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# Science and The Human Energy Field

James L. Oschman, Ph.D.

is interviewed by William Lee Rand



James Oschman is one of the leading authorities on the scientific understanding of hands-on healing. His extensive background as a scientist and his experience and understanding of holistic healing place him in a unique position to bridge the gap between the academic/medical world and the healing community. His book, *Energy Medicine*, and his soon-to-be-released new book, *Energy Medicine in Therapeutics and Human Performance*, are remarkable in the way they easily convey a scientific basis for hands-on healing. His work makes it easy for doctors and scientists to understand and accept Reiki, which is valuable for anyone wanting to place Reiki in hospitals or to work in a clinical or scientific setting. His fascinating ideas and insights give a new perspective on how Reiki works which inspires us to make better use of our skills.

*WLR: Can you share a little about your background as a scientist—what field(s) you were involved with, and what prompted you to refocus on energy medicine?*

JLO: As an academic scientist, I worked in the fields of cell biology, biophysics, and physiology, doing research and teaching at major universities and laboratories in the US and abroad. My specialty was electron microscopy—studying the microscopic structure and function of various kinds of cells and tissues. This was very interesting for about twenty years, but then I developed a back problem, probably from bending over microscopes for long periods. Eventually I found my way to Structural Integration, and this changed my life. In addition to helping my back, the practitioner (Peter Melchior) told me about a whole field of research into human energy that I had not encountered during my years in academics. I was curious about what happened to the various fascinating and important discoveries he told me about, and why they never came up in courses or seminars or conversations in academic circles. It seemed that for some reason nobody

wanted to talk about energy. This was strange to me. Following this curiosity led me into the field of energy medicine. I met many therapists who seemed to know a lot about energy, and I was curious about what science, if any, there was to explain their observations.

*WLR: From your perspective of having worked in academic science and also with Reiki and other forms of complementary medicine, can you see ways they fit together?*

JLO: The integration of research science with complementary medicine is a tremendously exciting endeavor. My first focus was not on what science can teach practitioners, but what science can learn from them. Later I learned that science can help the practitioner develop a better understanding of the effects of their work at the cellular and molecular levels. As we discuss this subject, I am sure you will see that Reiki and the other methods certainly do not violate the laws of physics. While we obviously have much to learn, we are beginning to develop logical explanations and testable hypotheses about these methods, and this is

the hallmark of good science. The testing of these hypotheses is one of the most revealing and exciting lines of investigation I can think of.

You will see that I focus on magnetic and biomagnetic fields. This is because we know a lot about these fields and they are relatively easy to measure. But this is not meant to exclude other kinds of energy from the inquiry. The body also emits light, sound, heat, and electromagnetic fields and, like all other matter, it has a gravitational field.

WLR: Can you give us a definition of energy medicine?

JLO: In a sense, all medicine is energy medicine. This may seem trivial, but it makes an important point. Any intervention with a living system involves energy in one form or another. We all have our specialties and interests, and it is challenging to take the step into the energy domain simply because it is the most multidisciplinary pursuit we can undertake, and it can always provide new insights, regardless of our main focus. It is worthwhile for Reiki practitioners to learn a bit of physics and biology so that they can understand the mechanisms involved. It can make your intentions clearer and make the work easier to explain to medical professionals who have a scientific background.

Energy medicine involves understanding how the body creates and responds to electric, magnetic, and electromagnetic fields, including light and sound as well as other forms of energy such as heat, pressure, chemical and elastic energy, and gravity. We are interested in how the body produces these different kinds of energy, and how these energies can be applied to the body for beneficial effects.

It is important for Reiki and other energy therapists to realize that science does not really understand the origin of these various kinds of energy. So if you feel uncertain about what the words mean, if you are bewildered by science, you have good company. The best minds in science, including Albert Einstein, struggled to understand what energy really is and how the various forms of energy relate to each other. The problem is still unsolved at a fundamental level. We say that an electron has an electrical charge, but why it has a charge and just exactly what a charge really is continues to be mysterious to science.

