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[p. 373]

**ON THE TRANSPARENCY OF
THE ANIMAL BODY TO ELECTRIC AND
LIGHT WAVES**

**As a Test of Death and
a Possible Mode of Diagnosis and
a Probable New Method of Psychic Research**

**by
Dr. Elmer Gates**

I have recently had my attention called to a report cabled from London to New York papers about experiments of mine concerning the transparency of living and dead bodies to electric waves and light rays. Some of the statements are partly true and some of them are wrong. I have been not a little annoyed by sensational and even "fake" articles that have from time to time appeared in the press tending by misinformation to cast discredit upon the real merit of my work in these lines. For instance, whilst I did not "see the shadow of the soul of a rat," as reported, it is nevertheless probable that I have opened up a new method of psychic research, and whether I have or not, I have at least discovered a new test of death and a new method of diagnosis, which are in themselves matters of interest and importance.

Please allow me to state what I have actually said and done in this domain. Several years ago, as an incident to other researches connected with my study of *methods of scientific research*, I discovered that certain wave-lengths of electric WAVES (not X-rays or ultra-violet light, as reported) pass more freely through the body of a *dead* than a living organism, and I proposed this as a test of death. This

[p. 374]

greater transparency at death I found to be due to the absence of the normal electric CURRENTS, which are always present in functionally active nerves and muscles, and not, so far as I have any evidence, to the passing away of a soul. When the body is alive it is a bundle of electric currents, and electric waves cannot pass through those currents, but when they cease at death, the body becomes transparent to electric waves. If anything like a soul-

organism passes away at death, these electric waves fail to give any evidence of that fact, by means of a shadow or otherwise.

I also discovered that LIGHT (either of the visible or invisible part of the spectrum) passes through the human body and still retains sufficient energy to affect a photographic plate on the other side of the body, and the body has different degrees of transparency or opaqueness to light waves of different lengths or frequencies. With reference to any given wave-length of light, visible or invisible, the bodily organs have different degrees of opaqueness that vary with the state of health of the organ, and this is, therefore, a new method of diagnosis.

I discovered that the living body gives off electric waves in proportion to the degree of muscular or mental effort or activity. It is known that an electric current gives off, in the ether around the conductor, electric waves, and, inasmuch as the functioning body is filled with electric currents, it might have been arrived at deductively that electric waves are given off. But I discovered this fact inductively by experiment. I found that these electric waves increase or decrease as the muscular or mental activity increases or decreases, and this, therefore, becomes a method of measuring subjective mental states and makes it possible to compare them to each other. By this method it can be told whether an emotion now present is stronger or weaker than was the same kind of an emotion three years or three days ago. Degrees of attention and effort

[p. 375]

can be compared. The mental state in one person can be compared with a like mental state in another person. This, for the first time in the history of science, introduces quantitative measurements into subjective or introspective psychology, and is therefore of prime importance.

Furthermore, I discovered that when a person who has been undergoing several successive psycho-physical measurements of his mental processes, suddenly falls away from, or rises above, any of his former standards of measurements, it indicates the approach of disease long before the first symptoms are felt, and before any other method of diagnosis would reveal it. Since the time of Fechner, Helmholtz, and Wundt, psychology has ceased to be a matter of guess and speculation—it has been reduced to measurement. Nearly every University has now its psychological laboratory and chair of psychology, and numerous devices have been invented to measure the least noticeable sensory stimuli, and the least noticeable difference between two sensations, and least noticeable differences of rate of change from one degree of stimulus to another, and various other mental activities. By making these psycho-physical measurements in an artificially

uniform environment, so as to obviate the effects of changes in temperature, moisture, etc., the measurements of one day may be compared with the next, and if any person has monthly or yearly psycho-physical measurements made, and if a record is kept, it will be easy to tell when he suddenly varies from his former standards; and when he does vary in any one or more measurements, it indicates the beginning of some wrong kind of functioning or some degenerative process, and then is the time to correct wrong habits and begin treatment.

About this time I was asked by Robert J. Thompson, of Chicago, to contribute an article on "Immortality from New Standpoints," to a symposium in his book entitled *Proofs of Life after Death*, in which article I gave it to be my

[p. 376]

belief that the world had not attained to any satisfactory evidence of the continuance of the personal life after death; and in order to give an idea of what I would consider to be satisfactory proof of man's duality I stated a purely hypothetical case, which, if it could be carried out in reality, would be the kind of proof demanded by scientists who are suspicious of the value of human testimony. Allow me to quote from page 324 of the book mentioned:

Science needs just one inductive fact from a direct observation of the objective conditions of the other life; and whilst I do not deny the possibility that there are those who have had such a personal experience, yet, if such is the case, that experience is so purely personal that it is divested of the essential characteristics of scientific proof.

