VIBRATION

'*There is geometry in the humming of the strings,*
there is music in the spacing of the spheres.'
Pythagoras

Science and Vibration

Scientists have determined that all the forms in the universe are, at their most fundamental level, patterns of vibration. Every structure of phenomenal reality, from atoms to the human body to galaxies, are clusters of vibrations emerging from an underlying field of energy. In his visionary book *Nuclear Evolution*, Christopher Hills writes: "If we look deeply into *all* life, we will find that it consists of vibration; even atoms are not material in that sense. They are only energy forms which are patterns vibrating in a certain way so that they interact with our senses, and we feel something solid. But it is only solid to *us* because we are vibrating in that same band of frequencies." Even the electrons in atoms are described mathematically as vibrations. However, unlike the vibration of a violin string, they are not the vibrations of a material entity, but rather vibrations of 'probability amplitudes' existing in three-dimensional space.

Throughout the natural world, patterns of vibration create simple and complex phenomena which, like the instruments of an orchestra, create intricate rhythms and melodies. "The many competing theories that seek to describe the fundamentals of the physical universe all tend to describe its manifest nature in terms of vibrational excitations, which are essentially wave-forms. And it is the multitude of such waveforms and their continual and dynamic interaction through which the information that underlies and pervades the world is embedded and expressed." In *Music of the Spheres*, Guy Murchie eloquently describes this amazing 'dance of nature':

> The evidence is indeed overwhelming that every atom is somehow made of durable waves that vibrate continuously in hierarchies of energy – neat terraces of binding resonance between ø frequencies. All atoms, from the simplest (hydrogen) to the most complex, have comparable wave patterns, and the bigger, heavier ones could be likened to complex musical instruments or even whole orchestras on which many notes are being played simultaneously as chords from the contrabass levels to the outermost shell's altissimo. And of course, atoms vibrate as a whole also, and complete molecules generate their own cohesive wave systems, as do entire crystal lattices in beautiful interweaving integrated regularities, and all larger objects and organisms – including human beings, stars and, for all we know, the universe. It is in these and comparable ways, as we are becoming increasingly aware, that all matter tends toward its natural rhythms, ranging from the simple mechanical oscillation of pendulums and springs and falling drops of spray to the ups and downs of weather to the rhythms of the heart to ecological fluctuations and the population patterns of insects, birds and animals. (1)

For centuries, scientists believed that matter was the fundamental building block of the universe. But, in the early twentieth century, physicists presented a new understanding of the nature of the universe which challenged pre-existing beliefs. Nobel-prize winning physicist Max Planck spoke about these new developments in his 1944 lecture "The Nature of Matter": "There is no matter as such. All matter originates and exists by virtue of a force which brings the particles of an atom to vibration and holds this most minute solar system of the atom together. We must assume behind this force the existence of a conscious and intelligent Mind. This Mind is the matrix of all matter."

The findings of quantum physics revealed that the objects of the material world were primarily vibratory, not an ensemble of bits and pieces of matter. In *The Intelligence of the Cosmos*, Ervin Laszlo writes: "The vibrations that make up the world we observe are not random but highly ordered: they are *coherent*. Their order and coherence tell us that they are not the result of mere chance. The vibrations are 'in-formed.' In the last count, we are in-formed clusters of vibrations in space and time, interacting and coevolving with other clusters both locally, here and now, and nonlocally, throughout the universe."

> In quantum physics, observations and calculations reveal that at the ultra-small dimension, space is not empty and smooth. It is "grainy," filled with waves and vibrations. When physicists descend to the ultra-small dimension, they do not find anything that could be called matter. What they find are waves and clusters of standing or propagating vibrations. Previously, scientists had assumed that it is matter that vibrates. There is a ground substance that vibrates, and that substance consists of matter particles and assemblies of matter particles. The world is material, and vibration is the way matter behaves. But the contrary turned out to be the case. There is no ground substance. The world is a set of variously integrated clusters of vibration, and matter is just the way the vibrations appear to observers. (2)

Laszlo proposes that the phenomenal world of space and time is the product of coordinated patterns of clusters of vibration in-formed by an underlying cosmic intelligence. In *What is Reality?*, he writes: "In its ground state, the cosmos is a coherent sea of vibration; a pure potential. The waves that emerge in its excited state are the actualization of the potential, and they convey the vibration of the ground state. Consequentially, the clusters that constitute the manifest entities of the universe are in-formed by the vibration of the cosmic ground state."

