Chapter 4

FRACTALS (DISPROVING REDUCTIONISM)

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How does chaos theory affect biology?
Complex situations deserve complex descriptions.
Reductionism is an inappropriate response to over-simplification of not knowing.

As we have shown in this book, the development of the laws of thermodynamics, entropy and reductionism were a needed step in the evolution of scientific thought. However, they have outlived their usefulness. Over the last fifty years science has found those reductionistic theorems and postulates to be sophomorphic and outdated. It was the belief in the Laplace demon or the existence of one simple equation that would predict all phenomena that led to this reductionistic type of theory.

Modern-day physicists, electronic theorists and scientists in all fields have found the severe limitations and disturbing consequences of belief in this thermodynamic mode. In every scientific field except those of pharmacology, medicine, and biology this type of theory collapsed; yet, biology is probably the area in which the theory fits least. Modern science has been able to almost completely disprove and challenge the idea of reductionistic entropy through chaos theory, or fractal geometry theory.

Newton found that certain relationships could be predicted via the physical effect one object had on another. This developed into a utilization of a two-body theory presenting linear approximations, which became linear equations. These equations predicted accurately the effects of one object on another. The development of these linear equations propagated and kept alive the idea of reductionistic theory.

Henri Poincare made a step into a new type of mathematics when he found that Newtonian equations of the linear type could very well predict two-body reactions; therefore, the effect of the Earth-moon system. However, when there were three bodies, such as the sun, Earth and moon, Poincare found a different type of activity; the three-body equation could not be worked out exactly. A three-body equation will require series of approximation to home in on the relationship in question. This developed into perturbation theory, which allowed for the prediction of the infinitely small effects subtle bodies could have on each other, allowing for not precise results, but probability theory.

Linear equations of all types of phenomena were found to work very well on paper, but in real life were drastically short of describing real situations. The more complicated the situation, the more complex the interaction. Thus several mathematicians and scientists felt that the limitation was in not having the extent of equations to be able to predict it. Poincare and others had created the idea of fractal geometry, and were able to show mathematically that complex situations could not be predicted exactly.

Thus the three-body equation became the infinite-body equation, where all the factors of the universe seem to apply forces that cannot be calculated in linear-type equations. Extremely complex situations could be approximated by calculus and reductionistic thought, but they could not account for the super predictability; they could not refine. The more complex the situation, the larger the number of variables, the more severe the limitations of reductionistic thought. Biology is the most complex of all situations, and this complexity of biology cannot be reduced to simple phenomena. These complex situations need complex solutions.

Small effects of almost minuscule reality could have large dynamic interactions in gross systems. As John Briggs and David Peat say in "The Turbulent Mirror": "Perhaps the batting of a butterfly's wings in Singapore might affect the weather in Kansas."

The mathematical problem of complex systems is caused by their being locked in feedback loops. In nonlinear equations, feedback and the idea of subtle limitations shape our new quantum mechanics to allow us to understand the idea of the fractal dimensions of our quantum biology.

Thus as we examine the natural process and the astounding complexity of the interaction of plant and animal in a natural environment, we can appreciate a look at the naturopathic process of medicines that animals can derive from plants and other natural entities. The use of glandulars is a perfect example in this case where the glandular will contain fatty acid compounds, minerals, and an astoundingly complex number of compounds that can be used naturally to treat many conditions. The reductionistic, sinthetic chemical companies sought to find ways to patent the key ingredient. Not all support structures allow for the shift in our history, where sinthetic chemicals

wove themselves so tightly into our medicine. With our new fractal quantum biology we can see that complex situations need complex solutions, and a reawakening of the process of glandular research, herbalism, naturopathy and homeopathy is needed to face the challenges of an increasingly toxic world.

Julian James writes in his book, "The Bicameral Mind and its Origins in Consciousness", that mankind has evolved thought patterns; that the actual physical structure of the brain and its ability to interact with the environment is an evolving system. Each new generation might have a different way of seeing things, perhaps in a superior way to the generation before.

In the writings of the early nineteenth century, people discussed the linear systems and interactions of mathematics. Even in the economic systems, direct reactivity and predictability were the dominant theme. However, in the late thirties and forties, a shift was made in thinking, where suddenly the idea of feedback loops, cybernetics, and system-imposed limitations started to appear. This was a revolutionary new thought pattern that opened the door for a different understanding from the one linear pseudo-predictability could provide.

System analysis patterns were developed in complex ways that needed much education and resources to learn. The idea of electronic modulation and feedback systems became the theme in the electronic industry. Cybernetic control mechanisms and circuit interplay were absolute necessities in designing electric circuits. Medicine, however, failed to keep up with feedback analysis, and many medications were designed for their short-term consequences, not for their long-term effects on feedback utilization.

Now, in our view of a quantum fractal light, let us look at various feedback circuits.

There are five basic kinds of feedback:

1) negative
2) positive
3) inner-limiting
4) self-limiting
5) outer-limiting

Negative feedback can be thought of using an analogy of the relationship between the furnace and thermostat; the furnace works until the thermostat turns it off. As the room cools, the thermostat relaxes to another temperature at which it turns the heater back on. This is an example of negative feedback. Negative feedback means that one type of function regulates another. *Pathologic* negative feedback occurs in certain kidney function diseases, CO_2 and O_2 regulation, and desire control problems.