When physicians and scientists react negatively to the term energy medicine, they are forgetting that there are many medical technologies using different forms of energy for diagnosis and treatment. X-rays and MRIs fall into the diagnostic category. Passive measures of the fields produced by the body are also important in diagnosis: electrocardiograms, electroencephalograms, electroretinograms, and electromyograms. Each of these diagnostic tools has a recently developed biomagnetic counterpart: magnetocardiograms, magnetoencephalograms, magnetoretinograms, magnetomyograms, and so on. Every doctor has used an electrocardiogram, an energy

medicine diagnostic tool we have had for nearly a century.

Modern researchers have developed the magnetic biopsy, the electrical biopsy, and the optical biopsy. Transcutaneous nerve stimulators, cardiac pacemakers and defibrillators, lasers, electrocautery, and pulsing magnetic field therapy are examples of energy treatment modalities that are part of conventional medicine. Controversial or not, energy medicine based on the use of medical equipment is alive and well in hospitals, clinics, and medical research centers. Reiki and other forms of hands-on healing are another form of energy medicine based on scientifically measurable energy fields emitted from the healer's hands.

WLR: Has the human energy field (HEF) been demonstrated to exist and can you tell us about the studies that are the most scientifically valid? What instruments have been used and how have measurements been made?

JLO: In a few decades scientists went from a conviction that there is no such thing as an energy field around the human body to a certainty that such fields exist and are medically important. Now doctors are making treatment decisions on the basis of these biofield measurements.

The first human energy field to be well documented was the field of the heart. This research led to the electrocardiogram and was done a century ago by Einthoven, who received a Nobel Prize for his accomplishments in 1924. About a quarter of a century later, Berger measured the electrical fields of the brain, resulting in the medical field of electroencephalography.

The research of Einthoven, Berger, and others established that organs such as the heart and brain produce bioelectric fields that travel through the tissues of the body and that can be recorded with electrodes on the body surface. The electrocardiogram, for example, can be picked up with electrodes placed anywhere on the body, even on the feet.

There is a fundamental law in physics, Ampère's Law, that says that when currents flow through conductors such as wires or living tissues, magnetic fields must be produced in the surrounding space.

Since living tissues are conductors of electricity, the well-established laws of physics require that the currents set up by the heart and other muscles, and the brain and peripheral nerves, will produce fields in the space around the body. These are called biomagnetic fields.

The biomagnetic field of the heart was first measured in Syracuse, New York, in 1963, using two coils, each with two million turns of wire (see Figure 1A). At about the same time these measurements were being made, a discovery took place in Cambridge, England that revolutionized biomagnetic field measurements and led to a Nobel Prize for Brian Josephson a decade later. Josephson's discovery led to the development of a very sensitive magnetometer

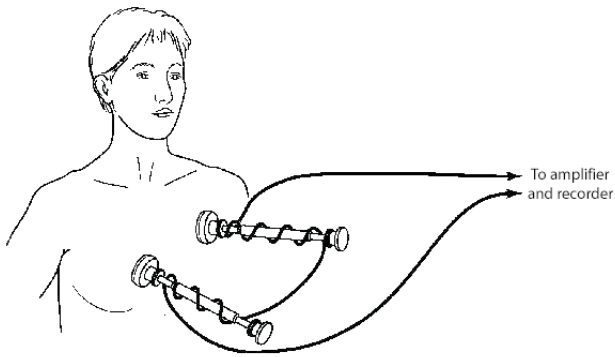


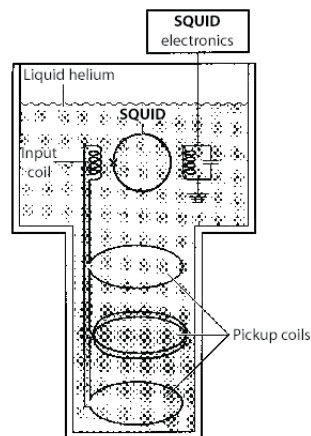
Figure 1A: In 1963, Baule & McFee at Syracuse University in New York detected the magnetic field of the heart using two coils, each with 2 million turns of wire. The heart's field is about one-millionth that of the Earth's field.

called a SQUID (Superconducting Quantum Interference Device). These magnetometers are now used in medical research labs worldwide to study the human energy field. Figure 1B shows the basic design of a SQUID magnetometer.

