In his own work on quantum physics at MIT, Edgar Mitchell (astronaut and founder of IONS, Institute of Noetic Sciences) had learned that at the subatomic level, the Newtonian, or classical, view - that everything works in a comfortably predictable manner - had long been replaced by messier and indeterminate quantum theories, which suggest that the universe and the way it works are not quite as tidy as scientists used to think.

Matter at its most fundamental level could not be divided into independently existing units or even be fully described. Subatomic particles weren't solid little objects like billiard balls, but vibrating and indeterminate packets of energy that could not be precisely quantified or understood in themselves. Instead, they were schizophrenic, sometimes behaving as particles - a set thing confined to a small space - and sometimes like a wave - a vibrating and more diffuse thing spread out over a large region of space and time - and sometimes like both a wave and a particle at the same time. Quantum particles were also omnipresent. For instance, when transiting from one energy state to another, electrons seemed to be testing out all possible new orbits at once, like a property buyer attempting to live in every house on the block at the same instant before choosing which one to finally settle in. And nothing was certain. There were no definite locations, but only a likelihood that an electron, say, might be at a certain place, no set occurrence but only a probability that it might happen. At this level of reality, nothing was guaranteed; scientists had to be content with only being able to bet on the odds. The best that ever could be calculated was probability - the likelihood, when you take a certain measurement, that you will get a certain result a certain percentage of the time. Cause-and-effect relationships no longer held at the subatomic level. Stable-looking atoms might suddenly, without apparent cause, experience some internal disruption; electrons, for no reason, elect to transit from one energy state to another. Once you peered closer and closer at matter, it wasn't even matter, not a single solid thing you could touch or describe, but a host of tentative selves, all being paraded around at the same time. Rather than a universe of static certainty, at the most fundamental level of matter, the world and its relationships were uncertain and unpredictable, a state of pure potential, of infinite possibility.

Scientists did allow for a universal connectedness in the universe, but only in the quantum world: which was to say, the realm of the inanimate and not the living. Quantum physicists had discovered a strange property in the subatomic world called 'nonlocality'. This refers to the ability of a quantum entity such as an individual electron to influence another quantum particle instantaneously over any distance despite there being no exchange of force or energy. It suggested that quantum particles once in contact retain a connection even when separated, so that the actions of one will always influence the other, no matter how far they get separated. Albert Einstein disparaged this 'spooky action at a distance', and it was one of the major reasons he so distrusted quantum mechanics, but it has been decisively verified by a number of physicists since 1982.

Nonlocality shattered the very foundations of physics. Matter could no longer be considered separate. Actions did not have to have an observable cause over an observable space. Einstein's most fundamental axiom wasn't correct: at a certain level of matter, things could travel faster than the speed of light. Subatomic particles had no meaning in isolation but could only be understood in their relationships. The world, at its most basic, existed as a complex web of interdependent relationships, forever indivisible.
Jahn and Dunne began to formulate a theory. If reality resulted from some elaborate interaction of consciousness with its environment, then consciousness, like subatomic particles of matter, might also be based on a system of probabilities. One of the central tenets of quantum physics, first proposed by Louis de Broglie, is that subatomic entities can behave either as particles (precise things with a set location in space) or waves (diffuse and unbounded regions of influence which can flow through and interfere with other waves). They began to chew over the idea that consciousness had a similar duality. Each individual consciousness had its own 'particulate' separateness, but was also capable of 'wave-like' behavior, in which it could flow through any barriers or distance, to exchange information and interact with the physical world. At certain times, subatomic consciousness would get in resonance with - beat at the same frequency as - certain subatomic matter. In the model they began to assemble, consciousness 'atoms' combined with ordinary atoms - those, say, of the REG (Random Event Generator) machine - and created a 'consciousness molecule' in which the whole was different from its component parts. The original atoms would each surrender their individual entities to a single larger, more complex entity. On the most basic level, their theory was saying, you and your REG machine develop coherence.

Certainly some of their results seemed to favor this interpretation. Jahn and Dunne had wondered if the tiny effect they were observing with individuals would get any larger if two or more people tried to influence the machine in tandem. The PEAR lab ran a series of studies using pairs of people, in which each pair was to act in concert when attempting to influence the machines.