Positive feedback can be seen this way: a speaker with an amplifier system and microphone starts to produce feedback. The subtle sounds made by the speaker are picked up by the microphone and amplified back to the speaker, which are then amplified back to the microphone. This type of feedback loop is called positive feedback, and provides amplification. Amplification occurs through maximization of potential. Positive feedback occurs in hyperactivity, anxiety states and tachycardia, among a host of others.

Another type of feedback is the special attractor or inner limiting of the actual entities existing in the universe. Some type of inherent mathematical relationship was infused into every electron, proton, neutron, molecule, atom and cell at the beginning of the universe. This led to the Feigenbaum numbers, which allows for each item to perform in chaos to a certain type of limiting feedback loop. This is basically the special attractor of the universe. God provides a pattern for reality.

The next type of feedback is the self-limiting cycle, in which a growing system starts to impose self limitations on its own biology. Thus an organism would know how cold it must become before it would need shelter, how warm it must become before it would need shade, how thirsty it must be before it needs water. Or a society might impose limitations on what its people can and cannot do. Society's laws are an excellent example of self-limiting circuits. Examples of pathologic, self-limiting cycles are hyper- or hypothyroidism, gonatrodin or other

Another type of feedback loop can be established from outer limitation cycles, where an external body, such as the government of the United States, might pose limitations on a smal er dy, as it tells cities or villages how much they can grow or how populated they may be. This is an example of outer limitation feedback. If the state of Massachusetts has laws about how arge a village can be, and the village of Neschwitz starts to grow too large, then the state will feed back and tell the city to take appropriate action. Examples of this dysfunction in medicine iatrogenic; doctors intervene externally and inappropriately to the organism. It is possible that any sinthetic intervention is inappropriate.

INTERNAL SYSTEM FUNCTIONS ON A COMPLEX INTERTWINED SET OF SOPHISTICATED FEEDBACK AND SELF-LIMITING CYCLES	External Intervention from Unsophisticated Sinthetic Source Results can only be derogatory.

In the case of positive feedback we can see why Poincare postulated that in some places the smallest effects could be magnified through feedback, and have disturbing or stabilizing effects on the total complexity.

Without knowing all the situations of feedback mechanisms inherent in any cell, let alone the complexity of the human body, one would be appalled by the idea of external intervention. If you had superficial knowledge of a television set and were asked to fix it when it was broken, without knowing the complexity of the feedback loops within, your interventions would be weak and befuddled. Attempts to reduce the functions of certain circuits to simply one type of wave form would be ludicrous; whereas many different circuits have vast quantities of wave forms coursing through them. The same analogy is seen in modern medicine, which tries to intervene on the human body. The first thing that would probably happen if we intervened on a TV set is that we would void our guarantee. Our sinthetic pharmacology and chemistry might have voided our biological warranty. Also our dabbling in the TV set without full knowledge of its function will have startling effects, as we upset feedback loops within the set. We might fix the temporary dysfunction in the short term, but in the long term, it would be highly likely that we would inappropriately intervene, and thus cause problems.

This is what is happening in our sinthetic pharmacological intervention of the human body, since we are voiding the guarantee. Of course, armed with our productionistic, reductionistic minds, we would try to over-simplify this reaction, and not have an appreciation of the complexity of the system we are working with. Thus our attempts would be superficial juggling until we could learn more about the intricacies of the circuit. We will never be privy to the intricacies of the human cells or body; its secret is locked in its nature, and our knowledge is always intertwined with probability, never in surety. Complementarity and indeterminacy have sealed that. So that we don't void our guarantee, our medicine should try to revise and adapt a natural modality, a behavioral intent, and a homeopathic pharmacology. We must develop a softer, more natural medicine more closely attuned to the laws of quantum theory and the natural process. We must challenge sinthetic technology, and also provide choice to the people in our society.

Poincare developed a many-body problem, and mathematically proposed it as nonlinear. To the ideal analytical system he added feedback, a nonlinear complexity. This corresponded to a very small third-body effect. Mathematically he was shocked to find that the small third-body effect could possibly produce vast differences. Even in the orbits of the planets, this third-body effect could cause chaotic orbits, which would cause the whole solar system to be unstable. Poincare told us that chaos is the essence of a nonlinear system, and that even completely determined systems such as our solar system can have indeterminate effects. He found mathematically that these effects, however small, could have an effect on the whole.

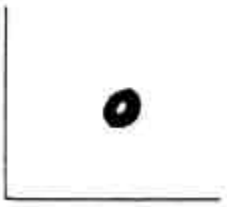
Two of our forms of feedback are the *attractor* and the *strange attractor.* These are functions that can be understood and exemplified in *phase space*. Phase space combines dimensions in a nonlinear system to demonstrate a unity function resulting from two or more dimensions, thus producing a shape different from the perception supplied by our senses. Such an example of phase space has been supplied in "Scientific American", where heartbeat and brain wave are shown to have irregularities in their phase space. To calculate and project this phase space, the dimensions of time and intensity of heartbeat are combined. A distinct time limit of one second was applied to the heartbeat to determine its regularity vs. time. It was found that the more regular the heartbeat became to time (in other words, the closer its phase space), the sicker the person was. The normal heartbeat seemed to follow some type of strange attractor, as shown.