> In the new map of the cosmos there is no such thing as "matter." There is only "matter-like" entities constituted of clusters of coordinated vibration. The material things we consider elements of the real world are bits and clusters of vibration, oscillating standing waves at various scales of size and complexity. Planck-size bits configure into clusters of coordinated vibration and their interaction creates the manifest world. The clusters, superclusters, and hyperclusters compose the particles, atoms and molecules; the organisms and ecologies; and the

> stars, stellar systems, and galaxies that are the furnishings of the world. They constitute individually distinguishable but not categorically separate entities. They are intrinsic elements of the field of vibration in which they appear. The vibrations that furnish the world appear in the "excited" (as contrasted with the "ground") state of the cosmos. Our universe can be defined as a coherent domain in the general wave field of the excited state of the cosmos. All things in it are clusters of coordinated vibration . . . The vibration of the ground state is eternal and immutable, but is capable of excitation. Its excitation produces the manifest universe. The cosmic ground state appears to have been last excited 13.8 billion years ago with the influx of energies liberated by the singularity we know as the Big Bang. The cosmos entered the excited state where it is a universal field of vibration producing waves of diverse amplitude, phase, and frequency. The interaction of the waves creates patterns of interference, of which the clusters and higher-order superclusters are the matter-like entities of the universe. (3)

Quantum physicists discovered that the universe is a "sea of motion," since the energy levels of subatomic particles are constantly fluctuating. No subatomic particle is ever completely at rest as they always possess a tiny residual movement. In *The Field*, Lynne McTaggart offers a useful analogy to describe this process: "Imagine taking a charged subatomic particle and attaching it to a little frictionless spring. It should bounce up and down for a while and then, at a temperature of absolute zero, stop moving. What physicists have found is that the energy in the Zero Point Field keeps acting on the particle so that it never comes to rest but always keeps moving on the string."

> In the quantum world, quantum fields are not mediated by forces but by exchange of energy, which is constantly redistributed in a dynamic pattern. This constant exchange is an intrinsic property of particles, so that even 'real' particles are nothing more than a little knot of energy which briefly emerges and disappears back into the underlying field. According to quantum field theory, the individual entity is transient and insubstantial. Particles cannot be separated from the empty space around them. Einstein himself recognized that matter itself was 'extremely intense' – a disturbance, in a sense, of perfect randomness – and that the only fundamental reality was the underlying entity – the field itself. Fluctuations in the atomic world amount to a ceaseless passing back and forth of energy like a ball in a game of pingpong. This energy exchange is analogous to loaning someone a penny; you are a penny poorer, he is a penny richer, until he returns the penny and the roles reverse. This sort of emission and reabsorption of virtual particles occurs not only among photons and electrons, but with all the quantum particles in the universe. The Zero Point Field is a repository of all fields and all ground energy states and all virtual particles – a field of fields. (4)

String Theory

Theoretical physicists have always endeavored to explain physical phenomena in a logically consistent form. Much of their work was an attempt to unify relativity theory and quantum mechanics into a coherent "theory of everything" without, however, much success. More recently, the development of *string theory* has opened up more hopeful avenues for a unification of the laws governing the microscopic world of subatomic particles and the macroscopic world of galaxies, stars and planets:

