

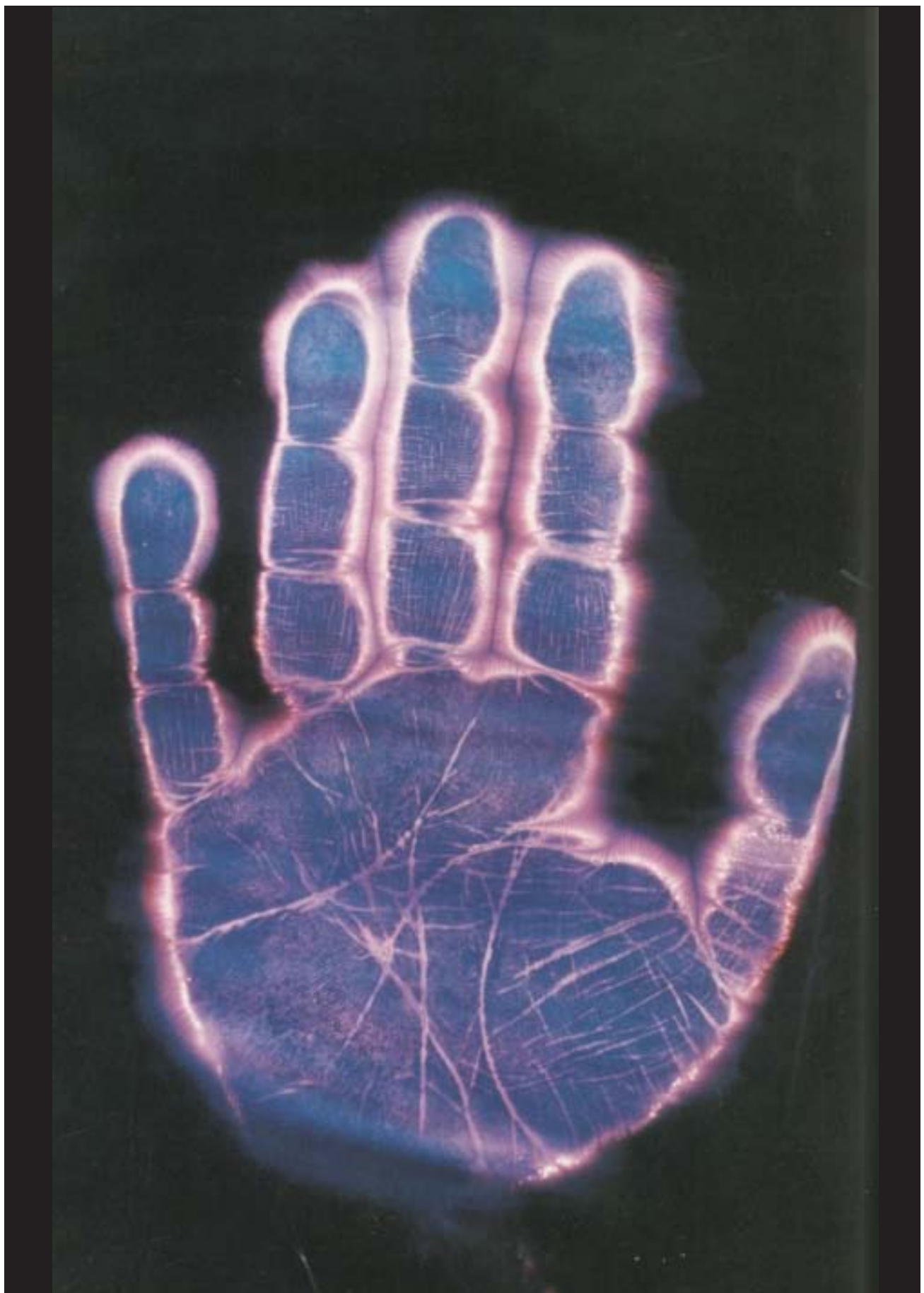


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The Ins And Outs of Mind-Body Energy