HEALTHY HEART BEAT IN PHASE SPACE

Cyclic Irregularity
of Healthy Beat

Heartbeat after one second

UNHEALTHY HEAT BEAT



Regularity in

Time Phase

Heartbeat after one second

An attractor is an aspect within a system that applies pull or push to a certain area, just as a pendulum has its attractor (gravity) at the lowest point. As the pendulum oscillates back and forth, to and fro, it is pulled to a one-point system. This is a *single-point attractor.* In all systems, even chaotic ones, there are attractors that seem to pull the participants or the cybernetic organism to certain levels. A complex system of interaction in feedback loops might result in a *torus attractor*, such as the one in the "Scientific American" article on heartbeat.

Complicated feedback systems such as cellular biology and microbiology will have torus attractors that set asymtopic limits that can never be achieved, and as an item pushes into one area, it is pulled to another to maintain this type of stability.

The attractors of life could include the 7.4 tendency of pH in blood, which has to be balanced through buffer systems, oxygen cycles, and phosphate chemistry. Blood sugar hovers in a broader band, oscillating from 10 to 300, but the torus of healthy blood sugar would oscillate between 80 and 120. As it started to approach the 80 range it would stimulate functions of pituitary, liver, and adrenal glands, to stabilize blood sugar by one of the three processes of: eating, glycogenolysis, or neoglucogenesis. Thus as blood sugar starts to climb, other feedback and regulatory processes will be invoked, and will bring it back down through insulin release, activity management, and caloric activity. This would be extremely complex, having thousands if not millions or billions of variables that would have to be regulated. Talk about a multi-body problem!

If we combined all the various toruses and all the various shapes in this vastly complex strange attractor, it might indeed look like the double-helix structure of the DNA. This would become not only a three-body problem, but a *billion and three*-body problem or larger, and once again the limitations of our Newtonian dynamics, or two-body linear equations, would not even come close to fitting this type of analysis. Here again we have seen dramatic proof of how Newtonian, reductionistic, thermodynamic philosophy has little to do with biology or medicine. This type of reductionistic theory then isolates into simple, sinthetic compounds and their simplistic interactions of the body. It is indeed an insult to the complexity of feedback loops. The reductionistic components of sinthetic technology are not sensitive to the feedback systems in biology. Nature has many very subtle, intricate control compounds and energetic safeguards. Only nature knows.

It has been proven that as little as 10^{-9} of a gram of thyroid hormone can have effects on the human body; yet, multi-milligram dosages are given daily in the form of thyroid hormone, synthroid (sinthetic thyroxin). This large amount would demand chemical action, yet upset subtle feedback loops, and cause further atrophy of the thyroid tissue. The "use it or lose it" law dictates this (see Registered Wellness Consultant Book).

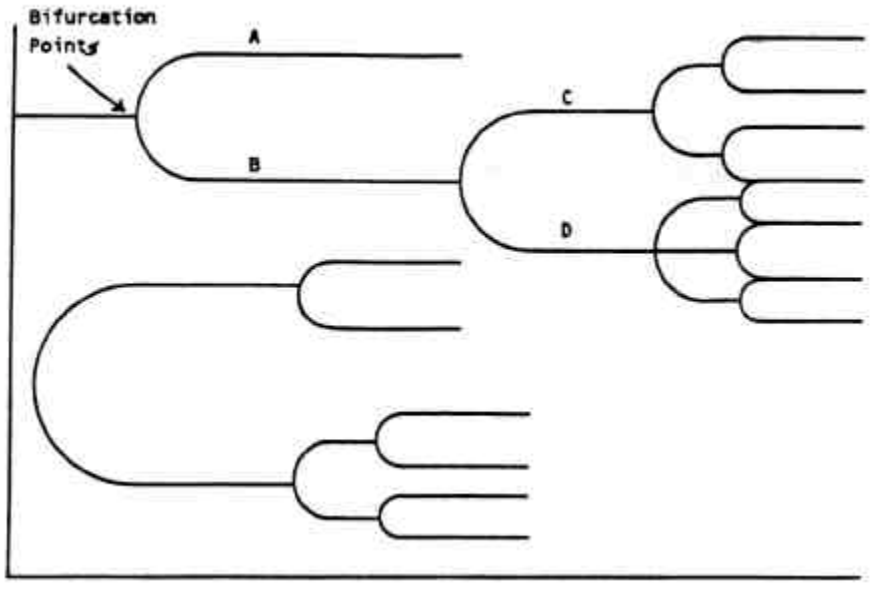
To supply an item that is supplied by the body (whether naturally or sinthetically) for long periods of time can cause the tissue to atrophy and lose potency. Such intervention should be reserved for short-term use, or in the case of tissue destruction, which is irreversible. Examples of such destruction might be surgery, irradiation, or possibly even genetic damage that has prohibited a certain area of tissues to produce needed enzymes, hormones, or whatever. In this case such hormones would have to be used in the long term.

The entire field of pharmacology is dedicated to the idea of blocking, stimulating, or interfering with cellular microbiology. This demanding of action interferes with the subtleties of the loops and causes vast differences in the structures and the activity of the cells.

The development of the torus of life, as complicated as it might be, is set up by DNA. The locking of the mathematical relationships, as we have indicated in our mathematics chapter, can flow from the Isaacsonian hermitian matrices. This would explain the Fibernaci link in development of the bronchial tree, and the capillaries and vein actions of the body.

Osborne Reynolds found that flow through different sizes of pipe would result in turbulence. As the flow of a liquid through a pipe reaches a certain speed in a certain sized pipe, turbulence results, and the engineer comes out with what is called "Reynolds's numbers". The body, in developing its flow of blood through the arteries and veins, has taken Reynolds's numbers to that barrier where there is almost turbulence, and thus maximum flow, below the levels of chaotic interruption.