Of 256,500 trials, produced by fifteen pairs in forty-two experimental series, many pairs also produced a 'signature' result, which didn't necessarily resemble the effect of either individual alone. Being of the same sex tended to have a very slight negative effect. These types of couples had a worse outcome than they achieved individually; with eight pairs of operators the results were the very opposite of what was intended. Couples of the opposite sex, all of whom knew each other, had a powerful complementary effect, producing more than three and a half times the effect of individuals. However 'bonded' pairs, those couples in a relationship, had the most profound effect, which "was nearly six times as strong as that of single operators.

If these effects depended upon some sort of resonance between the two participating consciousnesses, it would make sense that stronger effects would occur among those people sharing identities, such as siblings, twins or couples in a relationship. Being close may create coherence. As two waves in phase amplified a signal, it may be that a bonded couple has an especially powerful resonance, which would enhance their joint effect on the machine.

A few years later, Dunne analyzed the database to see if results differed according to gender. When she divided results between men and women, she found that men on the whole were better at getting the machine to do what they wanted it to do, although their overall effect was weaker than it was with women. Women, on the whole, had a stronger effect on the machine, but not necessarily in the direction they'd intended. After examining 270 databases produced by 135 operators in nine experiments between 1979 and 1993, Dunne found that men had equal success in making the machine do what they wanted, whether heads or tails (or Highs and Lows). Women, on the other hand, were successful in influencing the machine to record heads (Highs), but not tails (Lows). In fact, most of their attempts to get the machine to do tails failed. Although the machine would vary from chance, it would be in the very opposite direction of what they'd intended.

At times, women produced better results when they weren't concentrating strictly on the machine, but they were doing other things as well, whereas strict concentration seemed
important for men's success." This may provide some subatomic evidence that women are better at multi-tasking than men, while men are better at concentrated focus. It may well be that in microscopic ways men have a more direct impact on their world, while women's effects are more profound.

Page 130 ff. Chapter entitled Sharing Dreams

Braud launched his human experimentation with what would become one of his signature studies: the effect of being stared at. Researchers into the nature of consciousness are particularly fond of the phenomenon because it is a relatively easy extrasensory experiment with which to judge success. With transmitted thoughts, there are many variables to consider when determining whether the receiver's response matches the sender's thoughts. With staring, the receiver either feels it or doesn't. It is the closest you can get to reducing subjective feelings to the simple binary multiple choice of a REG machine.

In Braud's hands, staring and being stared at became state of the art, a stalker's paradise. Participants would be placed in a room and be attached to silver chloride palmar electrodes, a skin resistance amplifier and a computer. The only other equipment in the room was a Hitachi color Camcorder VM-2250, which was to be the implement of spying. This small video camera would be attached to a 19-inch Sony Trinitron in another room, two hallways and four doors away. This would allow the starer to view the subject peacefully without the possibility of any form of sensory cueing.

Pure chance, as arrived at by artful mathematical calculation - a computer's random algorithm - governed the starer's script. Whenever the script dictated, the starer would stare intently at the subject on the monitor and attempt to gain his or her attention. Meanwhile, in the other room, the staree, relaxed in a reclining chair, had been told to think about anything other than wondering when he or she was being stared at.

Braud carried out this experiment sixteen times. In most cases, those being stared at showed significantly greater electrodermal activity during the staring sessions than would be expected by chance (59 per cent against the expected 50 per cent) - even though they were not consciously aware of it. With his second group of participants, Braud decided to try something different. In this case, he had them meet each other beforehand. He asked them to carry out a series of exercises that involved staring into each others eyes and looking intently at each other when they talked. The idea was to reduce any discomfort over being stared at and also to get them to know each other. When this group underwent the trial, they got opposite results from the earlier tests. They were at their calmest precisely when they were being stared at. Like the Stockholm Syndrome, a psychological condition where prisoners begin to love their jailers, the starers had begun to love being stared at. In a manner of speaking, they'd become addicted to it. They were more relaxed when being stared at, even at a distance, and they missed it when no one was looking at them."

