



HOW HOMEOSTASIS AND STRESS COMBINED WITH CHAOS THEORY PROVIDE A NEW MODEL OF HEALING.

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Abstract: *The concept of Homeostasis and the Stages of Stress of the Generalized Adaptation Syndrome when combined with the principles of Chaos Theory and the Tiller-Einstein Model of Positive-Negative Space-Time offer a new model of healing based on the subtle energy flows of the Universe. The Stages of Stress of Hans Selyes' General Adaptation Syndrome result from the need to maintain physiological homeostasis to avoid crossing the "phase transition" boundaries of the homeostatic limits, which when crossed generate Distress. To prevent Distress and bring the physiological parameter in Distress back within the Homeostatic Limits, the body generates a series of compensations. If the stressor causing the Distress remains unresolved, it leads to long-term chronic physiological compensations resulting in a "new" compensated homeostasis, but one further from optimum function. As homeostasis represents a complex set of dynamic interacting equilibria Chaos Theory best describes this new self-organized system. Once self-organized, the new compensated homeostasis resists change, and unless de-compensated and driven into chaos by crossing the "phase transition" of the homeostatic limits, it cannot change. However, once the system goes chaotic what causes re-organization to move closer to optimal homeostasis? In the model proposed, based upon the Tiller/Einstein Model of Positive/Negative Space-Time, Deltronic flow in the form of Love and Compassion from Negative Space-Time directed by human Intention provide the organizational information to "push" the re-organization toward optimum function, a process called "Healing"!*

Introduction to Homeostasis and Stress:

The concept of Homeostasis was first introduced by the great 19th century French physiologist Claude Bernard whose now famous quote – "Le milieu intérieur est toujours la même!" (The internal environment is always the same or unchanging!)- was the first statement that organisms maintain a relatively constant internal environment in the face of constantly varying external conditions. The term Homeostasis was coined by the great 20th century physiologist Walter Canon, and includes all of the physiological adjustments

organisms make to maintain relatively constant internal states in the face of these constantly varying external conditions.

Physiological Homeostasis is maintained by an inter-linked series of primarily negative feedback driven equilibria. For instance, enzyme action is driven by the availability of precursor molecules, temperature and pH, but each of these parameters is also interactive with temperature affecting pH and pH affecting the mechanisms that regulate body temperature such as control of arteriole dilation. Each parameter will achieve a relatively "steady-

state” equilibrium if the other parameters are held constant. However, as one of these parameters varies, it acts as a perturbation disturbing the other two parameters, which in turn feedback to the first parameter causing a perturbation of the “steady-state” equilibrium of this system. The end result of all of these parameters interacting simultaneously is a set of dynamic equilibria that though constantly fluctuating, oscillate around a constant value.

Dr. Hans Selyes was both a medical doctor and researcher in physiology. As a medical student he became fascinated with what the “sick” state was and how this came about, especially before it had developed the signs and symptoms of a specific disease entity. Indeed, Selyes took a whole new perspective on sickness and disease, in his own words “Apparently, disease is not just suffering, but a fight to maintain homeostatic balance of our tissues, despite the presence of a damaging agent.”

Starting in 1936 and for over twenty years of diligent research Selyes discovered that all organisms displayed a stereo-typical response to stress, and that this response preceded the actual signs and symptoms of specific disease, a response he termed the Generalized Adaptation Syndrome or GAS for short. Indeed, he could not find a noxious agent that did not produce this syndrome from physical agents such as heat and cold to mechanical trauma, pain to even forced muscular exercise.

He summarized his decades of research into GAS, a three stage response to stress, for which he won the Nobel Prize in Medicine and Physiology in 1954. The three stages were: Stage 1 Stress, or the Stage of Alarm, the initial introduction to a noxious stimulus that drives a specific system out of homeostasis. This set of integrated physiological reactions to the Stage of

Alarm involved a co-ordinated set of hormonal releases (ACTH, CRH, cortisol, & adrenalin) and a series of Autonomic Nervous System reactions. If these reactions were successful, the organism returned to normal homeostasis, and these compensations were turned off by negative feedback.

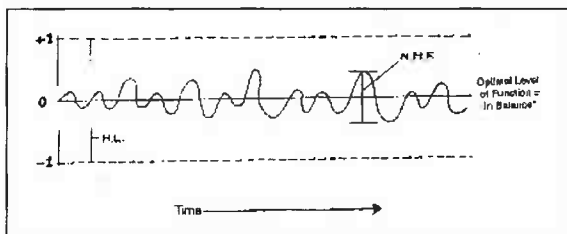
However, if this initial set of physiological compensations was not successful, and the “distress” of the Stage 1 reaction persisted, usually because the original stressor continued overtime, then Stage 2 Stress or the Stage of Resistance was initiated. In Stage 2 Stress these initial reactions were reversed by enlisting the support of other physiological systems that addressed the initial factors creating the Stage of Alarm. While Selyes termed this the Stage of Resistance because the organism now “resisted” the original stressor, it is more properly termed the Stage of Compensation, because it is by physiological compensation that the stressor was resisted. The result of Stage 2 Stress was the establishment of a new compensated homeostasis, which while causing less overt stress and ending the “distress” of Stage 1, it was now far less energetically efficient than the original uncompensated normal homeostatic state, and operated further from optimal homeostatic function, thus requiring more energy.

As long as the Stage of Resistance could be sustained by compensation, the organism would appear to be functioning normally. But over time, the initial compensations begin to “break-down” and additional compensations are necessary to sustain the Stage of Resistance. At some point, the organism can no longer sustain the compensations and additional energy necessary to maintain even this compensated homeostasis, and the physiological functions being compensated, now slip outside their homeostatic limits and the organism once again goes into overt “distress”, initiating the Stage 3 Stress, the Stage of Exhaustion.

However, you cannot "live" in this distressed state for long unless another successful compensation can be found. But by Stage 3 Stress, you no longer have the "energy" to compensate with, as you run out of what Selyes termed "Adaptation Energy" leading to "death". Interestingly, Selyes Adaptation Energy has exactly the same properties as Yuan Ch'i in the Chinese Acupressure-Acupuncture system, your prenatal Ch'i that once used up leads to your death as you can no longer adapt to the stress of life. For an excellent summary of these ideas see Selyes' book, *The Stress of Life*.

Figure 1 below presents the key features of the Homeostatic State with each physiological function oscillating about the optimum level of function due to the negative feedback loops involved in maintaining normal function. For each function, there is a Normal Homeostatic Range in which the organism operates when not under stress. There are also Upper & Lower Homeostatic Limits, the most "hyper-energy/function" or "hypo-energy/function" that can be sustained without sending the system into overt "distress" initiating the Stage of Alarm. In the Chaos Theory, these Homeostatic Limits represents the Phase Transition, the critical point as which the initial system breaks down and goes chaotic.