> A different approach has been adopted today by the majority of theoretical physicists: they take quanta – the discontinuous aspects of physical reality – as basic. But the physical nature of quanta is reinterpreted – they are no longer discrete energy-matter particles but rather vibrating one-dimensional filaments: "strings" and "superstrings." Physicists try to link all the laws of physics as the vibration of superstrings in a higher-dimensional space. They see each particle as a string that makes its own "music" together with all other particles. Cosmically, entire stars and galaxies vibrate together, as, in the final analysis, does the whole universe. The physicists' challenge is to come up with an equation that shows how one vibration relates to another, so that they can all be expressed consistently in a single super-equation. This equation could decode the encompassing music that is the vastest and most fundamental harmony of the cosmos. (5)

String theory was developed to explain some of the unresolved issues of quantum physics, including the puzzle of how elementary particles like photons and electrons can act like both particles and waves. String theory replaces the concept of fixed subatomic particles with vibrating strings: "Strings vibrate at different frequencies, and each frequency defines a corresponding kind of particle: one "note" on the string makes for an electron, another for a neutron, still others make for bosons and gravitons, the particles that carry the forces of nature."

String theory attempts to reconcile the particle/wave dilemma through the common attribute of vibration. "String theory considers waves to be the vibration of an invisible string, with particles being the specific "notes" that appear in space-time. The analogy to music is a powerful one, in that subatomic "harmonies" (vibrations which resonate with each other) are thought to determine how quarks, boson-like photons and gravitons, and other specific particles relate to one another and build up complex structures."

The permutations of a number of vibrating strings may underlie the proliferation of subatomic particles discovered in high-speed particle accelerators. As string theory developed, more advanced models were proposed such as 'superstring theory' and 'M-theory,' which were based on complex mathematical equations:

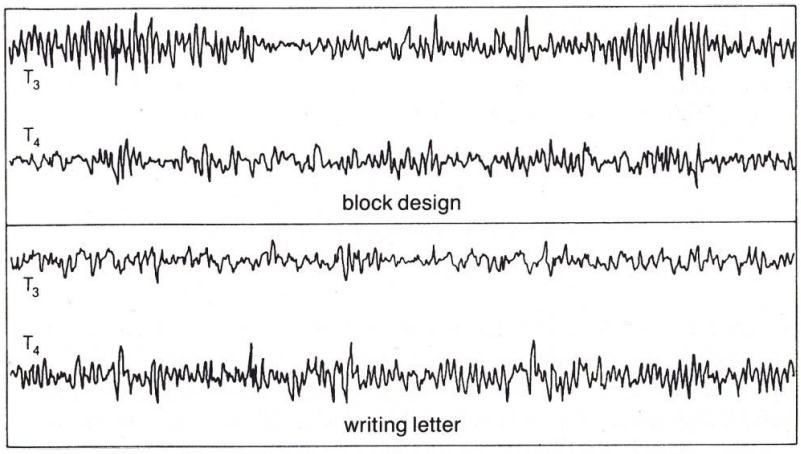
The ancient philosophers described the Cosmos in musical terms, intuitively appreciating its harmonic nature. With the advent of superstring theory, the idea that subatomic particles could be considered as vibrating strings reflects the ancient insight that the world is innately harmonious. The theory continued to evolve; the latest version is termed M-theory. A fundamental requirement for string theories is that the strings vibrate not within our familiar four-dimensional space-time but in multiple dimensions – in the case of M-theory, a total of 11. But in addition to perceiving the physical world as innately harmonic and the need for extra dimensions to understand it, M-theory has a further attribute that is revolutionary. Unexpectedly, but arising out of the mathematics of the theory, are a series of surfaces called membranes. These are multidimensional objects that may form the framework within which strings oscillate and to which they are energetically linked. (6)

Vibration and the Human Brain

Brain waves are produced by synchronized electrical pulses from masses of neurons communicating with each other. In a certain sense, brain waves are like musical notes – low frequencies are similar to a low-pitched drum beat while higher frequency brain waves are like the high pitch of a flute. Neurophysiologists distinguish a number of types of brain waves based on their frequency and amplitude. As well, each type is associated with different psychological states of consciousness:

