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Analysis

Psychology and 'Alternative Medicine'

The Mischief-Making of Ideomotor Action

(small muscle therapist control of radionic, point probe, and muscle testing)



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In 1992, I was hired by the State of Oregon as an expert witness in a trial of four chiropractors who had been accused of using a "Toftness-like device" in their practices. The "Toftness Radiation Detector" was an appliance designed by a chiropractor for diagnosing ailments. It consisted of a metal cylinder shaped somewhat like a thick soup can. At one end was a lens; at the other was a smooth plastic "rubbing plate." A handle was attached perpendicular to the middle of the cylinder. In practice, the operator would grasp the handle with one hand and place the lens against the patient's spine. While moving the device along the spine, the chiropractor would rub the fingers of his other hand back and forth on the plastic rubbing plate. As long as the lens was over a healthy part of the spine, the operator's fingers would continue to slide freely across the plate. At least that was the theory.

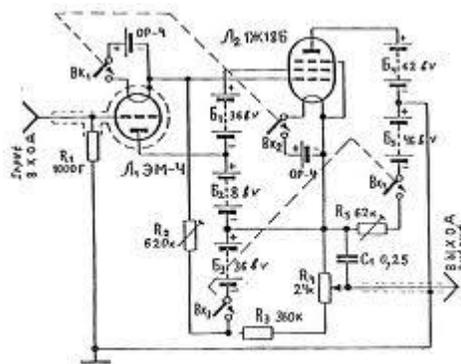
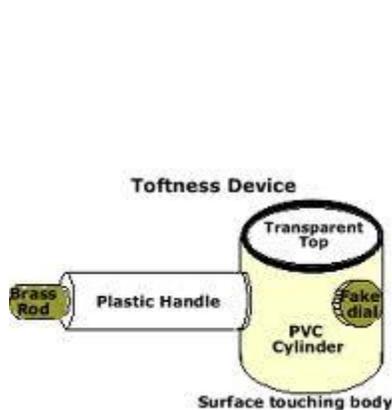
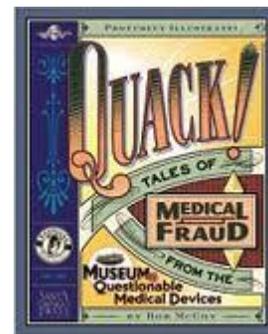


Fig. 3. The electrical diagram of the nursesensor [Zabotin, 1968].



According to Toftness, when the lens came to a diseased part of the back, the operator's fingers would encounter increased friction and start to "stick" on the rubbing plate. The lens, he believed, was sensitive to a very subtle form of radiation that was emitted by portions of the spine that were in need of chiropractic manipulation. Toftness conducted seminars to train chiropractors in the proper use of his apparatus. He would then lease these devices to them for use in their own offices.

In January 1982, the United States District Court in Wisconsin issued "a permanent nationwide injunction against the manufacturing, promoting, selling, leasing, distributing, shipping, delivering, or using in any way any Toftness Radiation Detector or any article or device that is substantially the same as, *or employs the same basic principles as*, the Toftness Radiation Detector." [emphasis added] The United States Court of Appeals for the Seventh Circuit upheld this decision in 1984.

Although the chiropractors who were charged by the State of Oregon claimed to have abandoned the outlawed Toftness device, prosecutors maintained that they were guilty of using a Toftness-like device. Their particular derivative had been designed by one of the defendants, also as an aid for spinal diagnosis. It consisted of a block of wood with an embedded concave plastic surface. This time, however, the "rubbing plate" was placed on an adjacent horizontal surface, rather than being part of the instrument that was in direct contact with the spine. The chiropractor would use his left hand to palpate the patient's spine while he moved the fingers of his right hand back and forth across the plastic rubbing plate. In this slight variation on Toftness' theme, the defendants claimed that whenever their left hand contacted a problematic spot on a patient's spine, friction would increase, causing the fingers of their right hand to "stick" on the rubbing plate.

Despite these similarities, the Oregon chiropractors strongly denied that theirs was a Toftness-like device. Although the chiropractor who designed the Oregon rubbing plate had been trained by Toftness and had previously used the Toftness Radiation Detector himself, he claimed that he no longer believed that Toftness' instrument detected radiation of any sort. In fact, he now believed that the sticking of the fingers on the plate with both the Toftness and the Oregon instruments was not triggered by any physical signal at all. Instead, he argued that the sticking was a trained subliminal response of the chiropractor, evoked unconsciously by his or her accumulated experience in locating spinal problems. He claimed that, although the visual and tactile signs of pathology obtained from spinal palpation were often too weak to be consciously perceived by a chiropractor, years of acquired expertise in spinal diagnosis were stored in his or her unconscious. Supposedly, this expertise could be brought to the surface with the aid of the rubbing plate.