Figure 1. Normal Homeostatic Limits.



Optimal Level of Function - represents state of Perfect balance.

H.L. Homeostatic Limits - the range of fluctuations around the optimal level

of function that can be tolerated without disruption of homeostasis.

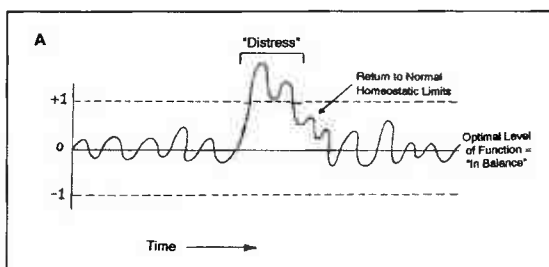
Homeostatic Limits vary depending upon the physiological function. For instance, for blood pH ± 0.1 pH unit, for temperature $\pm 0.5^\circ\text{C}$ core temperature, yet for blood oxygen tension $\pm 50\text{-}100\%$.

N.H.F. Normal Homeostatic Function - the deviations from optimal levels of function due to the various "Dynamic Equilibria" involved in maintaining homeostasis.

- +1 The greatest amount of hyper stress that can be tolerated before homeostasis is disrupted.
- 1 The greatest amount of hypo stress that can be tolerated before homeostasis is disrupted.

Figure 2A represents Stage 1 Stress, the stage of "Distress", a physiologically "chaotic state of function" after some factor has driven this system outside its Normal Homeostatic Limits, and the resolution this "Distress" by re-organization of this now chaotic system as the original stressor is eliminated or ceases and the initial compensations bring this parameter back into the original homeostasis.

Figure 2A. State of "Distress".



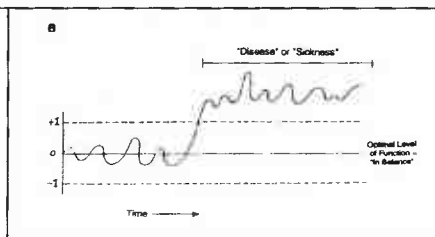
"Distress" results when the Hyper-stress (+1) or the Hypo-stress (-1) levels have exceeded Homeostatic Limits disrupting homeostasis. Once Distress has occurred, there are two possible outcomes represented in Figure 2A above and 2B below.

- 2A. Within a relatively short time, various physiological adjustments are made returning function to within Normal Homeostatic Limits, when again normal homeostatic limits are maintained.
- 2B. If the "distress" is too great or goes on too long, the body becomes highly stressed, and this uncompensated state of "distress" is called "Disease" or "Sickness".

Figure 2B below represents this on-going state of Distress we then term "disease" or "sickness". While both Disease and Sickness are represented by the state of overt Distress, Disease is usually a process requiring time before the parameter crosses the upper or lower homeostatic limits. In contrast, Sickness generally evolves quickly and rapidly drives the organism outside the normal homeostatic limits into Distress, and this Distress persists over time.

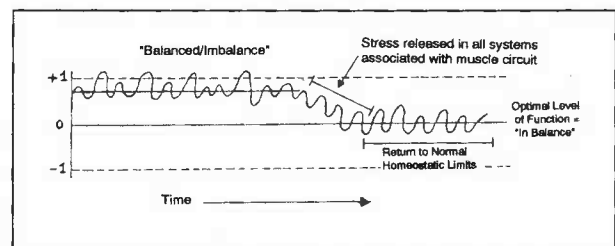
The end result of Disease or Sickness, is that the organism is in overt Distress with the physiological equilibria supporting homeostasis becoming chaotic. No organism can live long in this chaotic state of Distress, and this causes the initiation of physiological compensations to bring these chaotic physiological parameters back inside the homeostatic limits. If these compensations are not successful, the organism enters a state of total chaos resulting in the complete breakdown of homeostasis leading to death!

Figure 2B. Persistence of the state of Distress leads inevitably to the state of Sickness or Disease.



Normally, however, this state of "distress" in a specific system is compensated for by making compensatory changes in other related functions, creating a state of "Balanced / Imbalance" as demonstrated in Figure 3. Figure 3 shows how the initially "distressed" state is replaced by a new self-organized state of physiological compensation resulting in a return to within Normal Homeostatic Limits. However, this new compensated state, while once again within homeostatic limits now requires considerable more energy to maintain. And although "appearing" to be in homeostasis or in balance, is actually a state "Balanced / Imbalance" representing physiological compensation.

Figure 3. "State of Balanced/ Imbalance."



New Homeostatic Limits - if stressors causing Distress persist, the body first tries to compensate for the physiological effects of the on-going distress by altering or "resetting" the Homeostatic Limits as well as bringing down the overall level of "distress". The state of Balanced/Imbalance is this new compensated state.

State of Balanced/Imbalance - the new level of physiological function around which the dynamic equilibrium now fluctuates. Although this is energetically more demanding than the optimal level of function, it is far less demanding than the overt distressed state. Establishment of New Homeostatic Limits begins the state of "Balanced/Imbalance".

However, as this new compensated homeostasis now represents a new self-organized state, it

Compensation

Stress 2 Stress - Over Facilitated - Can't Soak

Stress 2 Stress - Over Facilitated - Can't Soak

will resist change even back to a more orderly and efficient state closer to optimal homeostasis. Therefore, in order for "healing" to occur, techniques must be applied to destabilize this compensated state, releasing it once more into a chaotic state from which it can re-organize back into a more efficient homeostatic state. Thus when a correction or balance is applied, this de-compensated chaotic state can now re-organized into a new homeostatic system closer to optimum homeostatic values. This process is called "healing". (See Figure 4)

Figure 4. Resolution of Stress results in a return to Normal Homeostatic Limits.

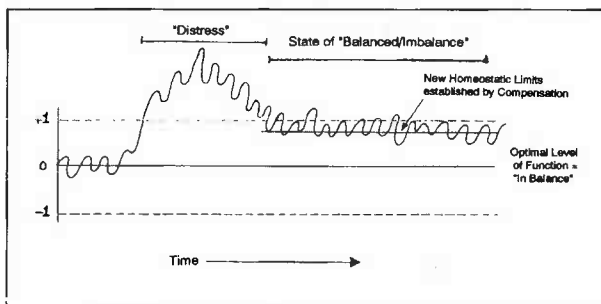
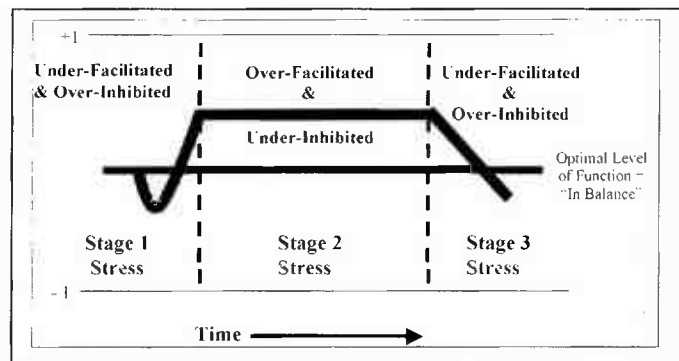


Figure 4 shows a return to within Normal Homeostatic Limits following therapeutic intervention. In Kinesiology this follows the release of stress from all states of muscle imbalance and return to normal energy flows in the primary energy systems of the body by energy balancing. The system will then usually return to within Normal Homeostatic Limits re-establishing an optimal level of function requiring the least amount of energy to maintain. Even if the re-organized state is not at optimal function, it has moved closer to this optimal function with less energy now needed to maintain this new, now less compensated state.