To give a concrete instance of what I would consider to be adequate proof of another kind of existence I will give a hypothetical case. Suppose there were a form of wave-energy somewhat similar to Roentgen Rays, but differing from them as they differ from sound. Let us suppose this new kind of radiant force to be invisible, but that it can be made visible by projecting it upon a wall coated with a substance whose color is altered by the action of the rays. Suppose, further, that all known inorganic and inanimate substances are transparent to that force, so that they can be held in the path of the rays, between their source and the wall, without cutting off part of the rays, and thus causing the color of the wall to be changed over a corresponding area—producing an effect like a shadow. Suppose, also, that it were discovered that a living thing is opaque to these rays and that it casts a shadow as long as it is alive, but becomes transparent at the moment of actual death. If on killing the animal hermetically sealed in a glass tube it

were found, after a certain lapse of time, to become suddenly transparent, and if at the same instant a shadow precisely the same shape as the animal were seen to pass out through the wall of glass and move upward in front of the wall, then the presumption would be that some organism, not atomic, perhaps etheric, and capable of passing through glass, had left the atomic body of the animal. If that escaping organism could be caught and made to give evidence that it still possesses mind, then we would have an inductive laboratory proof of the existence of a “spiritual” organism and of the continuity of life beyond death,—but this would not demonstrate endless existence. If such an experiment

[377]

can ever be made, then biology and psychology will have been extended across the border without an intervening chasm, and the continuity of personal identity beyond death will be scientifically demonstrated. It might be argued that the visible animal organism is composed of atomic solids and liquids and gases; and may there not be etheric solids and liquids and gases, the particles of which are infinitesimally smaller than atoms, and might there not be an etheric body composed thereof? Such proof could be made a co-ordinate part of the growing body of scientific knowledge. In the judgment of nearly every scientist in the world such demonstration of the actuality of another life has not yet been made.

Now, as before stated, I found the opaqueness of the living body to short electric waves to be due to electric currents in the body and *not*, so far as I know, to the presence of some non-atomic organism resident in that body. But electric waves are not the only kind of ether waves that are known to science, and there has recently been a most remarkable extension of our knowledge of rays and waves, and some of these various kinds of waves may accomplish for psychic research what the electric waves failed to show, namely, if there is in the present visible and atomic body another kind of body invisible to us, it may be that this other body will be opaque to some of these various other kinds of waves, and my hypothetical case may turn out to be a new method of psychic research which consists in placing the dying body of an animal in the path of rays of all known kinds, and of kinds yet to be discovered, and by various known or yet unknown technical expedients seeking to make visible the shadow of the escaping soul-organism, if such there be. For there may be rays to which such a non-atomic organism might be opaque, even if that organism were composed of particles much smaller than atoms or

even smaller than ions, and incapable therefore of giving off any kind of light-rays by which it might be seen or photographed.

It is inconceivable that if we continue to live after the

[p.378]

death of the present visible and atomic body that we could do so without having a material *organism*, but not, of course, of the ordinary kind of matter.. An absolute absence of matter in some form would be a real vacuum—a mere void—an empty space incapable of acting on anything or of being acted upon. If we continue after death as a "personality" or "mind," we must be functionally active, and the existence of functions without functioning structures is impossible. I repeat, that if we live after death it must be as an organism of some kind, and if such is the case it would not seem impossible that in the scientific laboratory there will some day be discovered means of physically detecting it and studying it. If immortality is a fact in nature the laboratory will quite likely be able to discover it, and the method I have proposed is full of promise.

Let us consider the physics of the case a little more closely. White light is composed of seven colors,—red, orange, yellow, green, blue, indigo, and violet. The red rays are slowest and longest, about 33,000 to the inch, and the violet are faster and shorter, about 60,000 per inch. That is, the oscillating particles that give off violet light vibrate about twice as frequently per second as those which give off red waves in the ether—making almost an octave of pitches of visible light. But the visible part is not all of the spectrum. If solar light be caused to pass through a quartz prism only a small part of the spectrum is visible—by far the largest part is wholly invisible, and this invisible spectrum lies mostly below the red. The longest known of these invisible waves have a length of 70,000 micro-microns, and the shortest ultra-violet are about 100 micro-microns in length—making nearly ten octaves of light vibrations (a micro-micron is about one-twenty-five-millionth of an inch).