A Video Demonstration

One of my tasks as a consultant and expert witness for the State of Oregon was to produce a video tape to illustrate the psychological principles that made the rubbing plate seem to work. For this purpose, I used two groups of student volunteers. I met with the first group and showed them the Oregon rubbing plate which the Assistant District Attorney had loaned to me. I also showed them a pendulum made from a ring suspended from a cord and a pair of dowsing (or "divining") rods consisting of two metal bars bent at right angles. [1] With one rod in each hand, I first demonstrated how dowsing works by holding the rods in front of me, aimed straight ahead and with their horizontal arms parallel to each other and to the floor. I then slowly walked about the room until the rods suddenly crossed one another. I walked away from that spot and showed how the rods uncrossed and became parallel again. I suggested that the place where the rods had crossed must be near a source of flowing water, perhaps a water pipe under the floor. I then requested that each of the students try the rods. To their amazement, the rods crossed when they walked over the spot I had indicated.

I then did a similar demonstration using the pendulum, before turning to the rubbing plate. I explained that the rubbing plate had been created by an Oregon doctor to amplify the sensitivity of our perceptions. To show how, I spread some playing cards face up on a table. I told the students that the red playing cards reflected mainly light from the long end of the visual spectrum. The black playing cards, on the other hand, reflected very little light, but what they did reflect contained an equal amount of radiation from all parts of the spectrum. Normally, I continued, the human senses cannot detect the difference between these two types of emission. However, by using the rubbing plate, we might be able to enhance our sensitivity to these differences, I suggested. I demonstrated this by passing my left hand back and forth, about a foot above the face-up playing cards. Meanwhile, my right-hand fingers were sliding back and forth across the surface of the rubbing plate. My fingers glided smoothly over the plastic surface whenever my hand was passing over a black card, but they would always begin to "stick" whenever my left hand encountered a red card.

I had each student try the experiment in turn. To their surprise, their fingers would also "stick" whenever their other hand was hovering over a red card. One of the students was from Africa. She became terrified when her fingers seemed to stick as her hand passed over a red card. She was convinced that this was the work of the Devil. I had to spend some time trying to reassure her that the sticking sensation was nothing but a normal, unconscious psychological reaction of her own, not demonic powers at work.

I did similar demonstrations for the second group of students. However, this time I let them see my dowsing rods crossing at a different arbitrarily chosen location in the room. Sure enough, for these students, too, the rods crossed just at the spot where mine had. Also, this time I told them that my fingers would stick only when my left hand was over a black card. As you might guess, for the second group, their fingers stuck only when their left hand was over a black card.

I made this video to illustrate a simple, but important, point. Under a variety of circumstances, our muscles will behave unconsciously in accordance with an implanted expectation.^[2,3] What makes this simple fact so important is that we are not aware that we ourselves are the source of the resulting action. This lack of any sense of volition is common in many everyday actions as well as reports of those responding to hypnotic suggestions. ^[4] The latter report that their actions feel as though they are being propelled by powers external to themselves. My demonstrations with the divining rods had implanted the suggestion in each of the onlookers that the rods would cross at a certain location. When these students took the rods in their own hands and walked over the place where they believed the water pipe to be, they unconsciously made tiny muscle movements that caused the unstable rods to cross. They emphatically denied that they had done anything intentionally to make the rods move. Indeed, many insisted that they could feel the rods moving of their own accord, driven by some outside force.

The sticking response on the rubbing plate is even more compelling in this regard. When the students see one hand over the card that is expected to make their fingers stick on the rubbing pad, they unconsciously press somewhat harder on the surface and/or change the angle of their fingers slightly. This is sufficient to increase the friction between their fingers and the rubbing surface. The subjective experience for most students is eerie and they insist that they are doing nothing on purpose to make the sticking occur.

Ideomotor Action

This "influence of suggestion in modifying and directing muscular movement, independently of volition" was given the label ideomotor action by the psychologist/physiologist William B. Carpenter in 1852. ^[5] Later, the concept was more widely publicized by the Harvard physician turned psychologist, William James. ^[6] Carpenter wanted to show that a variety of currently popular phenomena had conventional scientific explanations rather than the widely believed supernatural ones. The phenomena he tackled included dowsing ("water witching"), the magic pendulum, certain aspects of mesmerism, spiritualists' "table turning," and Reichenbach's "Odylic force." Carpenter did not question the reality of the phenomena, nor the honesty of the people who were involved. He only disputed the explanation, arguing that, "All the phenomena of the 'biologized' state, when attentively examined, will be found to consist in the occupation of the mind by the ideas which have been suggested to it, and in the influence which these ideas exert upon the actions of the body." Thus Carpenter invoked ideomotor action as a nonparanormal explanation for various phenomena that were being credited to new physical forces, spiritual intervention, or other supernatural causes. He published many books and articles during the latter half of the nineteenth century expounding his ideas about ideomotor action. ^[7,8]

William James [9] elaborated upon Carpenter's ideas, asserting that ideomotor activity was the basic process underlying all volitional behavior: "Wherever a movement unhesitatingly and immediately follows upon the idea of it, we have ideomotor action. We are then aware of nothing between the conception and the execution. All sorts of neuromuscular responses come between, of course, but we know absolutely nothing of them. We think the act, and it is done; and that is all that introspection tells us of the matter." James viewed ideomotor action not as a curiosity but as "simply the normal process stripped of disguise." James concluded that, "We may then lay it down for certain that every [mental] representation of a movement awakens in some degree the actual movement which is its object; and awakens it in a maximum degree whenever it is not kept from so doing by an antagonistic representation present simultaneously to the mind." Modern brain researchers have produced data and theory that help explain how quasi-independent modules in the brain can initiate motor movements without necessarily engaging the "executive module" that is responsible for our sense of self-awareness and volition ([see B. Beverstein, this volume](#)).