Figure 5 summarizes the Three Stages of

Stress of the Generalized Adaptation Syndrome, and the state of muscle stress found in the muscles associated with the stressed system when monitored. Clearly, the Over-Facilitated (OF) and Under-Inhibited (UI) states of muscle imbalance indicate Stage 2 Stress, or the compensated state of function. Thus, resolution of these OF/UI states of muscle imbalance represent moving the client back toward more optimal homeostasis.

Figure 5. The Three Stages of Stress of the Generalized Adaptation Syndrome (G.A.S.) and States of Muscle Imbalance associated with and indicating each stage of stress.



States of Muscle Imbalance & Selyes' Stages of Stress: Stage 1: Alarm Reaction.

The body shows the changes characteristic of the first exposure to a stressor, when one or more physiological parameters has deviated significantly from the Optimal Level of Function, and if this deviation is large enough to exceed Homeostatic Limits it creates the state of "distress". At the same time resistance is initially diminished, and if the stressor is sufficiently strong (severe burns, extremes of temperature), death may result. Before death, this state is indicated by Under-Facilitated and Over-Inhibited states of muscle imbalance.

ADAPTATION ENERGY

Stage 2: Stage of Resistance. Continued exposure to the stressor initiates adaptation, and resistance ensues via various compensations in physiological function. The bodily signs characteristic of the Alarm Reaction have virtually disappeared, and resistance rises above normal. Note that this compensated state requires more energy to maintain, and is indicated by Over-Facilitated and Under-Inhibited states of muscle imbalance.

Stage 3: Stage of Exhaustion. Following long term exposure to the stressor to which the body has become adapted, eventually adaptation energy is exhausted. The signs of the Alarm Reaction reappear, but now they rapidly become irreversible, and if prolonged, the individual dies. Before death this is indicated by Under-Facilitated and Over-Inhibited states indicating an uncompensated state of muscle imbalance.

Stages of Stress and Meridian Ch'i Flow and Health.

According to Chinese theory, as long as the Ch'i flow in every meridian is balanced with respect to Yin and Yang, and is neither in excess nor deficiency, the associated organ receives sufficient nutritive Ch'i flow to maintain the integrity of its structure and function. Any perturbation of this flow will have immediate consequences for the function or physiology of the associated organ, causing some degree of imbalance in its physiology. If the energetic imbalance is large or goes on for a period of time, the blockage of Ch'i flow will then become apparent in the physical structure of the tissue as physical degeneration represents the expression of the Second Law of Thermo-dynamics, the Law of Entropy, an increase in physical-energetic disorder in the system.

The degree of structural or physiological imbalance is directly related to the degree of

energetic disturbance in the meridian Ch'i flow, the bigger the disturbance or blockage in energy flow, the greater will be the physiological imbalance. Hence a minor energy blockage in a Secondary or Tertiary vessel may not even be noticed consciously because effective compensations have been established at a subconscious level. However, should a Primary meridian become blocked, there will be an immediate overt physiological reaction that is perceived consciously.

One approach to the perturbed physiology is to treat the symptoms arising from the disturbed physiology with a drug to counteract the physiological disturbance. The other approach would be to locate the energy blockage and the factors creating it, and then apply acupuncture or acupressure stimulation of one or more acupoints to eliminate the energy blockage, allowing the excess of energy, termed over-energy, to flow into the area of deficiency of energy, termed under-energy. This will occur automatically, like water running down the hill automatically seeks the most direct path. Once the energy has been equalized, the physiological disturbance then automatically returns to homeostasis, as the nutritive Ch'i once more carries organizing information or Deltronic flow into the disturbed tissue – a process we call “healing”.

The first reaction to blocked energy flow, from the perspective of the Generalized Adaptation Syndrome of Western physiology is called the Alarm Reaction or Stage 1 Stress. (See Fig. 6 below) The physiology becomes overtly perturbed with some physiological function exceeding normal homeostatic limits – if the physiologic function being observed was body temperature, this would be perceived as a fever ($> +1$ Homeostatic Limit), or chills (> -1 Homeostatic Limit). Perceived from the perspective of Chinese Medicine this would be an energy imbalance created by an excess of Yang or Yin, respectively – in the case of fever, an excess of Yang energy. This would then

initiate a series of both energetic and corresponding physiological compensations to re-establish normal body temperature. If these initial rapid short-term compensations are sufficient to release the energetic blockage, and bring the body temperature back within normal homeostatic limits, Stage 1 Stress has been eliminated. For instance, I become cold because I am sitting still and there is a cool breeze – this begins to lower my body temperature, so I begin to shiver – a Yin reaction in the Chinese System, a Stage 1 Stress response in Western physiology. I then begin to walk briskly, and the heat produced from my muscular activity rapidly raises my body temperature maintaining my homeostasis and the shivering stops – the Yin excess now balanced by the production of Yang energy.

If these initial compensations were not successful, however, and cannot bring the body temperature back within normal homeostatic limits, further more complex and on-going compensations are implemented leading to the Stage of Resistance or Stage 2 Stress. In this case, because movement alone was not sufficient, my body now adapts to this on-going stressor of cold by the hypothalamus releasing Thyroid Stimulating Hormone (TSH) causing the thyroid to release Thyroxin that in turn causes all of the cells of the body to increase their basal rate of metabolism increasing body temperature in the long-term.

The compensations of Stage 2 Stress always are energetically expensive, but if successful, remain outside of our consciousness. Stage 2 Stress, the stage of compensation, can not go on indefinitely because it is dependent upon putting more energy into this function than is required by homeostasis. This means energy has to be withdrawn for other energy resources of the body in order to maintain these

compensations. As an analogy, I need to borrow money to survive financially, so I borrow money from Peter to pay Paul. But because some compensations have compound interest on the original loan of energy, soon Peter cannot lend me enough money, so I also borrow more from Fred to pay the interest I also owe Paul, and over time I may need to even borrow more widely from Harry and James. What happens when Peter now calls in his loan, as he needs the money (energy) I borrowed to survive economically? My house of cards collapses, and I am suddenly bankrupt!