It is important to appreciate that the standard methods of recording electrical fields with electrodes on the skin surface (as in the electrocardiogram and electroencephalogram) provide much less information than the corresponding biomagnetic measurements. The reason for this is that the electrical resistances of the various tissues vary by a factor of about thirty. Bioelectric fields generated within the body by tissues such as the heart and brain take the paths of least electrical resistance, so the patterns measured at the body surface are sort of smeared out and difficult to interpret. In contrast, the magnetic permeabilities of the various tissues are all about the same as in a vacuum. In essence, the tissues are transparent to magnetic fields. So the biomagnetic measurements are a lot more informative about what is happening inside the body than are the bioelectric measurements.

This is an important point for energy therapists because a magnetic sense, if it exists, will provide much more information on what is going on within the body than will measurements of electrical fields from electrodes on the skin surface. And there is a good scientific basis for the existence of a magnetic sense in

Figure 1B: An important application of Josephson Tunneling is the SQUID or Superconducting Quantum Interference Device, and extremely sensitive magnetometer that is used to map the biomagnetic fields in the space around the body.



the human body. In fact, scientists from Milan, Italy have shown that tissues may exhibit the same Josephson effect that is the basis for the SQUID magnetometer.

*WLR: In various kinds of therapy we refer to healing energy. What do you think of this term?*

*JLO: This term has long been contentious in academic circles, but attitudes are changing due to some basic medical research. Much credit is due to the late C. Andrew L. Bassett and his colleagues at Columbia University College of Physicians and Surgeons in New York for their persistence in overcoming entrenched skepticism and daunting regulatory hurdles to bring pulsing electromagnetic field therapy (PEMF) for bone healing into mainstream medicine. The research showed that certain magnetic fields can jump-start the healing process in fractures that have failed to heal, even for as long as forty years. Bassett and his colleagues at Columbia also researched the use of PEMFs on other musculoskeletal problems, and had considerable success. These problems include osteoarthritis, osteonecrosis, osteochondritis dessecans, osteogenesis imperfecta, and osteoporosis.*

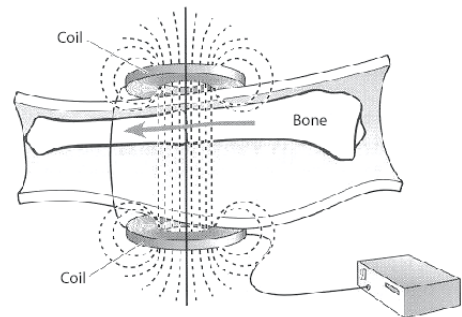


Figure 2A: In the early 1980s, Brighton, Bassett and others demonstrated that fracture "non-unions" could be stimulated to heal using electric and magnetic fields. The FDA approved the method as safe and effective.

The first FDA approval for magnetic field therapy was obtained in 1979. Subsequent work showed that healing in other tissues can be jump-started with fields pulsing at different frequencies. Figure 2A shows the bone healing device, in which coils of wire placed near the fracture site *induce* current flows in the bone.

The important frequencies for stimulating tissue repair are all in the biologically important extremely low frequency (ELF) range. Two cycles per second (Hz) is effective for nerve regeneration, seven Hz is optimal for bone growth, ten Hz is used for ligaments, and somewhat higher frequencies work for skin and capillaries.

The induction phenomenon was described by Michael Faraday in England in 1831. He showed that moving a magnet near a conductor induces a measurable current flow in the conductor.

Faraday's Law of Induction is a basic law of electromagnetism. It is the basis for a modern science called magnetobiology, which explores the effects of magnetic fields on living systems.

What is important about all of this is evidence that practitioners of various hands-on and hands-off therapies such as Reiki, acupressure, aura balancing, Bowen, cranialsacral, Structural Integration (Rolfing), healing touch, Polarity Therapy, massage, and Zero Balancing can emit ELF signals from their hands. This was discovered in a valuable study by Dr. John Zimmerman. His results are shown in Figure 2B. He found that this pulsing field is produced by the hands of practitioners of Therapeutic Touch and Healing Touch, but non-practitioners do not produce such signals.



Figure 2B: ELF electromagnetic signals are emitted from the hands of trained healers, but not from those without training.

Zimmerman found that the pulsing field produced by the hands of practitioners is not steady in frequency, but varies from moment to moment. The frequency sweeps up and down through the very same range of frequencies in the ELF band that medical researchers have identified as being effective for jump starting the healing process in the various tissues they have investigated.