Probably the first major scientist to become concerned about the mischief being created by ideomotor action, although he did not know the concept by this name, was the French chemist Michel Chevreul. Chevreul, who lived for one hundred three years, became interested in the experiments of some of his fellow chemists around the beginning of the nineteenth century. These colleagues were using what was known as "the exploring pendulum" to analyze chemical compounds.

The first recorded use of the exploring pendulum occurred around 371 c.e. A priest would bow over a plate, the edge of which was marked with the letters of the alphabet. This "diviner" or "oracle" would hold a ring, suspended from a thin thread, over the center of the plate. A question would be put to the priest. The movements of the ring would then be observed. When the ring was set in motion, it would swing toward one of the letters. This letter would be recorded; then the same process would be used to select another letter. This would continue until one or more words, which answered the question, would be generated. In this, we see the origins of the modern Ouija board, used to this day by occultists for divining purposes. [10]

In the early nineteenth century, certain chemists were advocating this method for analyzing the composition of substances. In 1808, a Professor Gerboin of Strasbourg wrote an entire book on use of the pendulum for chemical analysis. [11] As a budding scientist, Chevreul was intrigued, but he remained skeptical. He was surprised, however, to find that the pendulum worked as advertised when he tried it over a dish of mercury. He carried out more tests, however. To see if a physical force was responsible for the movement of the pendulum, he placed a glass plate between the iron ring and the mercury. To his surprise, the oscillations diminished and then stopped. When he removed the glass plate, the pendulum movements resumed. He next suspected that the pendulum moved because it was difficult to hold his arm steady. When he rested his arm on a support, the movements diminished but did not stop altogether.

Finally, Chevreul did what none of his predecessors had thought of doing. He conducted the equivalent of what we would call a double-blind trial. He blindfolded himself and then he had an assistant interpose or remove the glass plate between the pendulum and the mercury without his knowledge. Under these conditions, nothing happened. Chevreul concluded, "So long as I believed the movement possible, it took place; but after discovering the cause I could not reproduce it." His experiments with the pendulum show how easy it is "to mistake illusions for realities, whenever we are confronted by phenomena in which the human sense-organs are involved under conditions imperfectly analyzed." Chevreul used this principle of expectant attention to account for the phenomena of dowsing, movements of the exploring pendulum, and the then current fad among spiritualists, table-turning.

Chevreur was one of France's most prestigious scientists by the time he conducted these investigations. At about the same time, one of England's most famous scientists, Michael Faraday, published his investigation of table-turning, in 1853. [12] By the 1850s table-turning (also called table-tilting or table-rapping) had become the rage among spiritualists, both in North America and in Europe. In a typical session, a small group of persons, usually called "sitters," would sit around a table with their hands resting upon its top. After an extended period of expectant waiting, a rap would be heard or the table would tilt upon one leg. Sometimes the table would sway and begin moving about the room, dragging the sitters along. Occasionally, sitters would claim that the table actually levitated off the floor. Table-turning was what first attracted many prominent scientists to the investigation of psychic phenomena. During the summer of 1853, several English scientists decided to investigate this phenomenon. Contemporary theories attributed table-turning to such things as electricity, magnetism, "attraction," the rotation of the earth, and Karl von Reichenbach's "Odylic force." Electricity, which the public at that time considered to be an occult and mystical force, was the most popular of these explanations.

A committee of four medical men held seances in June 1853 to investigate. [13] They discovered that the table did not move when the sitters' attention was diverted; nor did it move when they had not formed a common expectation about how the table should move. The table would not move if half the sitters expected it to move to the right and the other half expected it to move to the left. "But," the panel commented, "when expectation was allowed free play, and especially if the direction of the probable movement was indicated beforehand, the table began to rotate after a few minutes, although none of the sitters was conscious of exercising any effort at all. The conclusion was formed that the motion was due to muscular action, mostly exercised unconsciously."

The most publicized and carefully controlled study of table-turning was reported by Michael Faraday in 1853. Faraday obtained the cooperation of participants who he knew to be "very honorable" and who were also "successful table-movers." He found that the table would move in the expected direction, even when just one subject was seated at the table. Faraday first looked into the possibility that the movements were due to known forces such as electricity or magnetism. He showed that sandpaper, millboard, glue, glass, moist clay, tinfoil, cardboard, vulcanized rubber, and wood did not interfere with the table's movements. From these initial tests, he concluded that, "No form of experiment or mode of observation that I could devise gave me the slightest indication of any peculiar force. No attraction, or repulsion . . . nor anything which could be referred to other than mere mechanical pressure exerted inadvertently by the turner."