In many ways this is an accurate model of what happens in the body, when Stage 2 Stress has gone on too long. As more energetic/physiologic systems are required to support the system in stress, they reach a point where the systems “lending” energy suddenly have no extra energy to “lend”, and withdraw their energetic support for the system in stress, which then results in collapse of the stressed system, leading to Stage 3 Stress, the Stage of Exhaustion. In Stage 3 Stress, the compensations supporting the stressed system can no longer be maintained and “breakdown” resulting in the person becoming overtly “sick” or “ill”. At this time they now suffer from an identifiable disease or physiological problem. If the person’s physiology cannot be pushed back into the Stage 2, the Stage of Resistance, with various types of assistance (e.g. drugs, good food, herbs, energy balancing, etc.), then the end of Stage 3 Stress results in death.

Stage 1 and 2 stress is reflected in the Law of Five Elements via an imbalance of meridian Ch’i, due to energy blockage. The meridians upstream of the block often gain an excess of Ch’i or “over-energy”, and at least some of the meridians downstream of the blockage become deficient in Ch’i, or “under-energy”. The difference between a Stage 1 stress and a Stage 2 stress is that the Stage 1 stress represents overt-uncompensated stress, one meridian is over-energy, another meridian is under-energy,

and there is as yet no compensatory energy-borrowing going on. If the energy blockage is resolved, for instance the person just gets more sleep, then the Stage 1 stress disappears as balanced energy flow is once again re-established.

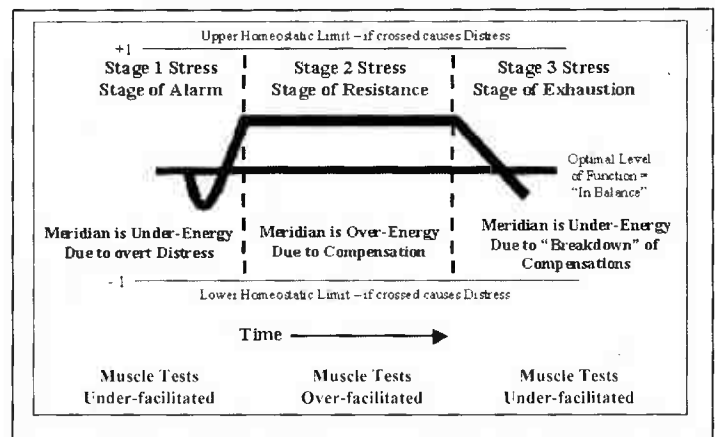
In Stage 2 stress, on the other hand, the energy blockage persists, and the body compensates by redistributing the original over- and under-energies via the secondary vessels of acupuncture. Several meridians have now "loaned" energy to the under-energy meridian, creating a number of under-energy meridians, but each with a smaller under-energy than the original under-energy meridian. Likewise, through compensatory redistribution of the over-energy, several meridians are now over-energy, but each is less over-energy than the original over-energy meridian, so the meridian system as a whole is "more balanced".

One of the common reasons the energetic imbalance persists, is that one or more of the acupoints has become "blocked" and can no longer maintain sufficient flow to maintain energetic homeostasis that is balanced energy flow. Indeed this is the basis for many cases of physiological compensation, because with a reduction in Ch'i flow, the organizational information provided by this subtle energy to maintain the homeostatic function is also diminished. Compensatory energy pathways are the activated to re-distribute the blocked energy creating an overall energetic state of "Balanced / Imbalanced energies"

To maintain a state of compensation, a stressed acupoint will draw on energy from another meridian to which it is connected via a secondary, tertiary or smaller vessel. So if there is a deficiency of Yin energy feeding into the point, then more Yin energy will be drawn into the point from another

Yin-meridian to balance the dynamics of the acupoint. Indeed, it is these acupoint compensations that often underlie meridian-wide over- and under-energy imbalances. These "frozen" states need to be addressed before attempting to just stimulate the acupoints according to the Law of Five Elements, or the compensated condition will just be re-created by the blocked flow of energy through the "frozen" points over time and the original condition will return.

Figure 6. Stages of Stress and State of Energy in the Stressed Meridian System.



How Chaos Theory and its relationship to the Stages of Stress of the GAS may provide a new model for healing in general, and energetic healing in particular is presented below after a brief description and discussion of Chaos Theory.

Introduction to Chaos Theory:

Chaos Theory had its origins in the work of the great French mathematician Henri Poincaré who in 1899 published the mathematical equations underlying Chaos Theory, but because of the re-iterative nature of these equations they could not be computed at the time. Indeed, the world was to wait until the 1960s for further development of his equations. It was only with the development of modern computers that there

was sufficient computational power to actually solve his equations. Following the development of Fractal Geometry, first by Lorenz, the principles of Chaos Theory evolved over the next decade. Fractal Geometry and the theory under-lying Chaos Theory was then put on a firm mathematical basis by the great mathematician and jack of all trades, Benoit Mandelbrot, and Ilio Prigione received the Nobel Prize in Physics for elucidating the finer details of this theory in 1977.

While the advent of Chaos Theory was at first touted as a major break-through in understanding complex systems, it soon lost favor in the sciences, especially the hard sciences like physics, because while extremely descriptive, it was not predictive. Indeed, much of the physical description of biological systems from the structure of the venation of leaves and the structure of fern fronds to the circulatory and respiratory systems of man can be accurately and mathematically represented by Fractal Geometry and the equations of Chaos Theory. But because of the extreme complexity of the interaction of complex systems, especially biological systems that involve numerous interactions of many complex dynamic equilibria, very small inputs at critical times can re-organize the whole system, and exactly which inputs at which times is unfortunately not predictable. Not surprisingly, Lorenz began the development of Chaos Theory while trying to predict the weather – a highly chaotic system.

There are some striking, counter-intuitive and unusual features of Chaos Theory that provide an excellent model for healing in general, and why the “set-up” system of kinesiology in particular can produce such profound healing outcomes; outcomes that often seem impossible from a more classical mechanics point of view. The basic

principles of Chaos Theory are briefly outlined below.