Hence we have uncovered a major synergy between clinical biomedicine and complementary medicine. It seems likely that one effect of the various hands-on and non-contact energy therapies is to introduce into tissues the same healing frequencies that medical researchers have identified as key to tissue healing (see Figure 2C). Moreover, careful medical research on the mechanism by which these signals affect cells applies equally to conventional and complementary therapies.

The basic physics of induction is important because it helps explain some of the effects of Reiki, laying on of hands, and other hands-on and hands-off therapies. In essence, the biomagnetic fields produced by a practitioner's hands can in-

duce current flows in the tissues and cells of individuals who are in close proximity. Evidence that this actually can occur is nicely summarized in a fascinating paper entitled "The Electricity of Touch" and in a book entitled *Science of the Heart* published by the Institute of HeartMath in Boulder Creek, California.

As a result of these discoveries, I have suggested a definition that is also a hypothesis: *Healing energy, whether produced by a medical device or projected from the human body, is energy of a particular frequency or set of frequencies that stimulates the repair of one or more tissues.*

*WLR: From your research, can you explain the biological mechanisms responsible for the HEF?*

JLO: The biomagnetic field arises from the pulsing electric currents set up by the tissues. The overall field, seen from a distance from the body, is a composite of all the fields, the largest being the field of the heart. Because the blood is a very good conductor of electricity, the whole of the circulatory system pulses with electricity each time the heart beats. The second-strongest source of electricity is the retina, which acts like a large battery that changes in polarity when light falls on it. The third-strongest field is that produced by the various muscles, with the larger muscles producing larger fields and tiny muscles, such as those that move the eyes, producing tiny fields. The field of the brain is about a thousandth as strong as that of the heart. Even weaker are the evoked fields produced by the brain when a sensory stimulus is provided, such as a sound, a light, or a touch. Finally, the weakest fields are those of the conducting system of the heart, called the Purkinje system, bundle of His, and bundle branches. Again, the overall field is a composite of all these fields.

*WLR: Are there instruments inexpensive enough that lay people could afford to use them to detect the HEF?*

JLO: The answer depends on which aspect of the field you wish to measure. Biomagnetic measurements generally require expensive equipment and shielded rooms to make sure you are not detecting noise from the electromagnetic environment. An exception seems to be the emissions from Qi Gong masters and others who are able to project very strong biomagnetic fields. These are strong enough to be picked up with two 80,000-turn coils of wire and an amplifier. This was demonstrated by Seto and colleagues in Japan in 1992 (see Figure 3). And there are fascinating measures of the electrical field of the heart that can be made by anyone, using do-it-yourself equipment, as described by Shawn Carlson in "The Amateur Scientist" in *Scientific American*, June 2000 issue. And there are also software and hardware for monitoring an important measure known as *heart rate variability*.\*

These instruments may well be valuable for research on Reiki if it turns out, as I suspect it may, that the energies involved are

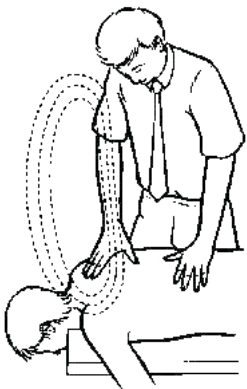


Figure 2C: The idea that some kind of field interaction occurs between individuals is a central theme in many healing techniques.

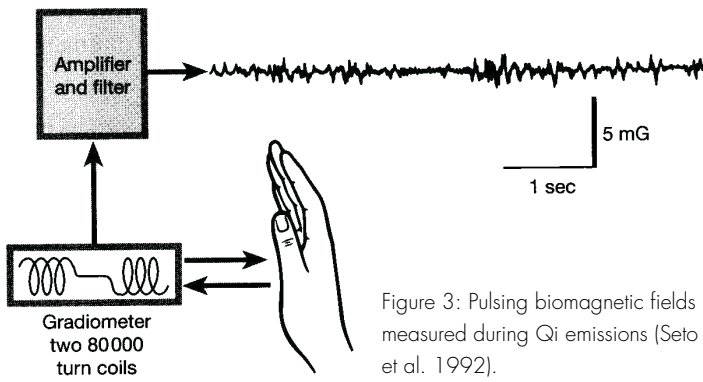


Figure 3: Pulsing biomagnetic fields measured during Qi emissions (Seto et al. 1992).

associated with the energy field of the heart, which is the strongest field the body produces. The Institute for HeartMath has pioneered a study of the relationship between the energy fields of the heart and emotional states. In essence, feelings of love, compassion, and appreciation produce particular harmonics in the frequency spectrum of the electrocardiogram that show up in the field of the body and that beneficially affect every cell in the body. Likewise, fear, anger, and anxiety affect the field, and this, too, is communicated via energetic pathways to every cell in the body.