By Elmer and Alyce Green

A new research frontier is developing in which physics, psychology, parapsychology, and medicine are blending to form a new "science of consciousness"

Seated in a chair in our laboratory at the Menninger Foundation in Topeka, Kans., a 45-year-old Indian yogi named Swami Rama performed an incredible feat. While seven of us watched, the Swami caused a 14-inch aluminum knitting needle, mounted horizontally on a vertical shaft 5 feet away from him, to rotate toward him through 10 degrees of arc. The Swami had been fitted with a plastic mask that covered his nose and mouth. He breathed through a foam-rubber insert which was covered by a plexiglass shield to deflect any "air currents" down to the sides. Even with this, one of the observers was convinced that the Swami had used some method that could be explained by some already known physical law.

We had warned the Swami that even if he succeeded in demonstrating this kind of phenomena not everyone would accept his explanation of how he had done it. He replied, "That's all right. Every man can have his own hypothesis, but he still has to account for the facts."

Energy was recorded emanating from a hand placed on a sheet of film. The film was exposed by an energized copper plate beneath it.

In science, facts have always been more sacred than theories. But a nonconforming fact usually becomes scientifically acceptable only when an enlarged theory is developed that rationally unites the nonconforming fact with the existing scientific data. Yet this does not always hold true, because the emotions of scientists get in the way. Some nonconforming facts are apparently too outrageous to be tolerated and some scientists ridicule them out of existence. They claim that the best explanation for statistically validated parapsychological phenomena is trickery by the experimenters. Others who are intrigued by the nonconforming facts generally remain silent. Heresy can cost them their promotions and reputations. Eugene Condon, former head of the National Bureau of Standards, phrased the threat in this manner: "Flying saucers and astrology are not the only pseudosciences which have a considerable following among us. . . . There continues to be perception, psychokinesis, and a host of others. . . . In my view, publishers who publish or teachers who teach any of the pseudosciences should, on being found guilty, be publicly horsewhipped and forever banned from further activity. . . ."

Nevertheless, some scientists have seriously investigated a host of "unexplainable" phenomena for about a century, and this field of study has grown rapidly in recent years. One of the most interesting and potentially useful areas is control of the autonomic nervous system, through which most psychosomatic (mind-body) diseases are developed. Physicians believe that from 50 to 80 per cent of human diseases are psychosomatic, that is, they result from the body's unconscious reaction to psychological stress. Thus it is possible, in theory, to train patients to control 50 to 80 per cent of their diseases, to handle other psychosomatic problems, and, hopefully, to decrease their dependence on drugs.

We once thought that the autonomic nervous system, which regulates the body's organs, could not be voluntarily, or consciously, controlled to any significant degree. But recent evidence indicates otherwise. Psychologist Neal E. Miller of Rockefeller University has used a system of rewards and punishments to demonstrate that animals can be conditioned to control autonomic processes, such as the flow of blood to various parts of the body. Human beings also can develop voluntary control of the autonomic nervous system—for example, lowering their blood pressure—apparently by learning to control normally unconscious parts of the mind. This kind of learning usually requires visual or audible feedback, such as a light that flashes or a buzzer that buzzes. These cues inform the subject of his success, telling him whether or not he is controlling what is happening in the normally unconscious domain inside the skin.

Although there is a line of separation between the conscious and the unconscious—the voluntary and involuntary nervous systems—this separation apparently can shift back and forth. For example, when we learn to drive a car we focus conscious attention on every detail of

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A volunteer at the Menninger Foundation is wired for simultaneous auditory feedback of hand temperature, muscle tension in the right forearm, and brain waves during attempts to control "involuntary" processes. A laboratory associate examines the polygraph machine, *right*, which shows a correlation between alpha and theta brain-wave states and the physiological changes that are taking place in the subject's body. The data is collected and compiled in a computer located in the master control room, *below*.



muscular behavior and visual feedback. In other words, we manipulate steering wheel, gas pedal, and brakes according to what we see on the road ahead of us. This tells us what we are doing and suggests corrections if, for example, the car heads toward a ditch. Through such feedback we learn conscious control of the striate, or voluntary, muscles. After much experience, driving becomes automatic. We then may drive through a long section of town while thinking about something else and then wonder if we stopped at all the traffic lights.