A. Principles of Chaos Theory:

Chaos Theory is the best system man has yet invented to describe the dynamics of complex interacting systems containing many variables and numerous interacting dynamic equilibria. Biological systems are one of the most complex dynamical systems known:

- a. A Dynamic Equilibrium is a system which continuously varies about some “value” due to a series of feedback mechanisms. The result of these feedback mechanisms is that the system “oscillates” about a common value, but is almost never actually at that value, e.g. the variability of heart beats that while averaging approximately 72 beats per minute, vary second by second from only a handful of beats per minute to hundreds of beats per minute. This is the basis of Heart Rate Variability or HRV measurements that have been shown to be one of the best predictors of morbidity (sickness) and mortality of all physiological variables. This probably results because it represents the balance between the Parasympathetic (slowing down) and Sympathetic (speeding up) inputs, and thus represents the balance of your basic physiological homeostasis.
- b. Perturbations to a dynamic equilibrium result in compensatory “feedback” that responds to negate disruption of the system by creating new, alternative pathways that tend to return it to either its original oscillatory value, or establish a new oscillatory value, but one often requiring greater energy expenditure.
- c. When several dynamic equilibria are interacting with each other, a “higher order” dynamically interacting system is established, in which the variations in one system become perturbations in one

- of the other dynamic equilibria, and vice versa – resulting in constantly changing and fluctuating feedback between the dynamic equilibria involved – indeed why they are “dynamic”!
2. When complex interacting dynamic equilibria initially interact – since each equilibria acts as an uncontrolled perturbation to the other, the system as a whole appears “chaotic”. However, over time, these interacting dynamic equilibria then tend to “self-organize” into a new stable system, oscillating as a whole around a new now stable value, which once established, now resist further perturbation.
 3. This behaviour was first observed and described by a meteorologist named Lorenz in the 1960s, as he was using the then newly developed “computers” to attempt to describe and predict the weather – a truly chaotic system made up of endless interacting dynamic equilibria.
 4. As he ran the equations of his simplified models, Lorenz discovered that quite contrary to his intuition and current scientific theory, these systems never reached an equilibrium steady-state value, but rather established infinitely varying, but self similar patterns about a relatively fixed point which he called an “Attractor”, and this type of mathematical equation was then named the Lorenz Attractor in his honor.
 5. Benoit Mandelbrot, a mathematical genius working for IBM, then began to further develop modeling of complex interacting systems and recognised that these self-organised self similar patterns could be defined mathematically by a new type of maths called Fractal Geometry, and developed equations using this new maths that generated figures known as a Mandelbrot Set – which can only be understood when depicted graphically as picture, especially coloured pictures. One of the primary properties of a Mandelbrot Set, besides its beauty, was that the same patterns would re-appear again and again at many levels of scale.
 6. Fractal Geometry defines the maths underlying chaotic systems, and showed how relatively complex patterns in nature could be generated by rather simple re-iterative equations by allowing their complex interactions using powerful computers. While the basis of these equations were derived by the great French mathematician, Henri Poincaré, at the end of the 1800s, without sophisticated computers, these re-iterative equations were impossible to solve! (Poincaré also laid down the mathematical basis for Holography, and even Relativity, but again could not solve these equations at the time!)
 7. Remarkably, many of the structures in biological systems are fractal in nature, for instance: the intestinal villi, branching of blood & lymph vessels, branching of the bronchi and bronchioles of the lungs, etc. and many of the structural patterns seen in plants like the venation of leaves and the structure of fern fronds.
 8. Once a chaotic system of many interacting dynamic equilibria “self-organizes”, that is develops a re-iterative set of “balancing” interactions, it then robustly resists perturbation or further change as more input occurs until some “critical point” is reached where just one more input causes the Attractor to “break down” and the system goes chaotic once

- more! That critical point at which the system goes chaotic is termed the "Phase Transition".
9. However, the chaos following a Phase Transition over time leads to the development of a new self-organized system around a new attractor, which "locks" into yet another self-sustaining pattern.
 10. One of the "critical" features of the Phase Transition is that because of the complex nature of many interacting equilibria, a tiny input at the critical time can trigger the Phase Transition, and hence re-organization of the whole system. The second "critical" feature is that there is no *a priori* way of determining either the exact factor that will trigger the Phase Transition or the new system that will self-organize out of the chaos of the Phase Transition! So while Chaos Theory is incredibly descriptive of how biological and other complex dynamic systems work, it is not very "useful" from the linear perspective of classical physics because it is not predictive!
 11. Within biological systems, the complex interacting equilibria self-organize around "homeostasis", and then resist perturbations. But as the perturbation increases in strength, the self-organized equilibria representing homeostasis is moved toward its "Homeostatic Limits" – the Phase Transition point for that biological system – which if crossed leads to chaotic function in at least some of the interacting dynamic equilibria involved. The chaos created by crossing the homeostatic limit leads to overt "distress", and if it continues over time is called "sickness" or "disease".
 12. Thus, as perturbations "push" the interacting dynamic equilibria toward the homeostatic limits, compensatory physiological mechanisms are activated to prevent the system from going through a phase transition. If these initial physiological compensations can not prevent the system from crossing the "Phase" boundary, the system goes into "Distress".
 13. This "Distress" then initiates a series of further physiological compensations to bring the system back inside the homeostatic limits, however, to do this requires the input of additional energy into the system being perturbed, usually by taking energy from other dynamic interacting equilibria that were supporting other physiological systems or functions, leading in turn to perturbations in these systems, requiring yet another set of compensations. The end result is that the system as a whole goes into a state of "Balanced – Imbalance" that while within homeostatic limits once more, is energetically expensive to maintain.
 14. In maths, when perturbation causes a phase transition, you just go from one pretty self-organized pattern to a new pretty self-organized pattern! But in biological systems, you may go from one self-organized system called "alive" to another far less interesting, at least to the organism, self-organized system called "dead"!

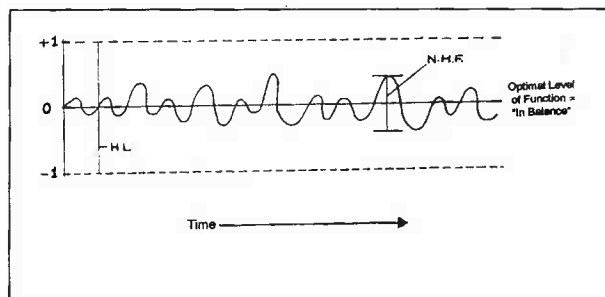
B. Chaos Theory and Healing:

The principles of Chaos Theory provide an excellent description of both sickness and health and the transition between the two we call "Healing"! The state of Homeostasis is indeed a set of complex interacting equilibria with constant variation around some optimal value for each physiological system and function. If the Homeostatic Limits are exceeded this leads

to dysfunction and disease or sickness. For instance, the Homeostatic Limits, for pH of the blood is only ± 0.1 pH unit, while for body temperature it is $\pm 0.5^\circ$ Centigrade and for oxygen levels in the blood is ± 50 to 100%. Since the oxygen levels and temperature affect pH, and the pH controls many of the reactions determining the oxygen carrying capacity of the blood and the body temperature, the interaction of just these three physiological systems can be very complex, and is thus constantly varying. (See Fig. 6)

However, once a biological system has been perturbed over the long-term, it establishes a new set of compensated Homeostatic Limits further from optimum homeostatic values through the process of physiological compensation. While this new set of interacting dynamic equilibria now sustain homeostasis, they do it at a cost, and that cost is greater energy expenditure. Yet, representing a new self-organized system, this new compensated homeostasis will resist perturbation to return to more optimal homeostatic levels, and to get this system to re-organize closer to optimal homeostasis requires that the compensated system enter, at least temporarily, a state of Chaos, as it is only from the chaotic state that re-organization to true homeostasis can occur.