The visible light passes quite freely through glass but most of the invisible spectrum is screened out. But quartz is also transparent to most of the invisible spectrum. Dark

[p. 379]

heat waves will not pass through glass or quartz but will pass through hard rubber or ebonite, and if our eyes could see these rays ebonite would make good window glass. Some of these rays pass through the animal body and the opaqueness of the organs varies somewhat according to the state of health, which is the basis of my new method of diagnosis. Now, below the longest and slowest

heat waves are still longer waves, but they are somewhat different in form—heat and light waves being *transverse* vibrations and electric waves being *longitudinal*. This domain of longer and slower waves lying below the dark heat rays is the empire of electricity. Bose's electric waves are about one-tenth inch long; Hertz's waves are about 150 feet long; Marconi's 600 feet and more, and so on. The shortest of these waves, like Bose's, especially when in a field of ultra-violet light, are transmitted more readily through a dead than a living body, and this is my new test for the presence of death.

Now from the longest to the shortest known electric waves to the shortest and fastest known ultra-violet waves there is a domain of pitches of over thirty-three octaves. No one known substance is transparent to all these pitches, but generally only to certain wavelengths, and it is probable that there is no known substance but that is transparent to some of these rays; there is no known substance but that is opaque to some of these rays; and it is conceivable and probable that to some of these pitches the soul organism, if such there be, will be opaque, and if so, it will cast a shadow,—not a shadow which we can see with the unaided eyes, but which can be made visible by proper luminescent, phosphorescent, chemical or other kinds of screens or surfaces. And this result is especially to be expected when two or more kinds of rays are simultaneously sent through the body, and still more probably, if we discover other kinds of rays not yet known, especially those

[p.380]

above the present upper limit of the invisible or ultra-violet spectrum, namely, such higher-pitched waves as would be given off by particles smaller than atoms and to which the smaller particles of the soul-organism would probably be opaque. Certain it is that this new mode of psychic research is amply worth pursuing. Even the failure to find evidences of man's duality by these systematic researches would have value because it would lessen the probability that there is such a soul-organism, and would give additional probability either to some hypothesis regarding immortality or to the belief that man does not live after death. We care not what the truth may be so we may know what the truth is. If death ends the "person"—if there is no continuance of individual life after death—then we may not hope to find physical evidences of the existence of a soul-organism in the present visible, weighable tangible body. If however it be a fact in Nature that the individual life continues after death, then its continuance must be based either on the existence of a soul-organism now present in our bodies and capable of leaving it at the biotic crisis called death, or

some other hypothesis must be sought, such, for instance, as I have suggested in the article to which I have referred.

This soul-organism which we hope to find by the new method of research will be a material organism, although of a different kind of matter than the atoms composing our visible bodies—a matter, for instance, consisting of solids, liquids and gases composed of particles much smaller than chemical atoms,—smaller even than ions, which are a thousand times smaller than atoms. Perhaps the soul is composed of the particles out of which ions are built up, or even still smaller particles. And if we find physical evidences of such an organism, then by experimentally studying that organism we may hope to arrive at a few facts about the future life.

[p. 381]

In this connection one must not forget that vast new field of research relating to radiant emanations of streams of ions and other kinds of particles, traveling at a speed of light, and capable of making shadow-pictures or skiagraphs of bodies composed of atomic matter—such as X-ray pictures. It may be that radiant matter may be found capable of making a skiagraph of the soul, if there is one, as I hope.

Of course this at once reopens the whole question of the value of the other kinds of evidence brought forward by psychic research, and with this in view I have been slowly organizing, at The Elmer Gates Laboratories, Washington, a special department of research to be devoted to these and allied subjects.

The present methods of psychic research have seemingly not led to results that are any more conclusive than were the observations and beliefs of peoples of thousands of years ago. New methods of investigation, carried on by more efficient ways of mind-functioning, may bring this most interesting subject out of the domain of superstition and speculation and place it in the sphere of actual knowledge. And knowledge upon this subject has most fundamental bearings upon ethics, religion, and philosophy. Clear proof that we live again would more profoundly impress and influence the world than any other thing whatsoever.