By then, Faraday suspected that his sitters were unconsciously pushing the table in the desired direction. However, his sitters firmly maintained that they were not the source of the table movements. And, as already mentioned, Faraday was satisfied that his sitters were "very honorable." So he devised an ingenious arrangement to pin down the cause of the movement. He placed four or five pieces of slippery cardboard, one on top of the other, upon the table. The sheets were attached to one another by little pellets of a soft cement. The bottommost sheet was attached to a piece of sandpaper that rested against the table top. This stack of cardboard sheets was approximately the size of the table top with the topmost layer being slightly larger than the table top. The edge of each layer in this cardboard sandwich slightly overlapped the one below. To mark their original positions, Faraday drew a pencil line across these exposed concentric borders of the cardboard sheets, on their under surface. The stack of cardboard sheets was secured to the table top by large rubber bands which insured that when the table moved, the sheets would move with it. However, the bands allowed sufficient play to permit the individual sheets of cardboard to move somewhat independently of one another.

The sitter then placed his hands upon the surface of the top cardboard layer and waited for the table to move in the direction previously agreed upon. Faraday reasoned that if the table moved to the left, and the source of the

movement was the table and not the sitter, the table would move first and drag the successive layers of cardboard along with it, sequentially, from bottom to top, but with a slight lag. If this were the case, the displaced pencil marks would reveal a staggered line sloping outwards from the left to the right. On the other hand, if the sitter was unwittingly moving the table, then his hands would push the top cardboard to the left and the remaining cardboards and the table would be dragged along successively, from top to bottom. This would result in displacement of the pencil marks in a staggered line sloping from right to left. Faraday observed that, "It was easy to see by displacement of the parts of the line that the hand had moved further from the table, and that the latter had lagged behind-that the hand, in fact, had pushed the upper card to the left and that the under cards and the table had followed and been dragged by it."

'It's Not the Same Thing!'

Faraday's report was sufficient to convince most scientists that table-turning and related phenomena did not stem from new physical forces or occult powers. Unfortunately, it inadvertently had the opposite effect upon a few prominent scientists such as Alfred Russel Wallace, the cofounder with Darwin of the theory of evolution by natural selection. Wallace had his first encounter with "the phenomena of Spiritualism" in the summer of 1865. He was seated with other sitters around a table. The table behaved in ways that he was sure could not be entirely explained by Faraday's findings and Carpenter's theory of ideomotor action. Faraday's research only dealt with one of the many possible causes of table movements. Indeed, in the original seances using tables, the movements were caused not by ideomotor action but by various cheating methods employed by fraudulent mediums and their accomplices. In addition, many converts' testimonials were obtained under conditions that tend to exaggerate normal human biases and result in sincere but mistaken reports of things that never actually happened.

Wallace experienced gyrations of the table that he was sure could not be handled by Faraday's findings. In his mind, this showed that skeptical scientists such as Faraday cannot be trusted to discover and fairly report upon truly revolutionary phenomena. [14,15] This tendency to dismiss a skeptical investigation because it cannot account for every instance of an alleged class of paranormal phenomena is what I call loopholism-the tendency to seek out each and every loophole in a skeptical account as a way to protect one's belief in a cherished supernatural or pseudoscientific claim. Wallace was familiar with Faraday's report. However, he seized upon the differences between the table's behavior in Faraday's experiment and what he had witnessed to assert that what Faraday had explained and what Wallace had experienced were not the same thing.

Perhaps the most striking, and saddest, example of loopholism is the story of the eminent American chemist, Robert Hare. Hare was professor emeritus of chemistry at the University of Pennsylvania when he became involved with table-turning in 1853, at age 72. According to Isaac Asimov, [16] Hare was "one of the few strictly American products who in those days could be considered within hailing distance of the great European chemists." When Faraday's report was published, the *Philadelphia Inquirer* asked Hare for his comments. In his letter to the paper, on July 27, 1853, Hare firmly rejected the possibility that some exotic force could produce movement of wooden tables. He wrote, "I recommend to your attention, and that of others interested in this hallucination, Faraday's observations and experiments, recently published in some of our respectable newspapers. I entirely concur in the conclusions of that distinguished expounder of Nature's riddles."

A Mr. Amasa Holcombe and a Dr. Comstock replied to Hare's letter and invited him to attend a table-turning session. Comstock appealed to Hare's sense of fairness by asking him to observe and test the phenomena for

himself rather than rely upon Faraday's report. Accepting the invitation, Hare attended a "circle" at a private house. He describes his experience as follows:

Seated at a table with half a dozen persons, a hymn was sung with religious zeal and solemnity. Soon afterwards tappings were distinctly heard as if made beneath and against the table, which, from the perfect stillness of every one of the party, could not be attributed to any one among them. Apparently, the sounds were such as could only be made with some hard instrument, or with the ends of fingers aided by nails.

I learned that simple queries were answered by means of these manifestations; one tap being considered as equivalent to a negative; two, to doubtful; and three, to an affirmative. With the greatest apparent sincerity, questions were put and answers taken and recorded, as if all concerned considered them as coming from a rational though invisible agent. Subsequently, two media sat down at a small table (drawer removed) which, upon careful examination, I found present to my inspection nothing but the surface of a bare board, on the under side as well as upon the upper. Yet the taps were heard as before, seemingly against the table. Even assuming the people by whom I was surrounded to be capable of deception, and the feat to be due to jugglery, it was still inexplicable. But manifestly I was in a company of worthy people, who were themselves under a deception if these sounds did not proceed from spiritual agency.

