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FIELD EFFECTS, ACUPUNCTURE POINTS, AND MERIDIANS†

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Recent developments in acupuncture research include construction, in the U.S.S.R., of the tobiscope. This is a special resistance measuring device which has located low resistance points on the human body which are claimed to have a one-to-one relationship to the acupuncture points on ancient Oriental charts. In addition, some Soviet researchers state that they have used Kirlian photography to identify acupuncture points.

INTRODUCTION

As is now fairly well known, acupuncture is an ancient Chinese art of preventative medicine. The old practice was that people would go to their doctor about once every quarter and pay him to have their "circuits" checked and balanced using acupuncture techniques and stimulation. Because of this, they were supposed to be free from illness. If they happened to become ill, folklore tells us that the doctor paid them by treating them free of charge.

The early theory, at a fairly simple level, indicated that there were 12 main meridians in the body, very much like electrical wiring, if you like, which acted as prime energy circuits for the body. There was thought to exist a deep inner circuitry connected in some way to the inner organs and body systems plus a shallow subsurface circuitry which was connected to the acupuncture points. It was felt to be essential for the health and well-being of the body that there be sufficient energy in these circuits and that they all be balanced with respect to each other; i.e., that there be an equalization of energy between the various meridians of the overall system. The energy flowing in the circuits was thought to be a fluid called "Chi" (Qi or Ki). These were thought to be the key aspects of the situation and the function of the acupuncture stimulation was primarily to take energy out of one limb of a circuit and put it into another; i.e., to shift these energies around so that one obtained a balanced system with continuously flowing energy.

Disease was thought to arise as a result of any major imbalance via what one might naively think of as an irrigation principle. Thus, if there was not enough energy flowing in one meridian, the body systems associated with that circuit had an altered energy terrain and the environmental energy fields were such that the soil became more favorable as a nutrient for bacteria to grow and thrive. This altered energy condition led inevitably to manifestations of disease at the physical level.

In more recent times, we have become aware of the rather remarkable application of acupuncture to anesthesia and perhaps the even more remarkable observation that the patient undergoing a major operation may be eating food such as an orange. This latter seems to be in gross violation of presently accepted ideas of necessary sterilization conditions in an operating room. Because of the Western focus on applications to anesthesia, models of structure and functioning of the meridian system have begun to localize around equation with the nervous system. However, it has also been postulated that this meridian system of the body is a fourth circulatory system of the physical body distinct from and on and equivalent level with the blood, the lymph and the nerve systems. We should keep our minds open to this larger possibility rather than try and squeeze all the emerging data into the more limited model of relegation to another behavior characteristic of the nervous system.

The purpose of the present paper is to focus attention on some of the general field effects, network characteristics, and biological functions of the meridian system as revealed by some research in the U.S.S.R. This is not intended to be a comprehensive review, but rather is a presentation of

† This paper has been extracted from an earlier article (Tiller, 1972) with no attempt to update the data or the ideas. Almost all the observations and theories reported here are associated with the work of others than this author. Much of this work is still in need of substantiation by other investigators.

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some of the less accessible material in this field that has recently come to the author's attention.

THE TOBISCOPE

Using a special resistance measuring device called a tobiscope, Adamenko (1972) located a network of low resistance points on the surface of the body which is claimed to be in one-to-one correspondence with the acupuncture points on the Chinese charts. The device consists internally of a bridge circuit so arranged as to be balanced by the normal skin resistance and unbalanced when making contact to an acupuncture point. The electrical signal due to the imbalance is applied to a D.C. amplifier which boosts the signal so as to activate a light bulb located in the front portion of the device (in other devices, the signal activates an audio speaker). This device is held in one hand (making contact with the metallic base) and the point is applied to the skin of the subject while the other hand of the operator is in contact with a different portion of the patient's skin. Thus, an electrical circuit is made from the base of the tobiscope, through the body of the operator, along the body of the subject to the tip of the tobiscope and, via internal connections, to the base of the device. Moving the point over the skin, at light pressure, a network of point locations are found that cause the light to be activated in the device. A shift of the tip by about 1 mm. removes the tip from these special network locations which locate the low resistance paths through the body. One also finds a network of such points on plants and animals.