*WLR: This is extremely interesting. Many Reiki practitioners feel that Reiki energy enters the system through the heart and travels down the arms to the hands. Can you give us a scientifically-based hypothesis describing how Reiki energies might be generated?*

JLO: Based on this information, one possible hypothesis is that when a Reiki practitioner begins giving Reiki, feelings of compassion, love, and other healing feelings are created in the heart. These feelings modify the electrical energies of the heart, which travel through the nerves and especially through the electrically conductive vascular system into the hands, where they create healing biofields that are induced into the client.

My guess is that the fields produced during Reiki treatments will be tiny and very precisely tuned to specific frequencies that stimulate the immune system and other important body systems. This is a hypothesis that needs to be tested.

The laying on of hands is an ancient healing method, and the various therapists who have been feeling and working with energy, literally for thousands of years, have to be regarded as true pioneers. I believe their experiences, such as the sense that the aura has layers to it, will someday be proven accurate. We will also find out what chakras really are. From a practical perspective, the science of the biofield has lots of catching up to do.

*WLR: Once these biofields are created in the hands of the healer, how do they heal?*

JLO: The discovery that pulsing magnetic fields can stimulate repair of bone and other tissues led to a whole series of careful

studies on how the methods work. As a result, we have a detailed understanding of how energy fields can jump start the healing process in different tissues. In fact, there are several plausible hypotheses under investigation. I will describe the hypothesis that has been most thoroughly studied. It is diagrammed in Figure 4 and can be referred to as a signaling cascade.

There are two parts to the story. First, we have a detailed picture of the cascade of reactions taking place from the cell surface to the cytoplasm and on to the nucleus and genes, where selective effects on the DNA have been documented. Secondly, there is a phenomenon called amplification that enables a very tiny field to produce a large effect. This story is a part of the lecture given by A. G. Gilman in 1994 when he accepted the Nobel Prize in Physiology of Medicine. What has been discovered is that a single hormone molecule or neurotransmitter or a single photon of electromagnetic energy can trigger a cellular response. One of the key steps in the amplification process is the activation of a calcium channel so that hundreds of calcium ions flood into the cell, where they activate various cellular processes involved in the repair of tissues that have been injured or diseased.

The most important aspect of this research is that very tiny fields can produce the best effects. This is actually a profound and vital realization that has implications for every branch of medicine.

When a therapist does not get a desired effect, there is a tendency to do more, to push harder or turn up the intensity of the device or give a larger dose of a drug. Modern research points in the opposite direction. Living tissues are actually far more sensitive to external fields than we ever imagined. After a period when many scientists were certain that observed sensitivities to energy fields were physically impossible, we now know that biological systems defy the simple logic that larger stimuli should produce larger responses. For many living systems, extremely weak fields can be far more effective than strong fields.

I suspect that energy therapies such as Reiki are valuable for preventing and even curing some of the serious diseases that are so costly in terms of human suffering and health care dollars.

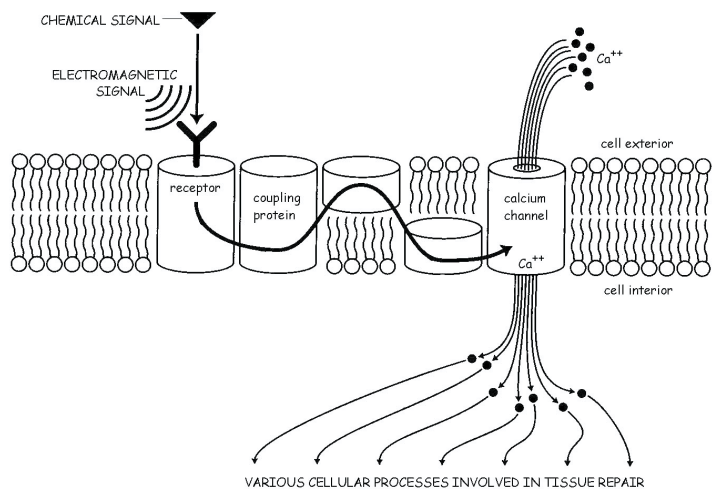


Figure 4: The cellular cascade and amplification.