A Russian physicist named Levlandau was one of the first modern scientists to try to pin down the steps for turbulent development. Like Leonardo Divinci, he realized that turbulence appeared after a huge number of bifurcations had occurred. A bifurcation is a trauma point in the path of an item at which it could choose a different path; so an object in path A that would have a bifurcation might choose to go around it to the left or right, resulting in a bifurcation point. Existence is full of bifurcation choices in which we choose to go left or right. If an item has an attractor, and items coming into this analysis mostly choose A, that type of attractor would set up a probability that, for example, 80% of an item flowing in path A would choose path B. But if there are more items put into it at some critical point, a situation might be set up in which the attractors would jump frompath B to path C, or choose another attractor. A point of instability has been mathematically related, being called the *Hopf Instability* (see *Bio-Quantum matrix*).



VERHULST NUMBER (FEIGENBAUM)

Hopf proposed a wealth of further instabilities. One such instability involves a jump from point attractor to limit cycle. This is the changing of a torus attractor, such as a three-dimensional system of a torus going to a six-dimensional system torus. A second jump might be a limit cycle transforming onto the surface of a torus. The third type bifurcation might happen if instead of jumping from a two-dimensional surface or torus onto a three-dimensional surface in a four-dimensional space, the torus itself breaks apart, and the surface enters into a fractional dimension. Thus the surface of the torus attractor is actually caught between the dimensions of a plane; two- and three-dimensional.

Thus as the *Eclosion* medical instrument analyzes the many-dimensional system (in this case, a twelve-dimensional responses), it is used to analyze an extremely complex set of situations, providing data to the medical practitioner.

This type of analogy can be seen in trauma cases, in which a patient has an attractor of a healthy torus after a trauma, which is a bifurcation point. The body now chooses to return to the previous torus or to develop an adaptation torus. An adaptation torus is a new attractor developed in response to a trauma case, in which a patient would reject the natural strange attractor. After a trauma the body might choose this adaptation attractor, rather than returning to the original healthy attractor. The adaptation torus is a compensation type of attractor, in which the body, rather than returning to its original phase space torus, might choose another torus, an adaptation torus, as Selye discussed.

As Hopf bifurcations occur, the torus of the biology of the organism can choose different responses, and thus biofeedback loops. The sum total history is the response of society changing tauruses in response to bifurcations. As various challenges occur; wars, natural disasters, or just ideas, these act as bifurcations, where society now must choose a response. Possibly the response of the old strange attractor might be reacted to. A society in response to a natural disaster might choose to return to its old sense of balances, and continue as if the natural disaster hadn't happened; or, as a result of the bifurcation of that disaster, a society might choose to find another set of morays, some way to help prevent the natural disaster, or perhaps a way to prepare for it. Or it might not have anything to do with a natural disaster at all; it might just be a result of a bifurcation producing the intent or the probability of change, or if nothing else, the chance for it.

So a society that witnesses a volcano erupting might have noticed that the first person it took was a young virgin, and then the volcano calmed down. So the society might adapt a process of sacrificing such a virgin. This might become the moray of the society, and once every year or so, the young virgin will be sacrificed. This would have drastic effects on the rest of the society.

In response to different bifurcation points in society, social changes can be marked. We often also find that certain accidental cases can be sparked, such as the malaria epidemic that sparked the doctor to develop air conditioning. It was his theory that by cooling the patient he could cure malaria. His medical theory was untrue; however, his craftiness in supplying the world with air conditioning greatly changed society and the places where man could live and operate productively.

So our responses to bifurcations are often accidental, and sometimes intentional.

In 1975 Feigenbaum made a very significant discovery. Working on chaos theory, using a hand calculator, he tested equations and found universal types of period doubling similarities and their transformations. He explored equations in learning, population, solid state devices, optical systems, electrical circuitry, sound feedback, and so on. He supposed that the fine details did not really matter in these systems, and that the period doubling was the common factor that predicted the chaos entering into the system. He presented universal numbers, which he calculated with his hand calculator. These numbers correspond to the ways that a system goes into chaos, and then finds itself in order.

When a system works on itself through feedback, it will change in precisely the same way according to universal dynamics. The ratios that Mitchell Feigenbaum discovered will be known throughout the rest of time as the *Feigenbaum numbers*. These Feigenbaum numbers fall out of the hermitian matrices of Dr. Isaacs, showing how this system reverts chaos back onto itself, back to order. Our biology was able to do that through the determinate values of feedback started from the beginning process of the galaxy.

Regularity of the heartbeat was a key as to when there was going to be certain spasmodic or arrhythmic behavior. By changing the refractory time on different heart muscles, he could discover when to produce out-of-sync rhythms by period doubling. This produces the arrhythmia of tachycardia, often bradycardia, and definitely many other cardiac dysfunctions. These can often be the result of inappropriate negative feedback or positive feedback in the circuits, as well as external or internal limiting cycles. Many of these can cause problems in the

cardiac rhythms. McGill University, Leon Gloss and their group found that by giving regular periodical stimulations to chicken heart cells, they could cause period doubling, and eventually chaos.

Walter Franceschini confirmed Feigenbaum's numbers. He analyzed various equations' modeling fluids in turbulence; thus the link between chaos/order and order/chaos was found to enter through the Feigenbaum numbers, which were predicted in the Isaacsonian hermitian matrix. Thus all of life is an iteration feedback through absorption, unfolding, processing toward chaos, approximating tauruses and new needs for DNA, and approaching new needs for order as we fight our battle against entropy.