- Delta (0.5 - 3 Hertz): deep dreamless sleep
- Theta (3 - 8 Hertz): intuition, reverie, deep meditation
- Beta (13 - 38 Hertz): alertness, mental activity, thought processing
- Alpha (8 - 13 Hertz): calm relaxed awareness, present in the 'now'

The right and left brain hemispheres are activated differently depending on the cognitive tasks being performed, as shown by the EEG brain wave patterns below:



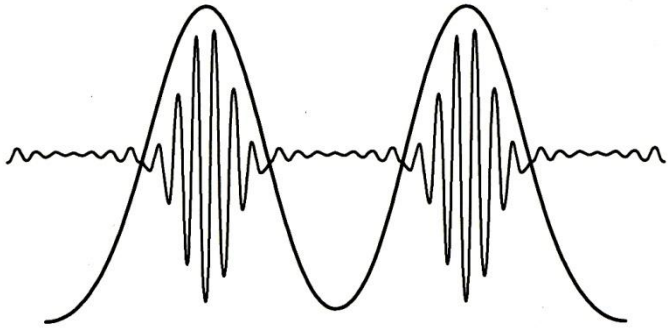
The above brain wave patterns were recorded in a study conducted by psychologists Robert Ornstein and David Galin in which a subject was asked to perform a verbal task (writing a letter) and a spatial task (arranging a set of coloured blocks to match a given pattern):

> The findings were immediate and very striking: while writing (presumably a left-hemisphere task) he produced high-amplitude EEG alpha waves over the right hemisphere and much less amplitude over the left hemisphere. This pattern reversed while he was arranging blocks, with the alpha rhythm dominant over the left hemisphere and less visible over the right hemisphere. The alpha rhythm is generally taken to indicate a diminution of information processing in the area involved. The left hemisphere "quieted down" while our subject was arranging the blocks; the right hemisphere quieted down while he was writing. With new subjects we found similar results: their EEGs showed (for each task) that the area of the brain *not* being used was relatively "turned off." (7)

The activity of the brain is governed by vibrations of different frequencies and amplitudes and their interrelationship. Also included are the vibrations of 'probability amplitudes' that occur in the quantum world. Vibrations of different frequencies interact, creating constantly changing patterns of brain activity:

> Increasingly, it is thought that the functioning of the brain also relies on vibrations, or oscillations, the preferred term of neuroscientists. These vibrations consist of relatively synchronized fluctuations of the membrane potentials of many cells and are reflected in the brain waves recorded by electroencephalography. One of the features of these vibrations is that they are "nested" one within another, or 'phase amplitude coupled.' This means that a slower rhythm will "contain" a number of vibrations of a faster rhythm, and the amplitude of the faster waves will fluctuate with the phase of the slower ones – at the peak of the slower rhythm, the faster waves might have their greatest amplitude, and at the trough of the slower rhythm, the faster waves their lowest amplitude. (8)

The figure below shows the amplitude variations of these slow and fast brain waves:



The work of neurophysiologist Karl Pribram sheds light on how the human brain acts as a hologram by 'translating' the vibratory frequencies of the external world into the perceptual reality that we experience in our lives:

> Our brains mathematically construct objective reality by interpreting frequencies that are ultimately projections from another dimension, a deeper order of existence that is beyond both space and time. The brain is a hologram enfolded in a holographic universe. For Pribram, this synthesis made him realize that the objective world does not exist, at least in the way we are accustomed to believing. What is "out there" is a vast ocean of waves and frequencies, and reality looks concrete to us only because our brains are able to take this holographic blur and convert it into the sticks and stones and other familiar objects that make up our world. How is the brain (which itself is composed of frequencies of matter) able to take something as insubstantial as a blur of frequencies and make it seem solid to the touch? According to Pribram this does not mean there aren't china cups ands grains of beach sand out there. It simply means that a china cup has two very different aspects to its reality. When it is filtered through the lens of our brain it manifests as a cup. But if we could get rid of our lenses, we'd experience it as an interference pattern. Which one is real and which is illusion? "Both are real to me," says Pribram, "or, if you want to say, neither of them are real." (9)