From these latest studies, Braud grew even more convinced that people had some means of communicating and responding to remote attention, even when they weren't aware of it. Like those people given Charles Tart's electric shocks, the person being stared at was not conscious of any of this. Awareness occurred only deep in a subliminal level.

Much of this research inspired an important consideration - the degree to which necessity dictated the size of the effect. It was obvious now to Braud that random systems or those with a high potential for influence could be affected by human intention. But was the effect any larger if
The system needed changing? If it was possible to calm someone down, would the effect be more exaggerated in someone who needed calming down -someone, say, with loads of nervous energy? In other words, did need allow someone greater access to effects from The Field? Were the more organized of us – biologically speaking – better at accessing this information and drawing it to the attention of others?

In 1983, Braud tested out this theory with a series of studies in collaboration with an anthropologist called Marilyn Schlitz, another consciousness researcher who'd worked with Helmut Schmidt. Braud and Schlitz selected a group of highly nervous people, as evidenced by high sympathetic nervous system activity, and another calmer group. Using a similar protocol to the staring studies, Braud and Schlitz by turns tried to calm down members of both groups. Success or failure would be measured again by a polygraph tracing of a person's electrodermal activity.

The volunteers were also asked to participate in another experiment, in which they'd attempt to calm themselves down with standard relaxation methods.

When they finished the study, Schlitz and Braud noticed a huge disparity between results of the two groups. As they suspected, the effect was far larger in the group needing the calming down. In fact, it was the greatest effect achieved in any of Braud's studies. The calm group, on the other hand, had registered almost no change; their effect only differed slightly from chance.

Strangest of all, the size of the effect on the agitated group by those trying to calm them down was only slightly less than the effect that people had on themselves when using relaxation techniques. In statistical terms it meant that other people could have almost the same mind-body effect on you that you could have on yourself. Letting someone else express a good intention for you was almost as good as using biofeedback on yourself.

Braud tried a similar study showing that you could also help someone else focus his or her attention by remote influence. Once again, the effects were largest among those whose attention seemed to wander the most.

A meta-analysis is a scientific method of assessing whether an observed effect is real and significant by pooling the data from a large body of often disparate individual studies. In effect, it combines single studies, which may sometimes be discounted as too small to be definitive, into one giant experiment. Although there are problems comparing studies of different shapes and sizes, it may give you some idea about whether the effect you are studying is big or small. Schlitz and Braud had conducted a meta-analysis on all of the studies they could find investigating the effect intention on other living things. Research conducted all over the world had shown that human intention could affect bacteria and yeast, plants, ants, chicks, mice and rats, cats and dogs, human cellular preparations and enzyme activity. Studies on humans had shown that one set of people could successfully affect the eye or gross motor movements, breathing and even the brain rhythms of another set. The effects were small, but they occurred consistently and had been achieved by ordinary people who had been recruited to try out this ability for the very first time.

Overall, according to Schlitz and Braud's meta-analysis, the studies had a success rate of 37 per cent against the expected result of 5 per cent by chance. The EDA studies alone had a success rate of 47 per cent compared with the 5 per cent success rate expected by chance.

These results gave Braud several important clues about the nature of remote influence. It was apparent that ordinary humans had the ability to influence other living things on many levels: muscle activity, motor activity cellular changes, nervous system activity. One of other strange possibility was suggested by all these studies: the influence increased depending on how much it
mattered to the influencer, or how much he or she could relate to the object of influence. The smallest effects were found in the fish studies; these increased in experiments dealing with cuddly gerbils; they increased yet again with human cells; and they were at their greatest when people were attempting to influence another person. But the greatest effect of all occurred when the people to be influenced really needed it. Those who required something - calming down, focusing attention - seemed more receptive to influence than others. And strangest of all, your influence on others was only marginally less than your influence on yourself.

Braud had even seen cases of telepathy during the influence sessions. At the beginning of one session, one influencer happened to remark that the electrodermal tracings of the subject were so regimented that they reminded him of a German techno-pop musical band called Kraftwerk. When Braud returned to the recipient's room at the end of the session, the first thing she said was that early in the session, for some odd reason, she kept thinking of the pop group Kraftwerk. In Braud's work this kind of association was becoming the norm, rather than the exception.