Iteration defines that normalcy and alteration are not opposites; neither are change and stability. The body remains stable; yet it is in a constant state of flux. This constant state of flux stays the same. This is a flip-flop on the Janusian concept of psychology.

Janus, the great god of Rome whose face looked through the door both ways, in and out, shows us the power of Janusian psychology; the genius. The genius is able to see that something can be in a state of flux, and yet in a state of stability. Einstein saw that an object that is falling is actually at rest at the same time.

In O'Neil's play, "The Iceman Cometh", the Iceman represents both life and death. The truest pattern of genius in our science is the pattern of realizing that something can be both in yin and yang at the same time, and that opposites sometimes can be truly equal. This is the idea of iteration in fractal geometry, or chaos theory.

In 1960 an MIT weatherman, Edward Lorenz, was using computerized simulations to solve nonlinear equations of the Earth's atmosphere for weather conditions. As he ran one value, rounding off his figures to six places, he came up with a pattern of weather. Then, rounding off the figures to three decimal places, he set the computer into motion, went out to lunch, and when he returned, he had a tremendous realization; not only was his second forecast different, it was *radically* different. The small three-decimal place discrepancy of the two solutions grossly magnified the chaotic process. As Poincare would have pointed out, the small indeed can affect the large.

What would it take to really round off a computer for better results? Perhaps our pocket calculators are not enough; perhaps we need computers that can work at 10^{23}, such as the triphasic computer system in the *Eclosion* system. Perhaps by working at 1023 we can establish how even the smallest intervention can have effects on the large. Joseph Ford called this the "round-off error", the missing information, and we need to exceed seventeen, twenty-three, thirty-first iterations, to drastically improve our predictive capabilities. Through iterations alone, even the smallest type of fluctuation can have large-scale effects.

As indicated in *Bio-Quantum Matrix*, synchronicity in the generation of random number series can be affected by the indeterminacy principle of the human mind. Thus the development of a synchronicity random number generator that could match the amount of synaptic clefts in the human brain could perhaps be accessible to the vibrations and the morphic resonance, and bring meaningful data to bear.

As we have pointed out in this book several times, indeterminacy is the key to our quantum biology. This indeterminacy, as it plays in large number series, takes on fractal dimensions, where large-scale chaos and entropy become a predictability and a factor in biology.

For hundreds of years scientists have sought to reduce the many mathematical variables to their meaningful components. This has been done through a quantifying mathematics. This type of quantifying mathematics reduces the complex imposing network of small forces and tries to calculate the large forces. So a bridge engineer would be concerned about force and structure, and would calculate toward one variable of force and resistance, letting the subtle iterations go as indeterminacy or experimental error.

Quantification in mathematics has been very powerful in the development of engineering, which has put a man on the moon and built large aircraft, automobiles and bridges. But our reductionistic quantification in mathematics has failed miserably to explain the phenomenon of biology, and especially the phenomenon of life itself, at the cellular level.

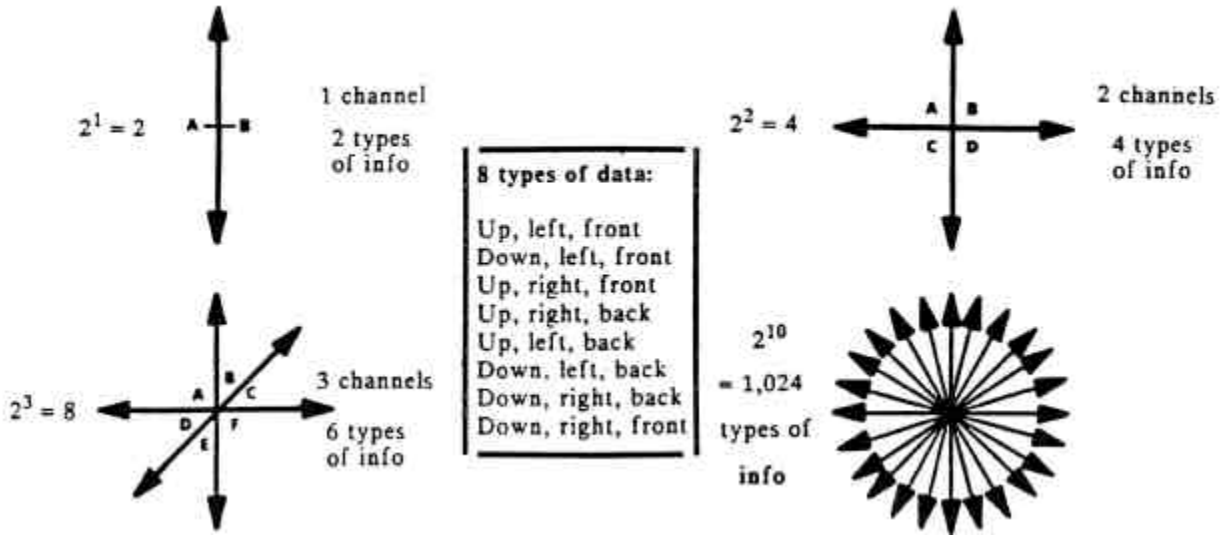
To this end, scientists recently have turned toward *qualitative* mathematics. In qualitative mathematics we don't look at the parts or reduce to simplistic forces; we look at the whole of the system, the Gestalt of the dynamic. We discover how the whole changes in response to even the smallest stimuli. Scientists are seeking to develop nonlinear, qualitative modes of analysis.