On a subsequent occasion, at the same house, I heard similar tapping on a partition between two parlours. I opened the door between the parlours, and passed that adjoining the one in which I had been sitting. Nothing could be seen which could account for the sounds.

Hare goes on to describe other phenomena that he could not explain on the basis of normal agency. Although he dismisses the possibility of trickery, Hare does not seem to realize that he would find it just as difficult to detect the modus operandi behind a magician's tricks as he would to find a normal explanation for mediums' feats. In one instance, a skeptical lawyer friend indicated that what they had just witnessed must be due either to legerdemain on the part of the medium or to the agency of some invisible intelligent being. Hare's response is revealing:

But assigning the result to legerdemain was altogether opposed to my knowledge of his character. This gentleman, and the circle to which he belonged, spent about three hours, twice or thrice a week, in getting communications through the alphabet, by the process to which the lines above mentioned were due. This would not have taken place, had they not had implicit confidence, that the information thus obtained proceeded from spirits.

In other words, Hare rejects the possibility of trickery not because it was impossible but because people of "good character" would not have wasted their time on this if it originated in trickery! This same overconfidence in the belief that members of one's own high social class could not engage in treachery protected the often inept spy, Kim Philby, from being exposed for decades while he stole British and American secrets for the USSR. It also shielded the Soviet "mole," Aldrich Ames, who left numerous clues as he systematically plundered the files of the CIA for years.

Hare describes his subsequent research into spirit communication in his remarkable 1855 book which bore the equally remarkable title, *Experimental Investigation of the Spirit Manifestations, Demonstrating the Existence of Spirits and their Communion with Mortals. Doctrine of the Spirit World Respecting Heaven, Hell, Morality, and God. Also, the Influence of Scripture on the Morals of Christians*. [17] Before undertaking his research into spiritualism, Hare tells us he was a materialist and an atheist. He describes in detail the various

experiments he conducted that, to him, proved the existence of the spirit world. He himself developed mediumistic powers. During these experiments Hare claimed he had communicated not only with the spirits of his departed relatives but also those of George Washington, John Quincy Adams, Henry Clay, Benjamin Franklin, Lord Byron, and Isaac Newton.

Hare created a device "which, if spirits were actually concerned in the phenomena, would enable them to manifest their physical and intellectual power independently of control by any medium." The Spiritscope, as he called it, consisted of a pasteboard disk slightly larger than a foot in diameter. Around its circumference he attached the letters of the alphabet in a haphazard order. An arrow that swivelled at the center of the disk was used to select letters one at a time by pointing toward them. For his initial test, he had a medium sit opposite him at a table. The disk was placed between Hare and the medium such that Hare could see the letters and the movements of the arrow but the medium could not. The medium sat with her hands on a surface above the table which, through a system of pulleys, cords, and weights, was attached to the arrow such that slight pressures of her hand would cause it to move in various directions and point to letters. Hare asked if any spirits were present. The arrow pointed to the letter Y (indicating "Yes."). Hare next asked the spirit to provide the initials of his name. The index pointed to R and then to H. Hare asked, "My honored father?" The index pointed to Y.

Hare carried out several more such experiments with similar results. Apparently he never fully understood the key aspect of Faraday's results-that honest, intelligent people can unconsciously engage in muscular activity that is consistent with their expectations. Although the medium sitting opposite him could not see the letters or the index on the disk, she was looking directly at Hare as he was observing the behavior of the index. We now know from many other investigations of ideomotor action - such as Oskar Pfungst's classic investigation of the allegedly intelligent horse, Clever Hans [18] - that people frequently give clues about what they are thinking or observing without realizing it. [19] These subtle clues can guide the behavior of other individuals-or even animals. Sometimes these individuals consciously detect these clues and use them to deceive, [20] but frequently the person being guided by the clues is just as unconscious of them as is the individual providing them.

Hare eventually found he could work alone, without the help of mediums, and still get meaningful communications from his Spiritscope. He had no inkling that he could be source of the messages being spelled out on his Spiritscope. Hare's example shows again that intelligence, professional accomplishment, and personal integrity offer no automatic protection against wishful thinking and self-delusion. Hare's Spiritscope served as the model for the later commercial development of the Ouija board-another striking example of the power of ideomotor action.