Some theorists have posited that the human brain can access information beyond that received by our five sensory organs. They believe that it is possible to gain "the holographically embedded information in the quantum zero-point energy field" through a form of non-sensory perception. The cerebral functions of the brain generate equivalent waveforms which convey information in the form of complex holograms. Ervin Laszlo:

> How do the body and brain make "waves"? Physicists discovered that all things in the universe are constantly oscillating at different frequencies. These oscillations generate wavefields that radiate from the objects that produce them. When the wavefield emanating from one object encounters another object, a part of it is reflected from that object, and a part is absorbed by it. The object becomes energized and creates another wavefield that moves back towards the object that emitted the initial wavefield. The interference of the initial and the response wavefields create an overall pattern, and this pattern is effectively a hologram. It carries information on the objects that created the wavefields. (10)

The human brain is able to decode the vibrational information that pervades both material existence and the immaterial world of consciousness. "Both consciousness and body are informed by the ground state of the cosmos. The body and the brain and the organism as a whole receive and resonate with the intelligence that permeates the universe." In *What Is Reality?*, Ervin Laszlo explores the possibilities for a new map of the cosmos and consciousness based on the vibratory nature of the universe:

> There is no such thing as color or sound in the universe, any more than there is matter. All that exists is vibration, clustering into patterns producing matter-like and mind-like Gestalts. Some clusters are received by sensory organs and are conveyed as electrical impulses to the brain, where they are decoded and give rise to the sensation of color, sound, texture, odor, and taste. In regard to sound, for example, waves in the air bring to vibration thousands of cilia (thin hairs) according to their frequency. The vibrations are compressed and amplified and then conveyed to the cochlea in the inner ear where the Corti organ transforms them into neural signals. The human ear decodes frequencies spanning about ten octaves. The human eye, in turn, responds to a smaller but likewise specific range of vibrations in the electromagnetic spectrum. The cornea acts as a convex lens that conveys streams of photons to the retina, where optical cells convert them into electrical impulses . . . The vibrations that give us the sights and sounds of the everyday world are of a relatively high frequency. There are, however, vibrations also of a lower frequency. Their decoding offers glimpses of a nonphysical but equally real world: the deep-dimensional world of mind or consciousness. These vibrations are not processed by specialized sensory organs but reach the organism through quantum-level resonance in a whole array of sub-neuronal networks. They do not produce Gestalts of physical objects, but forms and elements of consciousness. They are elements of the "transcendental awareness" that comes to light above all in NDEs [near death experiences], OBEs [out of body experiences], after-death experiences, and in meditative and other non-ordinary states of consciousness. (11)