To date, the development of biofeedback has been quantitative; in other words, involving one simple variable of response to certain stimuli, thought patterns, or behavioral conditions. Thus we might look at blood pressure in response to ideations about family, fatherhood, motherhood, and so on. Or perhaps GSR could be compared to conditions of fear or apprehension. In developing a qualitative type of biofeedback, the researcher takes a complete look by comparing eight or more variables at a time in response to various stimuli.

In looking at different brain wave responses; amperage, voltage, resistance, temperature, pressure, and oscillations at several different parts of the body, we can look at a qualitative, systemic change in response to

different items. This type of change would result in vast amounts of data. If we had simply a one-dimensional variable such as skin resistance, we might get a high or low skin resistance oscillating around some type of a norm.

Such systems are the Dermatron, Interro and Computron. These systems will generate 2^1 amounts of data. 2^1 equals two, so we know that the response of skin resistance is high or low. If we generate 2^2, we will have not just high or low, but left or right, generating four quadrants, allowing for four different types of data that can be upper left, upper right, lower left, lower right. So having two channels will allow us 2^2 in data. If we add a third channel, for example, skin resistance, voltage and amperage, then we find that we can get 2^3, or eight bits of data, eight quadrants where the problem could be. The Xrroid developed by this researcher generates ten different channels, or 2^{10} bits of data, which comes to 1,024 variables.



Up, left, back
Down, left, back
Down, right, back
Down, right, front

Thus by taking a qualitative look at the body through ten different dimensions, giving us 2^{10}, we can look at 5,000 items, such as amino acids, minerals, vitamins, sarcodes, isodes, nosodes and allersodes, and do it all in minutes, with the computer calculating the various reactions. By processing this through a trinary logic system, a system that is either on, off, or indeterminate, we now arrive at a qualitative indeterminate trinary logic system, which we have called the *Xrroid.* The Xrroid will allow a computerized machine to look at 5,000 entities; homeopathics, nosodes, sarcodes, and others, see ten different reactions of the body's response to them, and thus generate 1,024 x 5,000, or over 1,300,000 bits of data. This data is then processed with a trinary logic system matching the indeterminacy of the human brain. This process in the machine, generating 10^{23} random events and calculating the results, is known as the Xrroid.

By comparing the phase space dimension of the Xrroid results, we can find the strange attractor of the human body. This device enters a new dimension of biology, allowing us to utilize more natural modalities of mathematics to intervene on a biological system. This device has been sold for years, and used to help thousands of people to naturally regain their health.

It is another basic hypothesis of this book that since the beginning of the universe, wherever that might be, there has been an ingrained reactivity to chaos and large systems built into the basic matter of the universe. Every electron, proton, and other particle has a programmed ability to react. This type of reaction is set by quantic terms, and is espoused in fractal demonstrations of chaos theory.

As we have seen from chaos theory, as systems approach chaos a type of fractal processing guides them through bifurcation points into set patterns, which defy the old type of entropy random processing. But there seems to be an extra dimension to the processing of biological systems. Here, a more imposing cyclic transformation allows for metabolism and reproduction, a sort of super attractor which guides and processes material biologically, thus allowing for life.

Any strange attractor, even a super attractor, is a fractal curve. All fractal shapes are similar at descending scales, just as biology has similarity built into the small in relation to the whole. The part reflects the whole, as in reflexology, palm reading, or DNA research.