When this behavior occurs, processes normally controlled by the conscious have temporarily shifted—to the unconscious. When, through feedback, voluntary control is exerted over so-called involuntary processes, such as dilating and contracting the smooth muscles that control blood flow, the shift is to the conscious domain.

In 1964, we began a voluntary-controls research project at the Menninger Foundation to test this conscious control of the unconscious. We set up a laboratory in which we could monitor the physiological variables of our subjects while they practiced autogenic, or self-generated, techniques. Our equipment included an electroencephalograph (EEG) to measure brain waves, an electrocardiograph (EKG) to measure heart rates, galvanic skin response devices (GSP and GSR) to measure electrical potential and resistance of the skin, thermistors to measure skin temperature, and equipment to measure breathing rates and blood flow in the hands. All of these devices were connected to recording equipment in an adjacent room so that we could collect, and later analyze, all the data.

In one series of tests, our subjects—a group of women from the Topeka area—attempted to raise the temperature of one hand by increasing the flow of blood into the hand. Through a technique called passive concentration, some of our subjects were able to raise their hand temperature by several degrees.

Elmer Green adjusts a portable brain-wave machine that provides both auditory and visual feedback. In this experiment, blood flow and hand temperature can be correlated with alpha brain waves.



Observing this early work, psychologist Gardner Murphy, then head of the Menninger Foundation Research Department, felt that biofeedback might be useful. This meant connecting the monitoring equipment to visual or audible signaling devices. For example, when a thermistor was connected to a meter or a buzzer, the subject could tell if his attempt to change his skin temperature was succeeding by watching the meter needle or hearing the buzzer. When we combined biofeedback with autogenic training, we found that many people learned to control unconscious physiological functions more quickly than with either one alone. We called this combination of the two systems "autogenic feedback training." Autogenic training supplied a strong, suggestive imagery and biofeedback supplied immediate knowledge of the results. These are powerful factors in gaining voluntary control of involuntary processes, and are of great importance in our continuing research program.

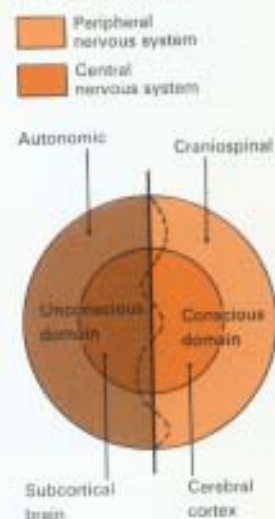
In a few short years, voluntary-controls research throughout the United States has begun to show positive results in alleviating a number of medical complaints. One of these is relief from migraine headaches. Patients have learned to cause their hands to become warmer, an action that relaxes the autonomic nervous system, thereby relieving the migraine pain. Other human malfunctions that can be brought under some degree of self-regulation include erratic heart rate, high blood pressure, Raynaud's disease (which involves deficient blood flow to the extremities), and unconscious muscle tension (responsible for or associated with many unpleasant symptoms).

How does all this take place? Perhaps as follows: According to neuroanatomists, the subcortex of the brain contains a neural network called the limbic system that responds to emotions. Whenever we "have an emotion," the electrical activity of the limbic system changes. This system, however, is linked by many nerve fibers to other sections of the subcortex which contain the neural circuits that control most of the body's involuntary, or autonomic, functions. The exact neural pathways have not yet been traced, but this much seems certain: If we have a thought that is associated with a feeling (and few thoughts are not), the limbic system, through its connections with various control circuits, brings about unconscious changes in some of the body's involuntary functions.