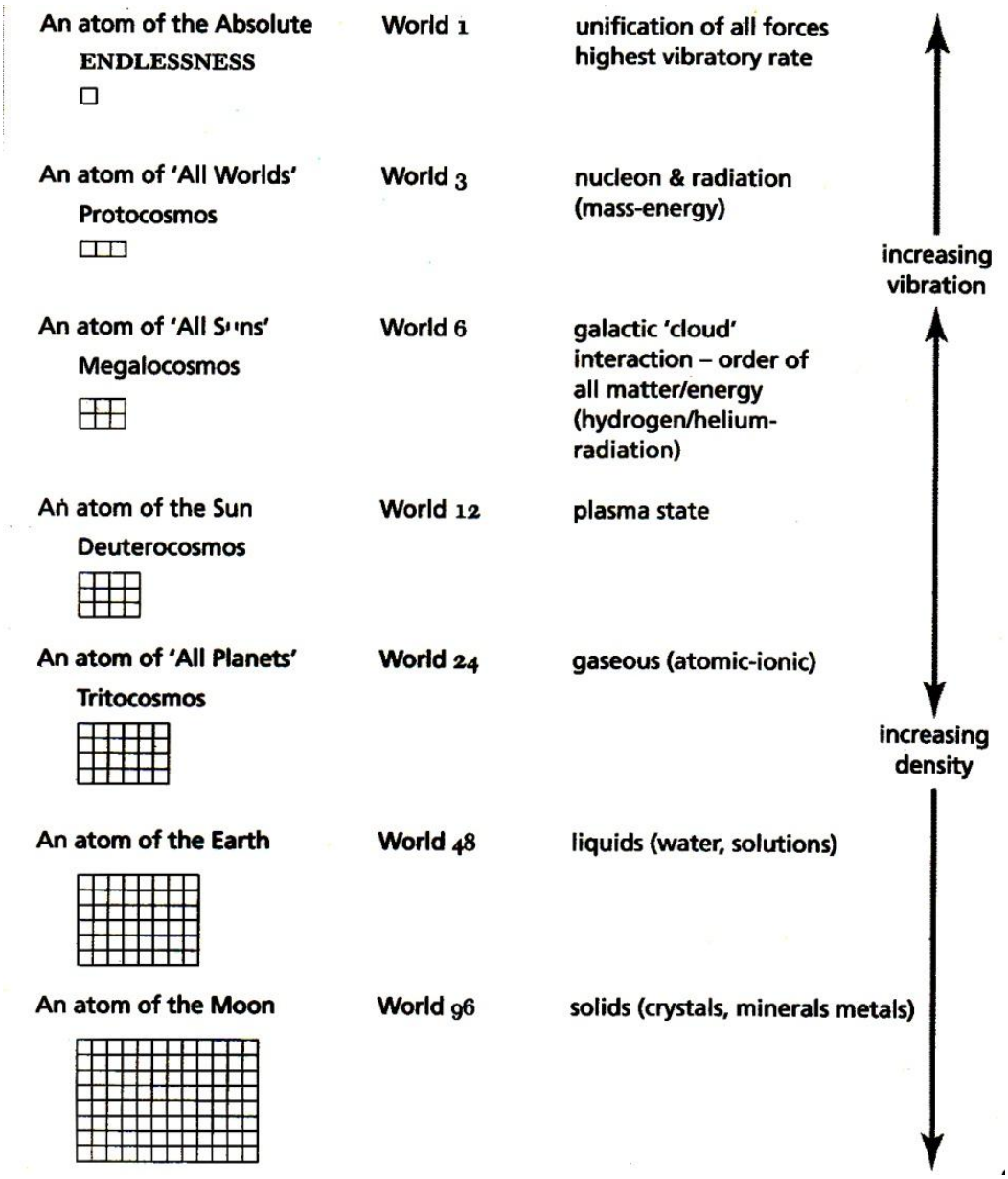
The Ray of Creation

G.I. Gurdjieff held that everything in the universe is material, though of different degrees of density based on its frequency of vibration: "It is necessary to regard the universe as consisting of vibrations. These vibrations proceed in all kinds, aspects, and densities of the matter which constitutes the universe; they issue from various sources and proceed in various directions, crossing one another, colliding, strengthening, weakening, arresting one another, and so on."

> He famously said that everything is material, even God, but that materiality had many different degrees of fineness. This is obvious even on an ordinary level: metal is denser than wood. When we go to even more dramatic differences in materiality, comparing, for instance, solids, liquids, and gases, we are not just speaking of differences in density, but of changes in behavior, even dimensionality, as well. For instance, a solid tends to stay together as an entity as it moves about, whereas liquids change shape as they flow along surfaces, and gases disperse in three dimensions. Beyond these levels, fire is also material, a plasma. Light and other electromagnetic vibrations, like heat, radio waves, x-rays and cosmic rays, are also properly considered as material. Physics has shown that phenomena once considered to be exclusively vibrations also

require a description as particles: electromagnetic vibrations are one aspect of light, photons another. The reverse holds true as well: atoms and elementary particles, the building blocks of matter, can also be described as vibrations. (12)