The Adamenko device operates on less than 1 microamp at 4 volts with the 3 transistor D.C. amplifier being very stable over the voltage range of 1.3 to 3.5 volts. The input resistance is about $4\text{–}5 \times 10^6$ ohms and the device needs dry skin to be effective in locating the acupuncture network points (wet, salty skin leads to surface shunt paths). He finds that a resistance of about 5×10^4 ohms exists between these network points and that the value increases by a factor of 2 to 3 during sleep. Over the same length of normal skin between two network points, the equivalent resistance is in the range $\sim 10^6$ ohms. At present, the Soviets are investigating an A.C. device and are finding interesting results in the region of 10^3 Hertz. Interestingly enough, this author finds the resistance ratio between normal skin and acupuncture points to also be a factor of about 10; however, the value of the resistance is larger by a factor of about 5.

The D.C. resistance between any two acupuncture points on the body differs by less than a factor of two suggesting that almost all of the resistance is embodied in the thin layer of epidermis at the skin surface. A similar range of resistance variation occurs due to emotional change, mental concentration, light stimulus, etc. In the case of emotional excitation, the points vary in diameter (as revealed by conductivity area) and there is the possibility of the areas overlapping one another to form high conductivity regions.

Adamenko (1972) has also discovered that a voltage signal can be detected between two network points provided two different types of metals are used as electrodes. On dry skin using plated circular electrodes (5–7 mm. diameter), a Ni – Ag combination yielded a potential difference of about 50 mv. At skin locations where such points are absent, the potential difference is close to zero. Likewise, using the same electrode material, Ni – Ni or Ag – Ag say, the potential difference is again close to zero. The greater is the work function difference between the two materials, the greater is the voltage developed. This suggests that we have a galvanic cell effect operating here. The current drawn from this battery is about 10 microamps. However, because this current level polarizes the electrodes, one is advised to use an impedance in the measuring circuit to reduce the current to levels below 2 microamps and then to amplify the signal for display purposes. In cases of emotional volitive excitation, the potential difference may increase up to 100 millivolts. Further, using parallel connections between several network points, the voltage obtained may be as high as 0.5 – 1.0 volts with a corresponding increase in saturation current.

The Soviets find that, as the electrode area, A, increases, the developed voltage increases. They also find that the amplitude of an A.C. pulse is diminished as A increases which probably represents an averaging phenomenon wherein the A.C. signal arises only at the acupuncture point (less than 1 mm. in diameter) in the central region of the electrode.

Adamenko (1972) performed an interesting healing experiment utilizing what he calls the "semiconductor" effect. One often finds, when measuring the resistance between symmetrical points on the left and right sides of the body, that the resistance is different in the forward (R) from

the reverse (R′) direction (just like a semiconductor material which contains p/n junctions). If the person is healthy relative to that meridian, or particular organ in that meridian, then the resistance will be the same ($R = R'$). However, if the person is ill relative to that organ or relative to an organ which is associated with that meridian, then one will find a difference in resistance ($R \neq R'$). This difference, ΔR, is called the semiconductor effect.

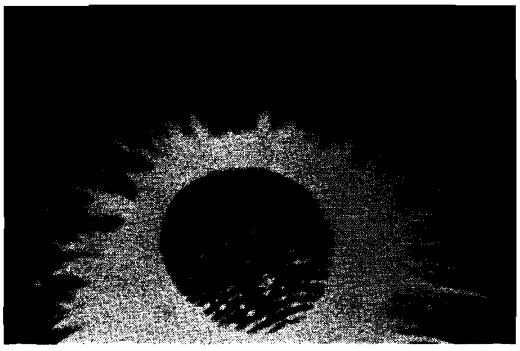
Adamenko (1970), used a manual healer in the healing experiment who projected energy via his hands located a short distance from the patient. The semiconductor effect was measured on both the patient and the healer before the experiment and also after the experiment. We can suspect that some energy was transferred from the healer to the patient because the value of ΔR had decreased for the patient. However, it was noted that the healer's circuits became somewhat unbalanced in the process (temporarily). This suggests that the healer gave up a particular kind of energy in a particular location of his body in order to bring into closer balance the circuitry of the ill individual. This appears to be a new type of energy that we have heretofore been unable to monitor in any numerical or objective way. The author has tried a similar experiment with a patient and healer while monitoring the acupuncture points and found similar results except that there was only a small change in the healer and ΔR for the patient changed over a period of a week after treatment eventually decreasing to zero. During this time period both R and R′ increased by a factor of 2.