Whatever the exact explanation, the important fact is that if we use a sensitive detector and visual and auditory displays to reveal minute physiological changes, we often can learn to control the sections of the involuntary system that regulate these changes. Theoretically, at least, we should be able to bring under control all our physiological processes with this technique.

This extension of conscious control over involuntary systems has far-reaching implications for psychology and medicine. It suggests that human beings are not biological robots, controlled entirely by genes and the conditioning of life experiences. Migraine, for example, tends

Shifting the States of Mind



The large circle represents the entire nervous system; the small circle only the central nervous system — brain and spinal cord. A solid vertical line divides the system into the conscious domain, which includes all voluntary processes, and the unconscious domain, which includes all involuntary processes. The dotted line suggests that this division is not fixed; there is a continuous undulating separation between the conscious and the unconscious.

to run in families and thus seems to be partly, at least, genetic in origin. When it is brought under voluntary control through autogenic feedback training, the patient is apparently overcoming a genetic predisposition. The freedom gained is not just physiological, however; it has an important psychological component. Many people who learn to control physiological problems find themselves relieved of some emotional and mental symptoms at the same time.

The self-regulation of mind-body energies by consciously controlling normally unconscious functions may, at first glance, seem to be little more than a simple medical advance, but the implications are "theory busting," to say the least. The investigation of voluntary or conscious control of mind-body energies has expanded to include two separate but related areas: Control by the mind of the energy inside the skin (Ins), the domain of psychology, physiology, and medicine; and control by the mind of the energy outside the skin (Outs), the domain again of psychology, but also of physics and parapsychology—the psychic phenomena. Furthermore, Ins and Outs energies are special parts of a general "field of mind" theory, which we will examine later. In a curious blend of Eastern theory and Western technology, a new "science of consciousness" seems to be developing.

Swami Rama, trained in the Himalaya in the discipline of yoga, is contributing to this blend. He came to the United States from India in 1969 and now lives in Palatine, Ill. His guru, or teacher, suggested that he could help bring Eastern and Western science closer together by working with psychologists and medical doctors who are studying mental and physical phenomena. Daniel Ferguson, a psychiatrist at the Veterans Administration Hospital at Fort Snelling, St. Paul, Minn., suggested that our Voluntary-Controls Project might want to study Swami Rama. It would be an opportunity to examine someone with extraordinary control over the autonomic system. In addition, because the Swami appears to have a measure of control over Outs energy as well as Ins, we could also study how the unconscious functions in the relationship between psychology and parapsychology.

Ferguson and the Swami first visited our laboratory in March, 1970. As with our other subjects, we wired up the Swami to record brain waves, heart behavior, respiration, skin resistance and potential, muscle tension, blood flow in hands, and hand temperature. He first made the temperature of the little-finger side of his right palm differ from the temperature of the thumb side by 10°F. He did this apparently by controlling the flow of blood in the large radial and ulnar arteries of his wrist. Without moving or using muscle tension, he "turned on" one of them and "turned off" the other. Later, he demonstrated that he could stop his heart from pumping blood, and could produce specific brain wave patterns on demand.

We asked the Swami how he controlled his heart and blood vessels, and how he consciously produced various kinds of brain waves at will. He explained that these phenomena were possible because, "All of the

body is in the mind. But," he added, "not all of the mind is in the body." In other words, each part of the energy structure called the body is literally a part of the energy structure called the mind, although the reverse is not necessarily true.