Radionics and Medical Radiesthesia

Perhaps in no other area has the seduction of ideomotor action created as much mischief as it has in medical settings. Over the past two centuries, many Europeans have used the term radiesthesia to refer to the alleged force that underlies dowsing and the exploring pendulum. The term is especially prevalent in connection with medical and healing applications. Medical radiesthesia is used to diagnose a variety of ailments-often from a distance. During this century, medical radiesthesia has often been merged with what is called "radionics." Radiesthesia remains very popular today among naturopaths. [21] Radionic devices are "black boxes" or similar contrivances that proponents claim have the ability to harness energy to diagnose and to heal illness. Today's practitioners of medical radiesthesia and radionics trace their beginnings to contraptions created by the San Francisco doctor Albert Abrams at the beginning of this century. [22]

Abrams had a conventional medical education, becoming professor of pathology at what eventually became the Stanford University School of Medicine. In 1910, Abrams claimed to discover that he could diagnose a variety of diseases by tapping his fingers on the patient's abdomen and listening for locations that yielded a dull sound. He then claimed to diagnose a patient from a distance by tapping on the belly of a proxy patient and using a drop of dried blood. Later, finding that an autograph was sufficient, he diagnosed by proxy numerous past celebrities, many of whom he diagnosed with syphilis. Next, Abrams built "electronic" boxes that would enable doctors to diagnose patients at a distance. He went further and devised other gadgets that he leased to others to treat patients at a distance. He required the others to sign an oath that they would never open them. But when finally examined, they revealed a functionless jumble of components. Abrams became extremely wealthy and earned an American Medical Association title, "the dean of the twentieth-century charlatans."

Some of his students had difficulty with the proxy percussion method, so Abrams devised a substitute—a glass rod drawn across the proxy's abdomen. When the glass rod encountered an area corresponding with the distant patient's disease, the friction would increase and the rod would "stick." Note that this "sticking" response resembles the modus operandi of the Toftness Radiation Detector and the Oregon rubbing plate. Indeed, Abrams was the grandfather of the use of the sticking response as the "output" feature of many subsequent radionic devices.

"Dr." Ruth Drown replaced the abdomen with a rubbing plate as the detection component in radionic devices. Mrs. Drown and her various contraptions were the objects of well-publicized quackery trials just before World War II. Like Abrams, Drown invented gadgets to both diagnose and treat patients from a distance. During the war, it became impossible to import Drown instruments into England. George de la Warr was recruited to construct a copy of Drown's apparatus for the British market, and developed grandiose and aggressively marketed descendants of the rubbing plate in England for 30 years. He added a variety of changes—all relying on a rubbing plate. He and his promoters claimed they had discovered a new form of radiation that would revolutionize science and society. In 1949, an inventor named Hieronymous obtained the first patent for a radionic machine. Not surprisingly, its alleged ability to detect unusual emanations depended upon a rubbing plate and the sticking response.

Facilitated Communication, Applied Kinesiology, and TCM

Devices whose seeming utility depends ultimately on a rubbing plate or some related form of ideomotor action are still widely promoted on the fringes of medical, agricultural, forensic, geological, mining, and other applied fields. The preceding account provides the barest outline of the extent to which theories, systems, and machinery, dependent on some kind of ideomotor action, delude intelligent, sincere people-sellers and buyers alike. The following are three contemporary instances of ideomotor action in medicine: "facilitated communication," "applied kinesiology," and certain aspects of Traditional Chinese Medicine.

"In facilitated communication," [23] the "facilitator" attempts to aid autistic children or those with other cognitive and language deficits to communicate. The child is placed in front of a keyboard, letters of which appear on a screen. The facilitator physically steadies the child's finger as it presses the keys. The child then types coherent sentences, apparently revealing high level communication skills.

Advocates of the method claimed that the children possessed high intelligence and considerable knowledge, but they could not express thoughts in speech or writing. Facilitators helped reveal the intellect within. Parents and many therapists were thrilled. Several university professors who specialized in treatment of mentally

handicapped children claimed that the method was a revolution in the understanding of autism. Scientists who called for controlled experiments were rejected for showing lack of understanding and sympathy. Facilitators maintained that they were not influencing the children's letter selections.

Some patients, guided by facilitators, typed out messages claiming that their parents or other caregivers had sexually abused them. Reputations were ruined, alleged perpetrators were jailed, and families were torn apart. Eventually, controlled, blinded experiments isolated the information coming to the facilitator from that coming to the patient, proving the source of the messages was the facilitator, through ideomotor action.

Another example is "applied kinesiology." Legitimate kinesiology is the study of human motor performance using the standard tools of biochemistry, physiology, biomechanics, and psychology. "Applied kinesiology" purports to show that isolated muscle group weakness can be used to diagnose allergies, toxicities, and other disorders. Naturopaths and chiropractors are among its most ardent practitioners. [24] Such things as refined foods, foods grown with chemical fertilizers, artificial food colorants and preservatives, infinitesimal pesticide residues, refined sugar, or even fluorescent lighting are said to sap vital energies and cause disease.

To measure susceptibility to such influences, practitioners place their palms face down on the hand or forearm of the patient who is told to exert an upward counter-force. The practitioner then puts a small amount of the allegedly offensive substance on the patient's tongue, skin, or nostrils, or turns on the fluorescent lights. The patient loses strength instantaneously, the kinesiologist's force easily overcomes the resistance, and the arm collapses. Of course, both participants in this *folie à deux* feel they maintain a constant effort throughout. As the reader is no doubt aware by now, such a demonstration proves nothing in the absence of a placebo control and a double-blind administration. Knowing an allegedly harmful substance has been applied, the practitioner unconsciously presses a little harder and the patient unconsciously resists a bit less.