It has been noticed that when a serious imbalance exists in the meridian circuitry and a needle is placed into the appropriate point, a force (almost like a suction force) holds the needle into the point so that, if one tries to withdraw it, the skin pulls up around the needle and it is not easily withdrawn. After the needle has remained in the point for a sufficient length of time to have brought about a temporary balance to the circuits, the needle may be withdrawn with no effort and the skin no longer pulls up around the needle. This suction force seems to be proportional to the degree of imbalance; i.e., to ΔR.

There are, at present, several ways in which one can produce point stimulation and it appears that, to bring about balance to the circuits, all one needs to do is stimulate sufficiently the acupuncture points. In increasing order of effectiveness, the various techniques are: (1) chemical stimulation, (2) manual massage (3) acupuncture needles (4) electrical energy injection (requires sophisticated understanding) (5) laser beam (requires sophisticated equipment and understanding), and (6) an injection of "biological energy" from a psychic healer. Using method 5, the Russians have found that when a mild intensity laser beam is directed at the acupuncture point above the upper lip, it will immediately stop an epileptic seizure.

KIRLIAN PHOTOGRAPHY

An additional technique developed by Soviet scientists for monitoring various physiological states of humans, animals and plants is called Kirlian photography after its inventors Semyon and Valentina Kirlian (1973). Using this device, one can observe flares of energy emitted from specific points of the organism (Figure 1). The

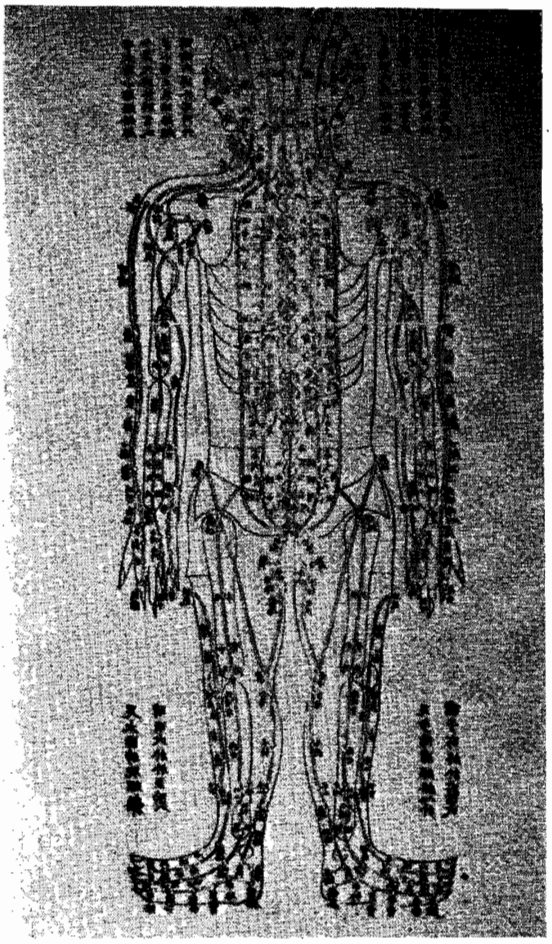


(Courtesy, V. G. Adamenko)

FIGURE 1 Kirlian electrophotograph, human finger pad.

flares change in both intensity and color depending on the emotional or mental state of the organism and on its state of physical well being. Using these flare characteristics, it has been possible to detect the onset of disease before it is manifested by conventional monitoring techniques. One of the important observations relative to this article is that the major flare points were found to coincide in location with the acupuncture points on the Chinese charts (Figure 2).