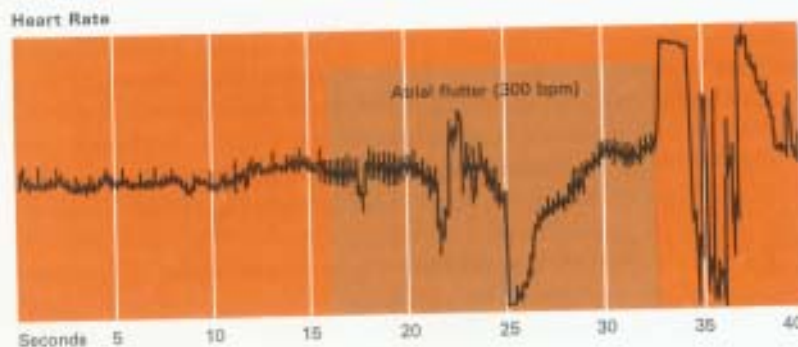
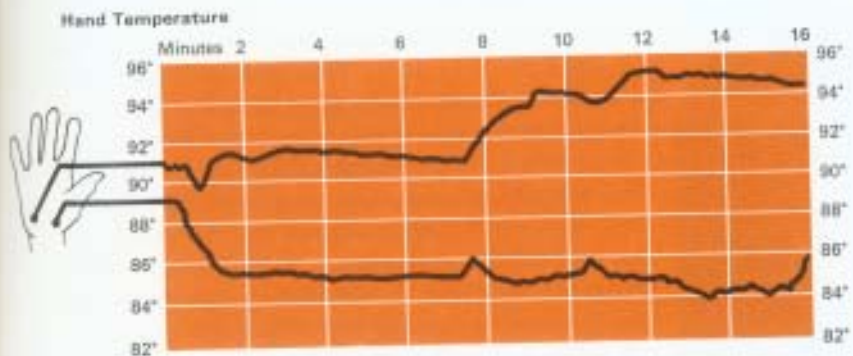
In the raja yoga school of philosophy, two of the most interesting concepts relating to Ins energy are that every part of the body is represented in the unconscious, and every part of the body also *represents* the unconscious. What potent ideas! They mean that when we extend conscious control over a specific part of the unconscious, as in autogenic feedback training, the associated physiological processes can be brought under voluntary control.

In yogic theory, the mind is not merely a person's perception of involuntary electrochemical changes in the body. On the contrary, the body is only the densest section of a "field of energy" that includes both body and mind. It is interesting to remember that our bodies, like everything else in the universe, are electromagnetic fields with swarms of particles as dense portions. We are almost entirely empty



Menninger researchers Alyce Green and Dale Walters prepare Swami Rama for skin temperature and heartbeat experiments.

Controlling the Uncontrollable



The Swami demonstrated that he can control the temperature of areas of his palm. After 12 minutes he obtained a spread of 10 degrees between the thumb side and little-finger side. The Swami's attempt to stop his heart caused an atrial flutter, raising the heartbeat from a normal reading of 70 to 300 beats per minute.



Jack Schwarz demonstrated voluntary control of pain for Menninger scientists. First they wired him to record his brain waves, heart activity, blood flow, hand temperature, respiration rate, and galvanic skin response. Then he pushed an unsterilized darning needle through his biceps. When he removed the needle there was no sign of blood. The monitoring equipment indicated little or no physiological response.

space, although we see ourselves and all nature as solid matter because that is the way we were constructed by evolution to see.

Yogis believe that, without exception, all body processes are mind processes. The mind handles Ins energy because it is Ins energy, even though that is not all it is. For mind is an energy structure, and all matter, whether physiological or nonphysiological, is a matrix of energy that is somehow related to mind. In every thought and in every cell, we are part of the general field, but we are normally unaware of this because we are not conscious of our own unconscious.

Swami Rama represents the classical tradition of Eastern philosophy, but Jack Schwarz, a member of our Western culture, demonstrated some of the same types of phenomena as the Swami. Schwarz, who now lives in Selma, Ore., came to the United States from Holland in 1957. Now in his late 40s, he first learned of his ability to control pain when he was a young child.

