to trust that the results for the instructed are still as reliable and valid as, say, the Science Applications International Corporation (SAIC) remote viewing studies, where sampling without replacement was a nonissue. To this extent, I feel that PEAR could have done better in their PRP experiments by simply always using sampling with replacement and always randomly selecting targets. At the very least, doing so would have made their experiments impervious to these two potentially fatal criticisms.

In the fourth section, "Thinking Outside the Box," they present the various theories they've proposed to explain the anomalous statistical results of their PK and PRP research. They also discuss why, in their view, their experimental results indicate that science needs to change its prevalent assumption that empirical methodology can ignore the subjective experiences of human participants and the experimenters themselves. The first theoretical model they present describes consciousness/environment interactions using metaphors with the standard quantum mechanical formalism applied to various canonical systems (e.g., the particle in a

box), and the second is a psychological-philosophical model labeled “M<sup>5</sup>: A Modular Model of Mind/Matter Manifestations,” which asserts that consciousness/environment interactions do not emerge from “direct intercourse” between the conscious mind and the tangible physical world, but rather have their origins in the unconscious mind, and in an “intangible substrate” of physical reality, where the distinction between mind and matter “blurs.” They then present a third model called the “Source of reality,” but a direct definition is lacking. Rather, they try to define it indirectly by its relation to mind, where “mind is the ultimate organizing principle that creates reality through its ongoing dialogue with the unstructured potentiality of the Source.”

In the limited space of this review, it is not possible to give a proper evaluation of these three models; however, I will comment that the M<sup>5</sup> model and the Source model appear to be variants of the philosophical position of monistic idealism. I personally have doubts about whether any variant of monistic idealism can ever be philosophically coherent, but setting this skepticism aside, we can ask what might justify such a hypothesis, which is clearly a radical departure from the more mainstream physicalist views about consciousness. As far as I can see, the most compelling justification is the fact that the apparent PK effects observed by PEAR were independent of time and space, as were the apparent PRP effects, and that such nonlocal information transfer phenomena seem extremely difficult to account for in a physicalist brain-based model of consciousness, with or without quantum effects. For these reasons alone, I think J&D’s models merit serious theoretical and philosophical consideration, my skepticism about coherency notwithstanding.

The fifth section, “Consolidation and Closure,” summarizes the findings in the previous chapters, and discusses the cultural and social implications of the PEAR research. The book concludes with an epilogue where J&D give their personal reflections on their careers at the PEAR lab.

In sum, the book is thought provoking on many fronts. In particular, it makes a persuasive case for the existence of a PK phenomenon that can manifest on microscopic and macroscopic scales, and is not bounded by space and time. The evidence accumulated for PRP is less impressive, in my view, but still suggestive of the same kind of apparent precognitive remote viewing phenomenon observed in the later SRI and SAIC studies. Hence, for readers already convinced that psi phenomena are real, the evidence discussed in this book will further reinforce that conviction. And for readers skeptical of the possibility of psi phenomena, their skepticism will be seriously challenged by the evidence, possibly even forcing them to concede, at the very least, that the evidence accumulated by PEAR best supports the psi hypothesis (whether or not they believe the psi hypothesis themselves).

**References**

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MAX DERAKHSHANI

*871 White Plains Road*  
*Scarsdale, NY 10583, USA*  
*maanelid@gmail.*