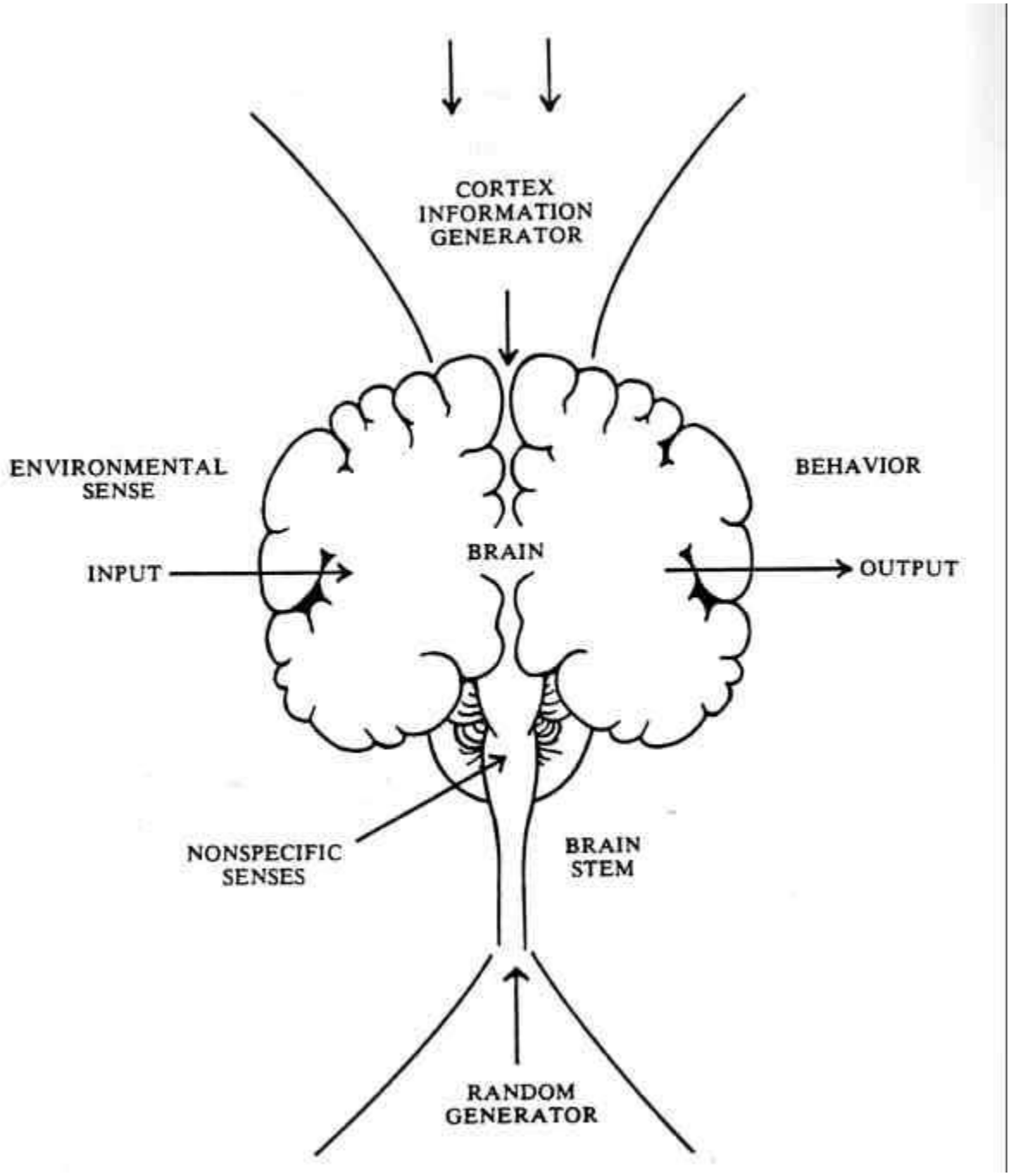
Medicine has always known that the ear might resemble the body and that various dysfunctions can tell us about problems in parts of the body. The foot, through zone therapy, reflects different parts of the body. The hand, or the palm, reflects life. Modern scientists now know that DNA inside every cell reflects the shape of the whole. Fractal shapes are always similar at different harmonic points in the building of the small into the large.

The phase space system of the human body bends and folds through fractal shapes. Fractals become organic when at each bifurcation point there is an indeterminate choice between several forms of iteration. An organic system would have an indeterminate reaction to equally possible systems of reaction. Cellular systems cannot work on one dynamic system alone; they must have back-ups.

As Briggs and Peat state in their book, "The Turbulent Mirror": "The human circulatory system is an amazing piece of engineering, consisting of a supply system, arteries carrying oxygen-rich blood; and the exhaust system veins carrying away the waste products. These two systems of branching pipes come to a central pumping area, the heart. It must be arranged in such a way that no part of the body, organ, or piece of tissue is far from both systems. These severe constraints dictate a fractal branching structure for the veins and arteries. However, blood itself is a very expensive commodity in terms of the body's resources. Consequently blood has a volume of only three percent of the body; the problem is how to get the circulatory system infinitely close to each body part and keep the total volume low. Nature's solution is more rapid branching than mere scaling would suggest. The blood supply bifurcates between eight and thirty times before reaching each particular location of the body, and has an over-all fractal dimension of three."

The longest particular illuminating fractal structure tells us something about the meaning of scaling. The ancient Greeks divined history's most famous scale, the golden mean, or golden section. Draw a line and divide it so the two segments, A and B, are in the same ratio to each other as the long segment is to the whole line. The proportion of A to B is an irrational number, 1.618... This proportion can also be found in a series of numbers beginning with 1, where each number is the sum of the two proceeding it; 1,1,2,3,5,8,13,21. The ratio of each number to its predecessor approximates the golden mean. This series is called the *Fibernaci numbers*, named after the thirteenth-century Italian mathematician, Fibernaci, who made it famous.

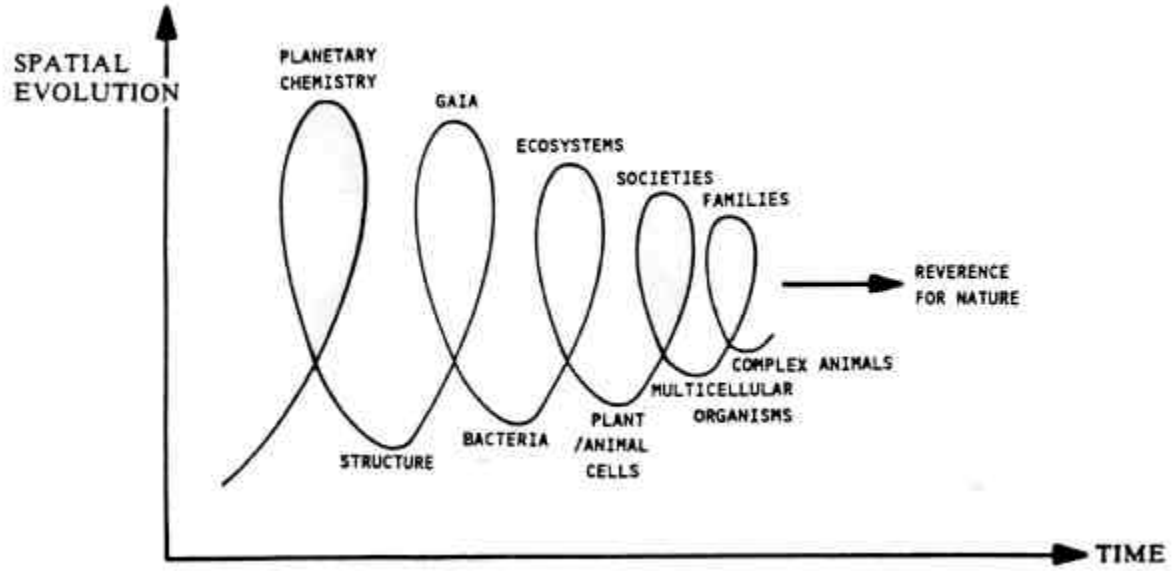
Studies have shown that the ratio of the lengths of the first seven generations of the human lung bronchial tubes follow the Fibernaci scale. The diameters of the tubes are classical; that is, Fibernaci up to ten generations. But after these initial generations, the scales change markedly.