Some years ago I participated in a test of applied kinesiology at Dr. Wallace Sampson's medical office in Mountain View, California. A team of chiropractors came to demonstrate the procedure. Several physician observers and the chiropractors had agreed that chiropractors would first be free to illustrate applied kinesiology in whatever manner they chose. Afterward, we would try some double-blind tests of their claims. The chiropractors presented as their major example a demonstration they believed showed that the human body could respond to the difference between glucose (a "bad" sugar) and fructose (a "good" sugar). The differential sensitivity was a truism among "alternative healers," though there was no scientific warrant for it. The chiropractors had volunteers lie on their backs and raise one arm vertically. They then would put a drop of glucose (in a solution of water) on the volunteer's tongue. The chiropractor then tried to push the volunteer's upraised arm down to a horizontal position while the volunteer tried to resist. In almost every case, the volunteer could not resist. The chiropractors stated the volunteer's body recognized glucose as a "bad" sugar. After the volunteer's mouth was rinsed out and a drop of fructose was placed on the tongue, the volunteer, in just about every test, resisted movement to the horizontal position. The body had recognized fructose as a "good" sugar.

After lunch a nurse brought us a large number of test tubes, each one coded with a secret number so that we could not tell from the tubes which contained fructose and which contained glucose. The nurse then left the room so that no one in the room during the subsequent testing would consciously know which tubes contained glucose and which fructose. The arm tests were repeated, but this time they were double-blind-neither the volunteer, the chiropractors, nor the onlookers was aware of whether the solution being applied to the volunteer's tongue was glucose or fructose. As in the morning session, sometimes the volunteers were able to resist and other times they were not. We recorded the code number of the solution on each trial. Then the nurse

returned with the key to the code. When we determined which trials involved glucose and which involved fructose, there was no connection between ability to resist and whether the volunteer was given the "good" or the "bad" sugar.

When these results were announced, the head chiropractor turned to me and said, "You see, that is why we never do double-blind testing anymore. It never works!" At first I thought he was joking. It turned out he was quite serious. Since he "knew" that applied kinesiology works, and the best scientific method shows that it does not work, then-in his mind-there must be something wrong with the scientific method. This is both a form of loopholism as well as an illustration of what I call the plea for special dispensation. Many pseudo- and fringe-scientists often react to the failure of science to confirm their prized beliefs, not by gracefully accepting the possibility that they were wrong, but by arguing that science is defective.

Another variation of this special dispensation was illustrated by the reaction of a dowser that Barry Beyerstein and I tested on an edition of the television program *Scientific American Frontiers*, hosted by Alan Alda. The dowser had agreed in advance to a double-blind test that he felt would prove his powers, but failed the test. Mr. Alda felt some compassion for this dowser, and discussed the failure with him. The dowser admitted he was disappointed but he felt that the outcome simply revealed that science had not yet matured to the point where it could cope with dowsing.

A final example of ideomotor mischief can be found in certain practices of Traditional Chinese Medicine (TCM.) [25,26] The essence of TCM is a scientifically undetectable vitalistic force called Qi (pronounced "chee"). Disease, according to TCM, results from an imbalance in the flow of the yin and yang forms of this universal "energy" in one's body. Acupuncture, Chinese herbs, massage, and so on, are supposed to restore the balance of Qi and thereby restore health. TCM practitioners claim to diagnose a wide variety of ailments using "pulse diagnosis" which bears little resemblance to the way scientifically trained physicians take a patient's pulse. The way in which the patient's hand is held by TCM practitioners while taking the pulse provides fertile ground for contamination by ideomotor activity (see the section on "muscle reading" in Marks and Kammann.) Not surprisingly, there is little to no objective evidence that these procedures have any diagnostic value. In a similar manner, TCM practitioners who employ the discipline called "Qi Gong" assert that they can direct their own Qi into others in order to achieve both diagnosis and healing. When a Qi Gong master's Qi is supposedly flowing, the "recipients" often feel suddenly energized or experience paralyzing weakness. In an unblinded demonstration shown on Bill Moyers' PBS series, *Healing and the Mind*, stalwart students were suddenly seen to lose the strength to push over their frail master. In properly blinded tests of Qi Gong masters, when "recipients" do not know when Qi is or is not being directed at them, such changes in how strong they perceive their muscles to be fail to appear.

Some Common Features of Ideomotor-Based Systems

Although the effects of ideomotor action have been understood for at least one hundred fifty years, the phenomenon remains surprisingly unknown, even to scientists. To conclude, the following are some of the psychological features that characterize nearly all the systems and schemes that have bases in ideomotor action.

Ideomotor Action

To reiterate, all systems using the rubbing plate, the dowsing rod, the exploring pendulum, or related technique depend on an almost undetectable motor movement, amplified into a more noticeable event. The impetus arises

from one's own subtle and unperceived expectations. Elaborate, grandiose theories are then devised to explain the observed effects.

Projection of the Operator's Actions to an External Force

This is one of key properties of ideomotor (small muscle control conscious or unconscious) action. Although the operator's own actions cause the fingers to stick, the rod to move, or the pendulum to rotate in a given direction, the operator attributes the cause onto an external force. Subjectively, that is what it feels like. Lacking a sense of volition, one credits unknown forces, radiations, or other external emanations.