Page 144 ff. Chapter entitled The Extended Eye

It was 1972, the year before he'd begun working on his Zero Point Field theories, when Hal was still at SRI. Even at that time, before he'd thought about the implications of quantum zero-point fluctuations, Hal was interested in the possibility of interconnection between living things. But at this stage, he didn't really have a focus, much less a theory. He'd been dabbling in tachyons, or particles that travel faster than the speed of light. He'd wondered whether tachyons could explain some studies he'd come across showing that animals and plants had the ability to engage in some sort of instantaneous communication, even when separated by hundreds of miles or shielded by a variety of means. Hal had really wanted to find out whether you could use quantum theory to describe life processes. Like Mitchell and Popp, he'd long suspected that everything in the universe on its most basic level had quantum properties, which would mean that there ought to be nonlocal between living things. He'd been kicking around an idea that if electrons had nonlocal effects, this might mean something extraordinary on a large scale in the world, particularly in living things - some means of acquiring or receiving information instantaneously. At the time, all he had in mind to test this assumption was a modest study, mainly involving a bit of algae, which Bill Church was eventually persuaded to invest $10,000 in.

Hal had sent the proposal to Cleve Backster, a New York polygraph expert who'd been carrying out studies just for fun, to see if plants register any 'emotion' - in the form of electrical signaling - on standard lie detector equipment, the same way humans do in response to stress. These were the studies that had so fascinated Hal. Backster tried burning the leaf of a plant and then measured its galvanic response, much as he would register the skin response of a person being tested for lying. Interestingly enough, the plant registered the same increased-stress polygraph response as a human would if his hand had been burned. Even more fascinating, as far as Hal was concerned, was that Backster had burned the leaf of a neighboring plant not connected to the equipment. The original plant, still hooked up to the polygraph, again registered the 'pain' response that it had when its own leaves had been burned. This suggested to Hal that the first plant had received this information via some extrasensory mechanism and was demonstrating empathy. It seemed to point to some sort of interconnectedness between living things.

The 'Backster effect' had also been seen between plants and animals. When brine shrimp in one location died suddenly, this fact seemed to instantly register with plants in another location, as
recorded on a standard psychogalvanic response (PGR) instrument. Backster had carried out this type of experiment over several hundred miles and among paramecium, mold cultures and blood samples, and in each instance, some mysterious communication occurred between living things and plants. As in *Star Wars*, each death was registered as a disturbance in The Field.

Hal's proposal for the algae experiments happened to be sitting on Backster's desk the day that he'd been visited by Ingo Swann. Swann, an artist, was mainly known as a gifted psychic, who'd been working on ESP experiments with Gertrude Schmeidler, a professor in psychology at City College in New York. Swann had rifled through Hal's proposal and was intrigued enough to write to him, suggesting that if he were interested in looking at some common ground between the inanimate and the biological that he start doing some experiments in psychic phenomena. Swann himself had done some work on out-of-body experiments and had got good results. Hal was deeply skeptical, but gamely took him up on his suggestion. He contacted Bill Church to see if he could change his study and use some of his grant money to fly Swann out to California for a week.

A short, chubby man with amiable features, Swann arrived dressed absurdly in a white cowboy hat with white jacket and Levis, like some visiting rock star. Hal grew convinced that he was wasting Bill Church's money. Two days after Swann arrived, Hal took him down to the basement of the Varian Hall physics building.

Hal pointed to the magnetometer. He asked Ingo to attempt to alter its magnetic field. Hal explained that any alteration would show up in the output tape.

Ingo initially was disturbed by the prospect, as he'd never done anything like this before. He said he was first going to psychically peer into the innards of the machinery to get a better sense of how to affect it. As he did, the S-curve suddenly doubled its frequency for about 45 seconds— the length of Ingo's time of concentration.

Could he stop the field change on the machine, which is indicated by the S-curve? Hal asked him.