One of the ways these methods work is by opening up the communication channels that enable cells in the body to talk to each other, and opening up the terrain through which cells are able to migrate to places where they are needed to initiate repair or to fight diseases. Another effect of these methods is to calm the person so their immune functions can operate smoothly.

*WLR: Is there any possible biological basis for some people being able to see or otherwise sense the HEF?*

JLO: There is an effect in physics that is also named for Michael Faraday and is called the Faraday Effect. Magnetic fields alter the polarization of light. Now, the eye is very sensitive to the polarization of light, and I believe some people have the ability to sense the energy field of the body by tuning in to the way the field alters the polarization of light. Some people are born with a heightened sensitivity of this kind and others pick it up later in life. I think it is this kind of vision that enables some people to see the layering of the human energy field.

Another mechanism that may be involved is the discovery by a number of scientists that the retina of the eye is a magnetic receptor as well as a light receptor. Some of the best research has been on honey bees. They use magnetic information for navigation. This research is quite sophisticated in that neurophysiologists have found specific nerves from the eye that send signals when a magnet is brought close to the eye. Whether the visual system can actually form a magnetic image of its environment is an interesting topic for further study.

The two approaches give somewhat different kinds of information about the human energy field. My goal is to see how these observations can be fitted together to provide a more complete picture than either approach can provide alone, and this is precisely what is happening.

*WLR: Is there a correlation between energy medicine and consciousness? If so, what role does consciousness play in energy medicine?*

JLO: With regard to consciousness, a number of scientists have suggested that underlying what we refer to as mind is a three-dimensional neuromagnetic field that is the real substance of consciousness. These are interesting concepts that I explore in my new book, *Energy Medicine in Therapeutics and Human Performance*, which is scheduled for publication in March of 2003.

The way this impacts energy medicine is important. There is no problem more urgent than the resolution of trauma and traumatic memories. This is so at the individual level and at the level of societies, nations, and ethnic groups. Given the present state of the world, energy medicine approaches to trauma may well hold the key to our future survival. Three important books delve into this subject—William Redpath's *Trauma Energetics*, Gallo's

*Energy Psychology*, and Levine's *Waking the Tiger*. It is a subject that I have taken up in my next book as well.

*WLR: Reiki healers note from experience that the Reiki healing energy seems to guide itself and in fact seems to contain a higher intelligence or higher power that creates exactly the right frequency or frequencies needed by the client. This higher intelligence also seems to guide the practitioner to place their hands in the right locations and to remain in a location for the right length of time. Is there anything in your research that would indicate this possibility—the existence of a higher intelligence that guides the Reiki energy and also guides the practitioner?*

JLO: From the scientific perspective, the higher intelligence you refer to is none other than the innate intuitive inner wisdom we all possess and can access when we relax our mental processes and allow our subconscious to sort out what is really going on. In *The User Illusion*, Tor Nørretranders describes how each second, our consciousness reveals to us a tiny fraction of the eleven million bits of information our senses pass on to our brains. Most of the information from our senses goes to our unconscious, where it is processed below our level of awareness. Therefore if we trust our hunches and intuitions, we are relying on information that is closer to reality than the way we sense reality, simply because they are based on far more information and on information that has had time to be processed within. So if you are able to leave your thought processes behind, you will find that your hands will go to the right places as if they were drawn there by a magnet, and you will move on to other locations when the time is right.

One of the ways this works, I believe, is that tissue that is damaged or diseased gives off signals that are induced into the energy systems of the hands that serve to guide you to the right places. This is a hypothesis worthy of testing.

In terms of the possibility of an inner mechanism automatically adjusting the biofield in the hands of the Reiki practitioner according to the needs of the client, I have written about this in my new book. When you recognize that living tissues are composed of semiconductor materials and that they form a sophisticated electronic circuit, it becomes clear about how different frequencies can be both sensed and projected. I call this the body's operating system and compare it to the operating system of a computer. This is a system that works quietly and invisibly in the background, coordinating all the tasks the computer accomplishes. Likewise the body's operating system runs silently and invisibly in the background of everything we do. One of its activities can be to adjust the frequency of its internal circuits to those most appropriate for the situation. In the case of a Reiki treatment, this would involve the operating system of the Reiki practitioner tuning in to the signals being emitted by the client and projecting into those tissues another signal that serves to balance the system. These, of course, are hypotheses for testing.