Bruce West and Arnie Goldburger have demonstrated that the lung incorporates a variety of fractal scales; shifting to scales allows the lung greater efficiency. West and Goldburger say: "The final product, which we have dubbed `fractional Fibernaci lung tree' provides a remarkable balance between physiological order and chaos..."

We will always be able to explore, because we will never know. With the indeterminacy principle, we will never be absolutely sure. Our grandchildren and our great grandchildren will always have more to explore in biology, medicine and science. Everywhere we look we see more complexity; this is not a reductionistic universe. It is not a linear dynamics, it does not yield to thermodynamics and entropy. Biology, by fate of existence, is the severe antithesis of linear, entropic, thermodynamic Newtonian dynamics.

Thus we can see that there is a nonlinear organization to the universe, and that the ideas of reductionism are totally inadequate to describe our present-day world. This pinnacles in biology, where the ideas of statistical distribution, reductionistic thought and even thermodynamics do not fit the system needed to explain the phenomenon of biology. A new system will be needed involving some new techniques to understand our biology. The implications and the effects on medicine will be most profound.



Hahn Selye writes in his classic book, "In Vivo (The Case for Supra-Molecular Biology)", that the reductionistic form of thought in medicine appalled him in as early as the 1930s. He saw in his medical education teachers and professors who would try to reduce complex sets of symptoms in their patients to one or two entities of disease, primarily trying to find some type of pathogen that was causing the disease.

Selye reported that he discovered "the syndrome of just being sick", where many of the diseases just seemed to be a result of being sick. Surely it was important to find remedies for one disease or another. It would be ever so much more necessary to learn something about the mechanism of being sick and the means of treating the general syndrome of sickness, which is apparently superimposed upon all diseases. Selye later coined the word "stress", and used it to direct his theories of the GA S (General Adaptation Syndrome). In developing this, he found that stress could create problems in four major areas:

1. Adrenal-cortical stimulation
2. Thymaco-lymphatic degeneration or atrophy
3. Gastro-intestinal ulcers
4. Heart and circulatory system

As a response to the stress, there was a three-part system of response:

1. The alarm reaction, initial reaction to stress
2. Stage of resistance and adaptation
3. Stage of exhaustion and system failure

Dr. Selye thus was able to resist the temptation of reductionism and linear thought and look for a more general pattern of disease that was very much parallel to the resistance of reductionism found in most modern mathematics; looking for fractals and complex dynamics as they affect biology.

Modern medicine is starting to accept some of Selye's work as looking for a syndrome of sickness and stress-related connection. There has also been much research and work on the psycho-immune system's function, relating to the well-being of the psychology of the patient's system and his ability to fortify and direct a proper immune system response. Even so, reductionism proliferates medicine.

Process of Disease:

1. Primary Cause of Disease, Stressors, etc.
2. Secondary Step Functional Disease
3. Third Step Organic Disturbance
4. Death

SUMMARY

1. REDUCTIONISM WAS THE PROBLEM IN MEDICINE, NOT THE SOLUTION.

2. MODERN SCIENCE, MATHEMATICS, AND PHYSICS HAVE RECOGNIZED THE FALLACY OF LINEAR REDUCTIONISM. WHY HAVEN'T MEDICINE AND BIOLOGY?

3. THE EVOLUTION OF MODERN THOUGHT HAS OUTGROWN REDUCTIONISM.

4. FEEDBACK HAS MANY FORMS, AND IS INTEGRAL TO LIFE.

5. THE ATTRACTOR OF LIFE IS SET BY THE TORUS OF APPROPRIATE CONDITIONS FOR BIOLOGY.

6. CRISIS BIFURCATION POINTS OCCUR AS A RESULT OF TRAUMA. THE PATIENT'S BODY CAN CHOOSE TO RETURN TO HEALTH OR ADAPT TO THE TRAUMA. MEDICINE SHOULD ATTEMPT TO RETURN THE PATIENT TO THE HEALTHFUL PATTERN.

7. BIOLOGY HAS AN IRREGULAR PHASE SPACE ATTRACTOR.

8. SMALL CHANGES CAN HAVE LARGE EFFECTS ON A SYSTEM.

9. HOMEOPATHY IS PROVEN SCIENTIFICALLY AND MATHEMATICALLY TO BE AN EFFECTIVE MEDICAL SYSTEM.