In the simplest Kirlian device, shaped like a sandwich or parallel plate condenser, the object (a leaf, say) is placed between the two plates to which voltage is applied. This voltage is pulsed with a pulse width of 10^{-6} to 10^{-3} seconds, a pulse height of 20 KV to 100 KV and R.F. under the pulse of 75 KH to 3 MH. The pulse repetition



(*Courtesy, J. A. Hurtak*

FIGURE 2 Chinese acupuncture chart.

rate is 60 H. The high electric field ($\sim 10^7$ V/cm.) produces a discharge phenomenon that is thought by the Soviets to be a combination of cold electron emission from living systems and a bioplasmic energy emission from some other level of substance in the organism. It is felt that the electron work function varies over the surface of the leaf or the skin and that energy emission occurs most strongly from these low work function points (acupuncture points). Using the electron emission idea, their acceleration in the strong field and their collisions with molecules in the air gap produces a conversion of electrical energy to light energy and these photons expose the film.

On the photographs, one sees an image of the structure of the surface plus a surrounding halo due to a high frequency discharge. Both the dimensions of the halo and the overall brightness of glow change in accordance with changes in the physiological state of the organism. Different sections of skin surface are found to emit radiation that results in characteristically different colors: the heart area shows as dense blue; the hip shows as olive; the forearm shows as greenish light blue. As a result of sudden emotional excitement (fear, pain, etc.), the color of the related section changes. according to the Soviets.

It has been found possible to develop transparent electrode systems and techniques for transferring information patterns from one side of a dielectric sheet to the other so that continuous visual monitoring of the energy emission patterns can be made. In this instance, one uses a transparent elastic dielectric and a transparent electrode so that the transfer of electron information to light information occurs and the light passes through the device to a waiting eye or camera, etc.

Using a transparent electrode device, Soviet investigators have photographed the palm of a healer's hand in the process of projecting healing to a patient. They find that, as he is warming up, many points on the palm are flaring. As he becomes more attuned, the number of flare points decreases and the area of discharge around any flare point increases. Eventually, the condition is reached where one sees only a brilliant luminescent disc (dime-size) in the center of the palm. This is when the healer is completely attuned and the patient says that he feels energy (or heat) in his body. Thus, we once again see a correlation between acupuncture points and the radiation of this healing energy whose nature we know practically nothing about. This appears to be a very powerful tool for monitoring the human organism and reveals another characteristic property of the acupuncture point system.

CONCLUSIONS

As we consider the Soviet research, we note that the meridian system may be simply categorized in terms of (a) structure (b) function and (c) characteristics of the network. Explaining this we have:

(a) *Network Structure*

(1) Connections exist between all parts of the network; (2) some parts are interactive with the outer surface of the body in a network of points.

(b) *Network Function*

(1) This probably acts as an organizing and cohering force for the other circulatory systems (2) producing communication of specific growing pathology to surface points (like the diagnostic circuit at the surface of a large modern computer).

(c) *Network Characteristics*

(1) Manifested electrical properties (voltage, current impedance, emission), vary with physical, emotional and mental states of the organism; (2) pathology is revealed by the generation of asymmetrical properties of the system (differential electrical resistance, differential thermal conductance, differential pressure, etc.); (3) stimulation of surface network points (by pressure, heat, light, electricity, chemicals, etc.) moderates the asymmetrical properties.

In conclusion, let us consider a very simple model of what might be happening during normal acupuncture point stimulation and how it relates to anesthesia.

The energy Chi is thought to flow in the meridian circuitry. If we look at the situation of anesthesia via needle insertion in a particular point, we expect that this might divert the flow of energy into other subsidiary channels. In turn, this is expected to produce a field effect which can act in at least two ways. It may act on the various important nerve centers so that the local energy fields are reduced to a point that the nerve firing does not occur. That is one possibility! The other relates to transmission line blockage; the nerve signals that normally go to the brain are blocked so that, although the nerves are firing, the information does not get through.

In addition, one must go deeper into this in the future because one must understand why we have a type of sterilization effect operating here. We hear of people eating oranges during surgery and it seems quite remarkable that this absence of what we think of as the need for proper sterilization in the operating room does not lead to any problems. This may be because we are dealing with another level of energy here (just as in the healer-patient experiments) and, if we deal with these other levels of energy, perhaps we can provoke energy alterations that eliminate the need for sterilization procedures.

As a final comment, let us proceed at the maximum possible rate to effectively reproduce and integrate the teachings concerning acupuncture that come to us from the East. Further, let us try to do this without destroying the holistic philosophy of healing that comes along with it!

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