Figure 6. Normal Homeostatic Limits.



- O Optimal Level of Function - represents state of Perfect balance.
- H.L. Homeostatic Limits - the range of fluctuations around the optimal level of function that can be tolerated without disruption of homeostasis.

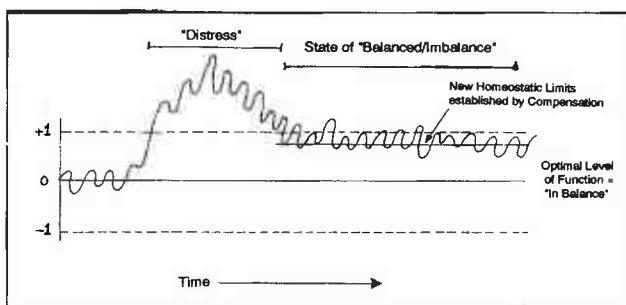
Homeostatic Limits vary depending upon the physiological function. For instance, for blood pH ± 0.1 pH unit, for temperature $\pm 0.5^\circ$ core temperature, yet for blood oxygen tension ± 50 -100%.
- N.H.F. Normal Homeostatic Function - the deviations from optimal levels of function due to the various "Dynamic Equilibria" involved in maintaining homeostasis.
- +1 Positive Phase Transition point: The greatest amount of hyper stress that can be tolerated before homeostasis is disrupted.
- 1 Negative Phase Transition point: The greatest amount of hypo stress that can be tolerated before homeostasis is disrupted.

So when an initial stressor acts on a biological system, it will perturb one or more of the interacting dynamic equilibria, resulting in initial physiological "stress" as that system goes out of balance disrupting to some degree all of the other equilibria with which it is interacting. If this stressor is temporary and not of sufficient magnitude to push the stressed system outside its homeostatic limits, then the system will institute temporary physiological compensations to return the system to its original homeostatic values, thus oscillating once more around some optimum value.

However, if the stressor goes on too long and the initial homeostatic limits are exceeded, or is sufficiently strong enough to drive the system beyond its homeostatic limits, then the system

begins to break down and become chaotic causing physiological "distress". At this point a Phase Transition occurs as the other physiological systems interacting with the "distressed" system re-organize to stabilize the "distressed" system through the process of physiological compensation. While the new self-organized system is now more stable than the state of "distress" and the original function has been brought back inside the homeostatic limits, it is no longer as close to its optimum value and thus places an energy "drain" on the organism as a whole. (See Fig. 7)

Figure 7. State of "Balanced/ Imbalance."



But because it is now a new self-organized system that resists change, "healing" can only occur if this self-organized compensation can be driven back into chaos, and then have some factor present that "pushes" the system back toward its original optimal homeostatic value.

So for "healing" to occur, the compensated system must be "de-compensated" to create a chaotic state from which change to a new "self-organized" state is possible. Then a "force" must be present to give that chaotic system a "push" in the direction of homeostasis and order. Without this "push", whether the de-compensated system re-organizes closer to or further from homeostasis is up to random chance of other small varying factors happening at the time. Thus healing requires both "de-

compensation" and "direction" for the system to move back toward homeostasis.

Indeed, the role of set-up in kinesiology is to destabilize the compensated state, to create a de-compensated, more chaotic state. As each Indicator Change is entered into the circuit via Pause Lock, representing another stressor or distortion of energy flow, the system enters an increasingly chaotic state. From this chaotic state, re-organization is now possible. However, the degree of re-organization is totally dependent upon the degree of "chaos" created in the system. The greater the degree of de-compensation, the more chaotic the system becomes, and the greater the possibility of change.

Thus, if the kinesiology set-up only creates a small degree of chaos, the system can only re-organize to a limited degree, while a more complex, multi-component set-up provides the opportunity for a more profound re-organization of the whole system. One of the greatest gifts to modern Energetic Kinesiology was from Alan Beardall when he developed both Hand / Finger Modes (Digital Determinators) and Pause Lock or Circuit-Retaining Mode. Both of these tools provide the possibility of increasing the degree of de-compensation, and hence chaos generated by the set-up.

The "balance" or "correction" then provides the "push" back towards the optimal homeostatic value of the unperturbed system, a process we call "healing". The "balance" gives direction to the self-organization that proceeds automatically by the complex interaction of the dynamic equilibria involved in this particular system such that the system now re-organizes closer to optimal homeostatic values. But what is this "push" in energy healing?

Whatever, the healing technique, the primary factor providing this "push" in contextual healing systems of energetic medicine is the Love and Compassion of the therapist, as this

provides a direct source of deltronic flow from Negative Space-Time bringing with it the organizational energy to heal. A description of the Positive-Negative Space Time model providing a Physics of Metaphysics and describing the origins of deltronic flow is beyond the scope of this paper but well described in both Richard Gerber's book: *Vibrational Medicine, Healing for the 21st Century*, and Tiller's book: *Science and Human Transformation: Subtle Energies, Intentionality and Consciousness*.

Briefly, Tiller proposes that there is a reciprocal domain to the physical world of our five senses so well described by modern Physics which he calls Positive Space-Time. This Positive Space-Time is the world or domain controlled by the Second Law of Thermodynamics which states that energy in all systems tends towards disorder – that is, energy always runs down hill. In physics terms, there is an innate tendency towards an increase in free energy in all physical systems over time – called Entropy.

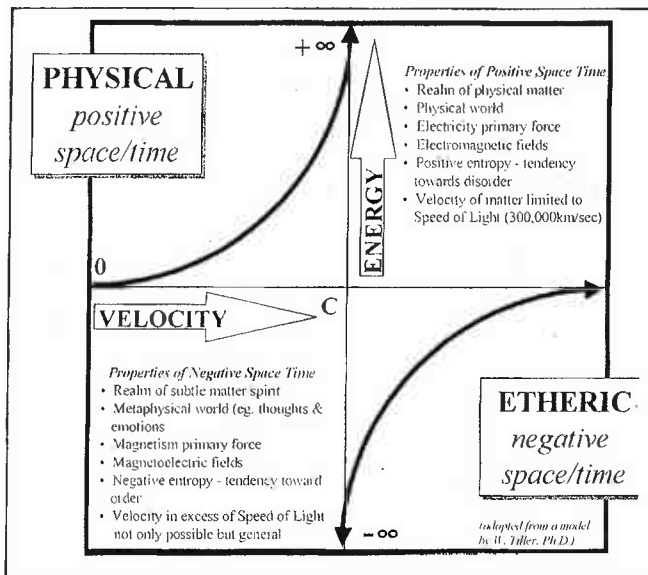
In Tiller's model, the force of Positive Entropy resulting in disorder can be counter-acted by a flow of "informational" energy from the reciprocal Negative Space-Time controlled by Negative Entropy or an innate tendency towards order. This flow of informational energy from the Negative Entropic Negative-Space-Time to provide the organizational information necessary to maintain the order and organization supporting life is carried by force particles Tiller called Deltrons. He proposes that the subtle energies of the body's energy systems such as Ch'i and Prana are indeed deltronic flows that sustain the energy templates manifesting as our physical structure. (Summarized in Fig. 8 below)

So the source of all Healing is activation of

this deltronic flow that brings with it the information-energy to generate self-organization out of chaos. Whether you are waving a crystal through the aura as in crystal healing, poking an acupoint as in acupressure or needling an acupoint as in acupuncture, or merely channeling energy as in Reiki and Therapeutic Touch it is the therapist's "intent to heal" that activates this healing deltronic flow of energy, which is then transduced by the various energy systems into the physiology of healing.