Schwarz first visited our laboratory in 1971. After we had wired him up in the same way we had the Swami, he produced a 6-inch darning needle that he first rolled in the dirt on the floor and then proceeded to push through the biceps of his left arm. The needle pierced skin, muscle, and a vein. After he pulled it out, the wound bled for almost 15 seconds. Then he said, "Now it stops." Two seconds later, the wound stopped bleeding. In a second demonstration, the wound did not bleed at all. At no time did he appear to be in pain.

The monitoring equipment provided intriguing information. The GSR showed that he was under no unusual stress. His heart rate remained essentially the same. But the thermistors attached to his fingers showed elevated temperature—a sign of relaxation. And his brain-wave patterns showed what we interpret as alert detachment.

In view of what we had learned from autogenic feedback research and from Swami Rama, it was interesting to hear Schwarz explain how he controls his body functions. Control, he says, depends on cooperation from the "subconscious." He does not force the phenomena to take place, but asks his subconscious if it is willing.

When Schwarz was asked to repeat the demonstration, there was a long pause before he said, "Okay." When we asked why he had paused, he



said, "I had to ask the subconscious if it was willing to do it again. When it said yes, then I said 'okay.'" Schwarz also said that part of the delay was due to the fact that his "paraconscious" also considered the situation. He described this level of mind as "wiser" than either the conscious or subconscious. It acts as a kind of intuitional guide.

If we do not have conscious communication with our unconscious (what Schwarz calls the subconscious), it operates as an automaton. That is why a person with a psychosomatic disease cannot control the disease merely by knowing that it is psychosomatic. A certain kind of internal communication is necessary. Indirect control of the unconscious can be temporarily established in human beings by hypnosis, conditioning, or of course, drugs. But the ultimate value of any method of controlling psychosomatic diseases seems to depend on how truly voluntary it is.

So much data on Outs energy has been collected over the last 100 years that many scientists believe the subject can no longer be ignored. The American Association for the Advancement of Science, the American Psychological Association, and the American Psychiatric Association have begun to recognize the need for serious scientific inquiry by sponsoring panels for discussion of parapsychological research. Parapsychology is the study of several kinds of phenomena including *clairvoyance* (seeing without using the eyes), *clairaudience* (hearing without using the ears), *precognition* (knowing of future events with no known source of information), and *psychokinesis* (the movement of physical matter by mind alone).

Psychokinesis, which Swami Rama demonstrated with the knitting needle, is the area that seems most likely to yield scientific facts that are beyond the need for statistical support. One of the earliest scientific investigations was conducted in the early 1900s by Sir William Crookes, chemist, physicist, and a president of the Royal Society of London. After years of research, he announced that he had observed psychokinetic (and other) events under strict laboratory conditions. But he could not account for the facts and would have to learn more before attempting to explain them. Because Crookes could offer no

Western awakening to acupuncture, *above*, has kindled interest in other techniques that involve mind-body energy. One is the Rolf Method of Structural Integration, *above left*. Roling attempts to realign the body structure and with it, the energy flow.



Healer before



Healer after



Patient before



Patient after

Kirlian photographs of finger pads of "healer" and patient indicate an energy transfer during treatment. In this form of photography, film is exposed electrically to record energy patterns that seem to be emitted by plants and animals.

suitable theory, and had no color movies, videotapes, or polygraphs to record information, the evidence he reported convinced only those who observed the events directly. Sir William's less-charitable colleagues thought he had lost his mind.

The next major effort to demonstrate psychokinetic effects took place in the laboratory of Joseph B. and Louisa Rhine at Duke University in the 1930s and 1940s. They first tested whether subjects could influence the roll of the dice by thought. Subsequent experiments by the Rhines and other researchers have amassed statistical evidence showing that the probability that chance alone could account for experimental results is less than one in trillions.

Yet, without personal experience, people remain unconvinced. When presented without a rationale, the idea of Ins and Outs energy seems quite difficult to accept. Swami Rama and Jack Schwarz have a simple theory to explain these phenomena, although it may not be very easy to believe.