Ingo closed his eyes and concentrated for 45 seconds. For the same length of time the machine's output device stopped creating equidistant hills and valleys: the graph traced one long plateau. Ingo said he was letting go; the machine returned to its normal S-curve. He explained that by looking into the machine and concentrating on various parts, he was able to alter what the machine did. As he spoke, the machine again recorded a 'double frequency and then a double dip— which Ingo said had something to do with his concentrating on the niobium ball inside the machine.

Hal asked him to stop thinking about it and chatted with him about other subjects for several minutes. The normal S-curve resumed. Now concentrate on the magnetometer, Hal said. The tracing started furiously scribbling. Hal told him to stop thinking about it, and the slow S resumed. Ingo did a quick sketch of what he said he 'saw' as the design of the inside of the machine and then asked if they could stop as he was tired. For the next three hours, the machine's output went back to its regular curves, monotonous and steady. A group of graduate students who'd gathered around put the changes down to some strange and coincidental electromagnetic noise creeping into the system. As far as they were concerned, a readily explained blip had occurred. But then Hal had the drawing checked out by Hebard, the post-doctoral student who'd created the machine, and he said it was dead-on accurate.

Hal didn't know what to make of it. It appeared that some nonlocal effect had occurred
between Ingo Swann and the magnetometer. He went home and wrote a guarded paper on the
subject and circulated it to his colleagues, asking them to comment on it. What he'd seen usually
went by the name of astral projection or out-of-body experiences, or even clairvoyance, but he
would eventually settle on a nice, neutral, non-emotive phrase for it: 'remote viewing.'

Hal’s modest experiment launched him on a 13-year project, carried out in parallel with his
Zero Point Field work, which sought to determine whether people could see things beyond any
known sensory mechanism. Hal realized he'd stumbled on some property of human beings that
was not a million miles from what Backster observed - some instant connection with the unseen.
Remote viewing seemed of a piece with the notion he'd been toying with about some sort of
interconnection between living things. Much later, he would privately speculate about whether
remote viewing had anything to do with the Zero Point Field. For the moment, all he was interested
in was whether what he'd seen was real and how well it worked. If Swann could see inside
magnetometers, was it possible for him to see anywhere else in the world?

Inadvertently, Hal also launched America on the largest spy program ever attempted using
clairvoyance. A few weeks after he'd circulated his paper, two blue-suited members of the Central
Intelligence Agency arrived at his door, waving the report in hand. The agency, they told him, was
getting increasingly concerned about the amount of experiments the Russians were conducting into
parapsychology funded by the Soviet security forces." From the resources they were pouring into
it, it seemed as though the Russians were convinced that ESP could unlock all of the West's
secrets. A person who could see and hear things and events separated by time and space
represented the perfect spy. The Defense Intelligence Agency had just circulated a report,
'Controlled offensive behavior - USSR', which predicted that the Soviets, through their psychic
research, would be able to discover the contents of top secret documents, the movements of troops
and ships, the location of military installations, the thoughts of generals and colonels. They
might even be able to kill or shoot down aircraft from a distance.' Many senior staff at the CIA
thought it was high time that the US looked into it as well; the problem was that they were getting
laughed out of most labs. Nobody in the American scientific community would take ESP or
clairvoyance seriously. It was the CIA's view that if they didn’t, the Russians would probably
gain an advantage that the US would never be able to overcome. The agency had been scouring
around for a small research lab outside academia that might be willing to carry out a small, low-
key investigation. SRI - and Hal's current interest - seemed perfect for the job. Hal even checked
out as a good security risk since he'd had experience in intelligence in the Navy and had worked
for the National Security Agency.

The men asked Hal to carry out a few simple experiments - nothing elaborate, perhaps just
guessing objects hidden in a box. If they were successful, the CIA would agree to fund a pilot
program. The two men from Washington later watched Swann correctly describe a moth hidden in
the box. The CIA was impressed enough to throw nearly $50,000 at a pilot project, which was to
last for eight months.

Hal agreed to continue with the box-guessing exercise and for several months he carried out
trials with Ingo Swann, who managed to describe objects hidden in boxes with great
precision… You'll have to buy the book to read the rest of the story.