The second role of the therapist in energy medicine is to provide a "stabilizing" force during the process of set-up to allow the client's energy system to experience the chaos of de-compensation. Without this stabilizing force, it is not "safe" for the person to go into the chaos of de-compensation exactly because the compensation was created to end the chaos of "distress" in the first place! Love and Empathetic Compassion are the most harmonic forces in nature, and thus able to "stabilize" high degrees of chaos as well as provide the "push" back toward the self-organization of homeostasis.

Figure 8. Model of Positive and Negative Space/Time.



Both physical and metaphysical realities are predictable from Einstein's equations demonstrating that matter and energy are interconnected. Tiller proposes a complement to the Physical World in the Metaphysical World.

An example of these phenomena is presented below from Dr. William Tiller's recent book, *Science Experiments with Real Magic*. Dr. Tiller and I undertook a series of experiments in his laboratory in Payson Arizona doing different types of set-ups and applying different balancing techniques in healing. Dr. Tiller's laboratory is a "conditioned space", that is the energetic domains have been harmonized (for more information on conditioning space see Tiller's book, *Science and Human Transformation: Subtle Energies, & Intentionality*). This allows far more subtle energy effects to be observed more robustly.

The laboratory had a series of pH meters continuously monitoring pH in several different locations to measure changes in the randomness of the void. The void is not

really empty space, but a seething sea of virtual particles popping into and out of existence. When a virtual particle "pops" into existence, it withdraws energy from the void, but at the same time its virtual antiparticle also "pops" into existence and they immediately annihilate each other with this energy returning to the void. Since the sum of the energy changes between particle manifestation and annihilation is zero, the same amount of energy lost by the void in particle manifestation is then returned to the void by particle annihilation, therefore there is zero change in energy – hence the void being called the Zero Point Field. This is the Zero Point Field you may have read and/or heard about, and for an excellent description you are referred to Lynn McTaggart's fine book, *The Field*.

From the point of view of modern physics, the void is totally random, and hence can be ignored as a factor in experiments. However, Tiller and his group have shown over a number of years that this is only true in the absence of human intent. It is not only Tiller, but a number of respected scientists that have shown that human intention plays a significant role in how our physical world operates, and this research is summarized in *The Field*.

Human intent can direct "informational" energy in the form of deltronic flow from Reciprocal Negative Space-Time into the Positive Space-Time domain which reduces the randomness of the void and this is overtly measurable using the simple physicochemical system of pH. In the absence of human intent, pH will vary randomly about the value of the solution in which the pH electrode is immersed. This value can be "set" very precisely by use of buffers to hold the pH stable. However, there are still random variations in pH due to the "noise" in the system.

In the pH system there are only a few variables that account for virtually all of the variation in the concentration of hydrogen ions, H^+ ions, this is what pH measures, the H^+ ion concentration or acidity of the solution. A solution with an

excess of H^+ ions relative to water is acid, while a deficit of H^+ ions makes the solution alkaline. Only temperature and dissolved oxygen have any significant affect on pH in a closed system, because these factors shift the dynamic equilibria controlling the H^+ ion concentration.

In Tiller's lab there were pH meters continuously recording pH directly into a computer at various locations around the lab. In the absence of people in the lab, the pH variation is totally random, varying by only +0.01 pH unit for days on end, and only changes as the temperature and dissolved oxygen varied according to physical-chemical principles. The pH meters were insulated to reduce the temperature variations, and oxygen content usually varies relatively little in an open environment, rapidly equilibrating with the oxygen content of the surrounding air resulting in minimal pH variability due to O_2 variation.

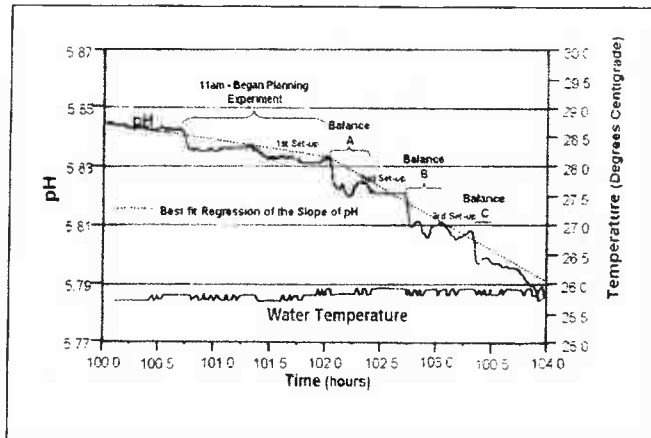
Human intention when focused and directed can strongly alter the randomness of the void which can then change the direction of the pH in a constant direction, perhaps as "organizational energy" is moved through or into the void. This "energy" represents "information", and in this case not random information, but rather directed information, perhaps the basis of "healing energy" used in Energy Medicine! Indeed, in physics today they tend to talk of the "information" in the system rather than the "energy" or mass of the system, as information is considered more fundamental!

In our experiments, I treated several different people for several different conditions from physical pain, to psycho-emotional issues to mental problems with decision-making. I initiated the circuit by entering the issue into Pause Lock, and then continued the "set-up" until I could no longer access further stress in the circuit. I

then located the type of corrective technique to balance the circuit. At this point I stated – "Starting Balancing Now!" – and the technician activated an event recorder that noted this in the pH recorder. As soon as the balance was complete, I stated – "Balance Complete Now!" – and the technician again activated the event recorder.

The next day when I came into the laboratory, the technician said, "Well I'm a believer!", as he had analyzed the data from the experiments the previous day. As soon as we sat down the morning before and overtly began to plan these experiments, human intention in action, the pH meters showed a deviation from randomness, but when I stated - "Starting Balancing Now!" – there was a dramatic decrease in the randomness of the void, as the pH began a rapid drop which lasted until I stated - "Balance Complete Now!". At this time, the pH returned to the same trajectory of pH decrease as before the correction began and remained on this trajectory until the next correction began which was again accompanied by a rapid decrease in pH indicating another decrease in the randomness of the void. (See Fig. 9 below)

Figure 9. pH and Healing: Changes in randomness of the Void as indicated by decrease in pH during Healing.