With the appropriate equipment, we could study these interactions and either confirm or refute the hypotheses. In the process, we would learn a great deal of information about the body that would be valuable for all branches of medicine. This is how science is done. Having a hypothesis, even if it is wrong or incomplete, is an advance over not having a hypothesis as it gives you something to test. Whether your hypothesis is right or wrong is not as important as the information that emerges from the testing.

*WLR: In Reiki II, students learn how to send Reiki at a distance to others. The strength of the Reiki healing energy does not seem to diminish regardless of the distance involved. It can be just as strong when sending across the room as when sending a treatment to someone on the other side of the planet. This goes against the normal scientific theory about the radiation of energy that usually states that the greater the distance from an energy source, the weaker the energy becomes. Is there any scientific way to explain how this could happen?*

JLO: There are several phenomena in physics that could mediate healing at a distance. For example, scalar waves have the extraordinary property of affecting the structure of space everywhere, instantaneously. Scalar waves therefore do not have a velocity as such, and their effects do not diminish with distance.

The scalar wave was predicted from physical theory a century ago, but physicists generally dropped it out of their equations because they could not contemplate a phenomenon that had such remarkable properties. Now that there is growing experimental evidence for healing at a distance, as well as for the benefits of prayer, the scalar wave is being reexamined for its possible role in mediating such phenomena. This is important because many of the complementary therapies are discovering that healing work that can be done locally can also be done at a distance.

A valuable perspective comes from a quantum physicist, Dr. Milo Wolff, who has described the interdependence of all matter on all other matter in the universe. His articles are written in a language that is quite accessible to the nonscientist, while being quite precise and perceptive on a scientific level. His fascinating concepts integrate the properties of the cosmos, matter, and physical laws.

Figure 5 shows how this works. It is from Milo. It shows quantum waves of a particle of matter. For its existence, the particle depends on the interactions between its own out waves and the waves coming in from all of the other particles in the universe. The particle is therefore dependent on its interaction with all other particles in the universe. I think Milo's conclusions are sound.

Another aspect is so-called quantum non-locality or inseparability or Bell's inequality or the EPR effect (for Einstein, Podolski and Rosen, who wrote an important paper in 1935). This is a quantum phenomenon which seems to run counter to common sense, or else that tells us that common sense is not really the way the world

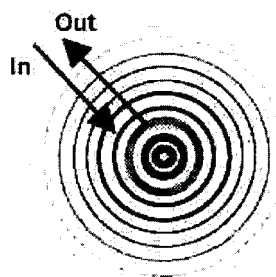


Figure 5: The existence of a particle of physical matter is dependent on its interaction through quantum waves with all other particles in the universe.

works. The reality of this phenomenon has been established experimentally, notably by the French team of Alain Aspect, in 1983.

One experiment demonstrating quantum non-locality involves atoms of calcium that are put into an unstable energy state so that they emit a pair of identical photons traveling in opposite directions at the speed of light. Since they are both moving apart at the speed of light, their velocities add, so they are actually separating at twice the speed of light. Modern technology allows us to track the behavior of these two photons as they move apart. The behavior seems very strange. As one of the photons passes through a polarizer that changes a property called *spin*, the spin of the other photon changes also. The first photon appears to send its twin a message describing what happened to it, no matter how far away they are from each other or how fast they are separating. Since relativity theory does not allow for any kind of message that is faster than the speed of light, one can only conclude that there is some means of instantaneous communication between the two photons that were once together in the original calcium atom. Einstein called this "spooky action at a distance." It is as though the separation of the particles is an illusion—once particles are paired they will always be paired. Since all matter in the universe was once gathered together in one place, before the big bang, all matter in the universe continues to be in relation to all other matter. Milo Wolff's concepts describe the basis for this.

Since these discoveries seem to run counter to common sense, physicists have carefully dissected the experiments to find flaws. The discussion of this subject continues in the physics world, with some physicists accepting quantum non-locality and others rejecting it.