According to their theory, not only is all of the body in the mind, but all of nature is a "field of mind." Magnetic, electrostatic, electromagnetic, gravitational, and other fields surround the planet and are special parts of a general planetary field of energy. Human minds are part of this normally unconscious field, and Outs energies can be controlled when we become conscious of the Outs, or extrapersonal, extension of our unconscious. This is a generalization of the theory that explains voluntary control of Ins energy. In other words, we can control both Ins and Outs energies only after we become conscious of our unconscious. Psychokinesis, and all other parapsychological phenomena, as well as control of physiological processes, are included in this field of mind theory.

As far as we know, no one has yet been able to detect the "energy" associated with such psychokinetic phenomena. But it seems only a matter of time until a satisfactory energy detector is built and the field of psychokinesis will be opened for further studies of variables in mind and in matter.

Schwarz demonstrated what could be regarded as parapsychological phenomena—perhaps even psychokinetic—some years ago before physicians of the Los Angeles County medical and hypnosis associations. After the doctors examined his hands, Schwarz put them into a large brazier of burning coals, picked some up, and carried them around the room. Subsequent examination of his hands showed no burns or other signs of heat.

Schwarz's explanation for this is much the same as Swami Rama's. Mind and matter are essentially the same. But we are normally unaware of this because at best we are only slightly aware of our own unconscious and the field of mind of which it is a part. As we become more aware, we can draw on the field of mind for specific powers. In this case, it provided for Schwarz some sort of extremely effective insulation against the hot coals.

Clearly, our capability to regulate our physiological processes has great potential for our well-being. But apart from satisfying our scientific curiosity, why do we bother with parapsychological matters? Partly because there is a potential for misuse of these abilities. As parapsychology becomes scientifically established, we must consider what will happen if human beings can learn to control the minds of other human beings. Evidence of such a possibility is already being seriously discussed by a number of scientists. In *Psychic Discoveries Behind the Iron Curtain*, published in 1970, authors Sheiler Ostrander and Lynn Schroeder discuss the possible use of parapsychological forces for espionage and sabotage. Thus parapsychology confronts us with a number of moral problems.

When the atomic bomb was developed, moral questions were discussed after-the-fact because of the secrecy required by national security. However, psychokinesis is not a secret, and we shall have time to develop rules to guide us in this field of scientific inquiry.

We tend to agree with the existential experts who maintain that the only good "measure and countermeasure" is knowledge and transpersonal awareness. This awareness of the mind operates from a center above or beyond our personal egotism. It transcends the extrapersonal awareness used in developing psychic abilities. According to the field of mind theory, the only dependable guide for the extrapersonal is the transpersonal. Thus it seems that we should support transpersonal research, if only for reasons of safety. If human beings destroy either themselves or their planet it will not be for lack of extrapersonal development, but for lack of transpersonal development.

Whatever else may be said, it seems clear that there are problems in using Outs energy wisely. By default, we have already allowed physical pollution to endanger the planet. There is a disturbing similarity between man's current abuse of nature and his possible exploitation of parapsychological forces for personal gain. Perhaps by serious scientific study of the field of mind, the "science of consciousness," we can avert "psychic" pollution.

For further reading:

- Aurobindo, *The Synthesis of Yoga*, Sri Aurobindo Ashram Press, 1955.
(Available from the California Institute of Asian Studies,
San Francisco, Calif.)
- Berber, T. X., et al. (Eds.), *Biofeedback and Self-Control, 1970: An Aldine Annual*, Aldine-Atherton, Inc., 1971.
- Green, E., Green, A., and Walters, E., *Journal of Transpersonal Psychology*, Volume II, 1970.
- Rorvik, David M., "Jack Schwarz Feels No Pain," *Esquire*, December, 1972.
- Schultz, J. H., and Luthe, W., *Autogenic Training: A Psychophysiological Approach in Psychotherapy*, Grune and Stratton, 1959.
- Stulman, Julius, *Fields Within Fields . . . Within Fields*, Volume 5, Number 1, 1972.