The Cause of the Action Is Attributed to Forces New to Science and Revolutionary in Nature

This is implied in the previous point. Not only is the cause attributed to an external source, but each time the phenomenon is encountered anew, those who have not read their history attribute it to a force previously unknown.

Delusions of Grandeur

Not only do the proponents insist that the cause is external, but they tend to see themselves as revolutionary saviors of mankind. They claim to have discovered new principles and forces, ones whose ramifications will transform contemporary science, not to mention society as we know it.

Delusions of Persecution

Those who suffer from delusions of grandeur frequently exhibit delusions of persecution. Self-styled revolutionaries assert that orthodox scientists dismiss discoverers of breakthroughs such as radionic devices and the like merely out of envy, pig-headedness, conformism, or unwillingness to give credit to brave outsiders who are not part of the scientific establishment.

To Be Forearmed Is To Be Disarmed

Proponents of quack devices and procedures will often argue that they are aware of ideomotor action and the role of expectancies. They often assert that their awareness makes them immune from its effects. Many dowsers now admit unconscious expectations can affect the action of the divining rod. They assert that their awareness prevents ideomotor action and allows expression of the "true dowsing response." Unfortunately, the awareness of ideomotor action does not make one immune from its expression.

Self-Sealing Belief Systems

Once the proponent becomes convinced that his favorite system "works," then the psychological forces discussed by James Alcock come into play. These self-serving biases serve to protect the belief system from falsification. Loopholism is one way proponents protect their beliefs in the face of contrary evidence. Saying "It is not the same thing" allows the believer to shield the system. Alcock supplies more examples of this ability to distort, forget, or ignore evidence. The true physician is aware of distortions of one's own judgement, as well as those of pseudoscientific competitors.

References

1. Vogt EZ, Hyman R. *Water Witching U.S.A.* 2d ed. Chicago, IL: University of Chicago Press; 1979.
2. Ibid.
3. Spitz H. *Nonconscious Movements: From Mystical Messages to Facilitated Communication*. Manwah, NJ: Lawrence Erlbaum; 1997.
4. Bowers KS. Dissociated control, imagination, and the phenomenology of dissociation. In: Spiegel D, ed. *Dissociation: Culture, Mind and Body*. Washington, DC: American Psychiatric Press; 1994: 21-38.
5. Carpenter WB. On the influence of suggestion in modifying and directing muscular movement, independently of volition. *Proceedings of the Royal Institution of Great Britain*. 1852;1:147-153.
6. James W. *Principles of Psychology*. New York, NY: Holt; 1890.
7. Carpenter WB. *Mental Physiology*. London, UK: C. Kegan Paul; 1874.
8. Carpenter WB. *Mesmerism, Spiritualism, &c.* New York, NY: D. Appleton; 1874.
9. Carpenter, On the influence of suggestion in modifying and directing muscular movement, independently of volition.
10. Vogt and Hyman, *Water Witching U.S.A.*
11. Jastrow J. *Wish and Wisdom*. New York, NY: Appleton-Century-Crofts; 1935.
12. Faraday M. Experimental investigation of table turning. *Atheneum*. July 1853:801-803.
13. Podmore F. *Mediums of the 19th Century*. Vol. 2. New Hyde Park, NY: University Books; 1963.
14. Wallace AR. *On Miracles and Modern Spiritualism: Three Essays*. London, UK: James Burns; 1875.
15. Wallace AR. *My Life: A Record of Events and Opinions*. New York: NY: Dodd, Mead; 1906.
16. Asimov I. *Asimov's Biographical Encyclopedia of Science and Technology*. Rev. ed. New York, NY: Equinox; 1976.
17. Hare R. *Experimental Investigation of the Spirit Manifestations, Demonstrating the Existence of Spirits and Their Communication With Mortals: Doctrine of the Spirit World Respecting Heaven, Hell, Morality, and God*. New York, NY: Partridge and Brittan; 1855.
18. Pfungst O. *Clever Hans*. New York, NY: Hold, Rinehart and Winston; 1965. [This is a reprint of the original 1911 edition. It contains a useful introduction by Robert Rosenthal.]
19. Hyman R. Cold reading: how to convince strangers that you know all about them. *Zetetic*. 1977;1(2):18-37.
20. Marks D, Kammann R. *The Psychology of the Psychic*. Amherst, NY: Prometheus Books; 1980.
21. Beyerstein B, Downie S. Naturopathy. *Scientific Rev Alternative Med*. 1998;2(1):20-28.
22. Armstrong D, Armstrong SM. The body electric: future shocks. In: *The Great American Medicine Show*. New York, NY: Prentice Hall; 1991.
23. Dillon K. Facilitated communication, autism, and Ouija. *Skeptical Inquirer*. 1993;17(3):281-287.
24. Beyerstein B, Sampson W. Traditional medicine and pseudoscience in China: a report of the second CSICOP delegation. Part 1. *Skeptical Inquirer*. 1996;20(4):18-26.
25. Ibid.
26. Sampson W, Beyerstein B. Traditional medicine and pseudoscience in China: a report of the second CSICOP delegation. Part 2. *Skeptical Inquirer*. 1996;20(5):27-34.

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