A readable account will be found in a book by F. David Peat entitled *Synchronicity*. And both Ken Wilber and Larry Dossey have written extensively on the subject. At a recent conference on healing, Dossey stated that you can't have a little bit of non-locality. Either this is the way the universe works or it is not. Many phenomena are pointing to the validity of non-locality.

*WLR: The Reiki attunement is a unique part of Reiki training. A person does not have to train to gain the ability to give Reiki energy treatments. The ability is passed on to the student through an attunement process given by the teacher. The attunement seems to turn on the student's ability to channel Reiki and there is a noticeable difference in the strength of healing energy students have before and after the attunement. Is there anything in your*

*understanding of biology or science that would provide an explanation for how this is possible?*

JLO: As with other aspects of energy medicine, it is possible to suggest hypotheses for testing. My suspicion is that what is being passed during the attunement process is a frequency or a set of frequencies that can be transferred from a teacher to a student via the energy field and that will always be remembered by the student. The memory process is probably similar to that involved in homeopathy, in which the electromagnetic signature of a substance is transferred to water. While some scientists have viewed the idea of memory in water with great suspicion, others are doing research to find out how it works. Some good hypotheses have been developed for this. The human body contains a water system that is a veritable antenna for fields in the environment, and it could well be this water system that picks up the frequencies and remembers them much as water can remember the signal from a homeopathic remedy.


*WLR: What direction do you see the scientific investigation of energy medicine taking and what developments do you see for the future?*

JLO: Energy medicine is coming of age now that the old arguments about vitalism vs. mechanism have been resolved and methods have been developed for measuring the human energy field. In my opinion, the study of the fields produced during Reiki and other energy healing methods will be some of the most interesting research that can be done with present measuring devices. It is also important to realize that healing may not always involve projecting healing energy into a person; in some cases it may involve removing energy from a site of injury or disease. So it is also important to study the kinds of fields that can be detected radiating from damaged or diseased tissues.

Another fascinating area is opening up for the study of quantum holography. Edgar Mitchell, the former Apollo astronaut who founded the Institute for Noetic Sciences, has taken a keen interest in this topic, and has written a fascinating chapter about it in a book entitled *Clinical Applications of Bioelectromagnetic Medicine* that is being edited by Paul Rosch and Marko Markov and will be published soon by Marcel Dekker, Inc., New York. One idea from quantum holography is that all bio-matter, from simple cells to organisms, is informationally interconnected internally by non-local quantum coherence (e.g. soliton waves) and externally with the larger environment by coherent quantum emissions. Another is that photonic emissions from living matter carry information about the whole organism.

From what I have seen so far, I believe that the study of quantum coherence is going to take all of medicine to an entirely different level, and many of the seemingly miraculous healings in the past will be easier to understand, explain, and replicate. It may well hold the key to spontaneous healing, the topic of a best-selling book by Andrew Weil (1995). He concluded that "...all the circuitry and machinery is there; the problem is simply to discover how to turn on the right switches to activate the process." I believe we are coming to a time when quantum coherence and other scientific approaches will teach us how to turn on the switches Andrew Weil described in his book.

We have the methods to do all of this research, and I have every expectation that it will lead us into a new medicine that is more effective, less expensive, and easier to perform than the system we have at present. I would like to see a research center that does nothing else but study the kinds of fields emitted by tissues that are diseased or injured and the physiological effects of the signals produced by Reiki and other energy therapists.

The answers to all of these important questions will emerge when modern science begins to listen to and study the people who have been making practical use of energy medicine since long before there even was such a thing as science. 

#### **List of equipment and software to monitor the human energy field:**

- Nerve Express from Heart Rhythm Instruments, Inc., Metuchen, NJ was developed by a Russian scientist, Dr. Alexander Riffine. It has been successfully tested at Columbia University College of Physicians and Surgeons.
- Heart Tuner from Heart Coherence can be used to link or phase lock two hearts in coherence for greater empathy, compassion, etc. Heart Coherence is in Enschede, The Netherlands.
- Per Quantum or Pro Quant Systems from Tauberbischofsheim, Austria.
- Freeze-Framer from the Institute of HeartMath, Boulder Creek, California.
- Freeze-Framer™ and Heart-Lock-In® from Futurehealth, Inc., Newtown, PA. These systems are based on the work of the Institute of HeartMath.

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