Note that although different Healing techniques were used, the Signature of changes in pH remained identical.

One of the most interesting observations was that the flow of “healing energy” or organizational information from the Negative Space-Time caused a decrease in randomness of the void, as measured by a rapid drop in pH with the initiation of each “healing” event and a return to the random pH fluctuations at the end of the “healing” event. All of the healing events looked identical, in spite of the fact that very different healing techniques were employed. For the first correction I used a typical frontal-occipital holding for stress defusion; for the second, I used a straight acupressure technique; and for the last a direct “channeling” technique. Yet, the energy signature of all healing techniques looked the same. From these observations, it appears to me that the specific correction or balancing technique is not so important, as

long as it permits you to channel your Love and Compassion as a mechanism to provide the de-compensated system - that is the chaotic energy created by the set-up - the “information” needed to direct self-organization towards homeostasis.

Summary:

Homeostasis represents a self-organized system derived from the many complex interacting dynamic equilibria necessary to maintain life. Stress initially drives this system toward chaos, but as all self-organized systems it resists perturbation by generating either short-term compensations (if the initial stressor is resolved) or long-term compensations (if the stress is on-going). These compensations result in either a return to normal homeostasis if the stressor is resolved, or the establishment of the compensated state of “Balanced/Imbalance” if the stressor is on-going. The compensated state of “Balanced/Imbalance”, although within the homeostatic limits, is further from Optimal Homeostasis, and thus it now requires more energy to maintain this compensated homeostasis.

The “set-up” procedures in Kinesiology result in de-compensating the “Balanced/Imbalance” state by releasing the blocked energy, however, this creates an increasingly chaotic state as de-compensation proceeds. It is from this chaotic de-compensated state that re-organization may occur, and the more thoroughly de-compensated the system becomes, the greater the chaos and the greater the possibility for a re-organization of the system closer to Optimal Homeostasis. However, for the system to re-organize closer to Optimal Homeostasis requires “information/energy” that brings order into this chaotic disorganized de-compensated state – this is the role of the “healer” or therapist.

The role of the “healer” in the energetic “healing process” is two-fold: first to “hold the space”, that is provide the energetic stability necessary to permit the system to go into chaos; and second to provide a flow of Negative

Entropic energy providing the organizational "information/energy" from Negative Space-Time necessary to "push" the chaotic, de-compensated energy into a new self-organized state, *one that is closer to Optimal Homeostasis*.

The origin of this organizational information/energy to heal is derived from human Intent directing Love and Emphathic Compassion that activates the Negative Entropic flow of Deltrons into the chaotic system providing the order needed to create a new self-organized state, one that is closer to normal homeostasis. Without human Intention and Loving Compassion, the chaotic de-compensated state will indeed self-organize, but not necessarily closer to Homeostasis.

Suggested Readings:

(Author: Last name, first; Book Tiles.
Italics, bold; Publisher, City, State, , Year.)

1. Selyes, H. *The Stress of Life*. McGraw Hill Publishers, New York, NY, 1978.
2. Utt, R. *Stress the Nature of the Beast*. Applied Physiology Pub., Tucson, AZ, 1997.
3. Helms, J.M. *Acupuncture Energetics. A Clinical Approach for Physicians*. Medical Acupuncture Publishers, Berkeley, CA, pp.26-27, 1995.
4. Maciocia, G. *The Foundations of Chinese Medicine*. Churchill Livingstone, London, England, 1989.
5. Xinnong, Cheng (chief ed) *Chinese Acupuncture and Moxibustion*. Foreign Language Press, Beijing, China, 1987.
6. Porkert, M. *The Theoretical Foundations of Chinese Medicine*. The MIT Press, Cambridge, MA, 1974.
7. Low, Royston: *The Secondary Vessels of Acupuncture*. Thorsons Publishing Group, Northhamptonshire, England 1983.
8. Kaptchuk, T.J. *Chinese Medicine. The Web that has no Weaver*. Ryder, London, 1983.
9. Gleick, J. *Chaos*. Penguin, New York, NY, 1988.
10. Prigogine, I.: **Order out of Chaos**. Bantam Press, New York, NY, 1984.
11. Krebs, C.T. & Brown, J. A *Revolutionary Way of Thinking. From a Near Fatal Accident to a New Science of Healing*. Hill of Content Publishing, Melbourne, Australia, 1998.
12. Gerber, R. MD: *Vibrational Medicine for the 21st Century*. HarperCollins Publishers Inc., New York, NY, 2000.
13. Tiller, W.A.: *Science and Human Transformation: Subtle Energies, Intentionality and Consciousness*. Pavior Publishing, Walnut Creek, CA USA, 1997.
14. McTaggart, L. *The Field. The Quest for the Secret Force of the Universe*. Harper Collins Publishers, Inc. New York, NY, 2002.
15. McTaggart, L. *The Intentionality Experiment: Using your Thoughts to Change your Life and your World*. Harper Collins Publishers, Inc. New York, NY, 2007.
16. Tiller, W.A., Dibble, W.E.Jr, Kohane, M.J. *Conscious Acts of Creation: the Emergence of a new Physics*. Pavior Publishing, Walnut Creek, CA USA, 2001.

17. Tiller, W.A., Dibble, W.E. & Krebs, C.T. *Instrumental Response to Advanced Kinesiology Treatments in a "Conditioned" Space*. Subtle Energy, Vol. 7:15-27, 2004.
18. Tiller, W.A., Dibble, W.E., Jr, Fandel, G.J. *Some Science Adventures with real Magic*. Pavior Publishing, Walnut Creek, CA. USA, 2005.
19. Lipton, B. *Biology of Belief*. Mountain of Love/ Elite Books, Santa Rosa, CA, USA, 2005.
20. Oschman, J.L. *Energy Medicine*. Elsevier Science Limited, London, 2003.
21. Benor, D. J. *Healing Research. Holistic Energy Medicine and Spirituality. Volume 1*. Helix Editions Ltd. Oxford, England, 1993.
22. Benor, D. J. *Healing Research. Holistic Energy Medicine and Spirituality. Volume 2*. Helix Editions Ltd, Oxford, England, 1994.
23. Rae, A. *Quantum Physics. Illusion or Reality?* Cambridge University Press, Cambridge, England, 1986, reprinted 2002.
24. Gribbin, J. *Q is for Quantum*. Phoenix Press, Orion Publishing Group Ltd, London, 2002.
25. Bohm, D. & Hiley, B.J. *The Undivided Universe*. Routledge, London, 1995.
26. Goswami, A. *The Self-Aware Universe*. Jeremy P. Tarcher/Putnam, Penguin Putnam Inc, New York NY, 1995.