In Gurdjieff's cosmological conception of the Ray of Creation, there is an increasing density (and corresponding decrease in the rate of vibration) in the progression from higher worlds to lower worlds: "The matter of each World (from the Absolute down) contains the higher World within it, but is constrained by a particular bonding and, thereby, is held in a denser arrangement; this increasing density progressively limits the allowable motions of atoms and decreases its rate of vibration." The diagram below conveys this pattern (13):



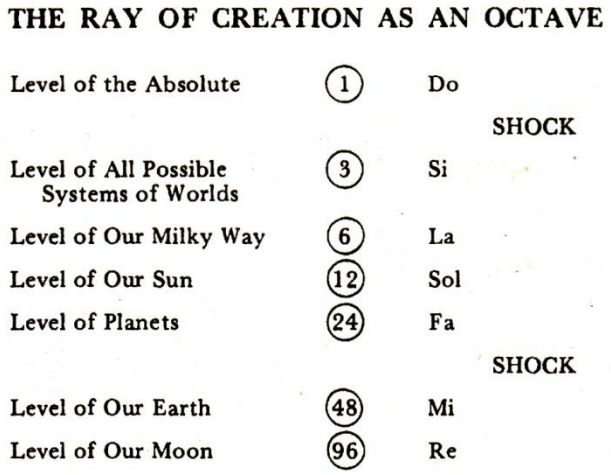
In *Man in the Cosmos*, Christian Wertenbaker relates vibrational frequencies to the structure of the universe:

> Everything vibrates, from electrons and photons, to atoms, molecules, cells, bodies, planets and stars. These entities vibrate in many frequency ranges, and interact by means of vibrations, most prominently electromagnetic vibrations. To interact, things must be tuned to each other in some way. There are patterns, harmonic relationships, of all kinds. And ultimately, when science probes the smallest constituents of matter, nothing is left except equations describing vibrations. Vibrations are essentially regularities in time. If there was no regularity in time, there could be no enduring entities. The basic structure of the world, with discrete objects and living beings in it, maintaining their integrity for a certain duration, depends on regularity in time. But the regularity is not fixed, or nothing could happen, or change. So there is a constantly changing, developing, interacting pattern of vibrations. (14)

From this perspective, the Ray of Creation is the fundamental cosmic octave, describing the process of the descent of energy and vibration from the Absolute to lower levels of reality, as well as the evolution of lower-order forms to increasing complexity, coherence and intelligence. In *The Intelligent Enneagram*, Anthony Blake writes: "The general idea we find in Gurdjieff's scheme is that some primordial will sets up a hierarchy, so that a movement from below is made possible which can progress back up the various organizational levels, though in unpredictable ways. The movement from below is temporal and successive: in relation to this the structure of the various levels from above to below is 'eternal.' The octave of the Ray of Creation is therefore a peculiar marriage of the *temporal* and the *eternal*, which two sides must always be kept in mind."

> The ray of creation, or cosmic octave, has a twofold meaning. First, we have the creation of the various levels. Second, we have the prospect of a transmission down, *through* them. The transmission of influences requires something more than the bare creation of the various levels. At this point we can draw on the concepts of matter, energy, and information. The first order of creation produces different levels of material organization by a progression of separation. There is another order concerned with the transmission of influence, or *information*. Information and matter are then linked in the general exchange of *energy*. Gurdjieff's cosmic octave reaches from the Absolute down through various stages, or worlds or systems, such as galaxies and stars, including our own sun, to reach a state of black inertia. Gurdjieff explains this chain of worlds as having certain critical transitions in its structure. The chain is not an unbroken continuum but exhibits structural discontinuities (a change in the workings of the fundamental law of seven). Local features of the universe, such as our own solar system, also form their own chains and have their own critical points. (15)

Along the Ray of Creation, the transformation of matter and energy proceeds in two directions: *involution* or descending movement from fine to coarse (greater density), and *evolution* or ascending movement from coarse to fine (lower density). According to Gurdjieff, the Law of Seven (or Law of Octaves) governs process, change and transformation at each level of the Ray. The law is based on the musical scale and contains two 'intervals' or 'shocks' which change the direction of the flow of energies throughout the universe, as shown in the figure below:



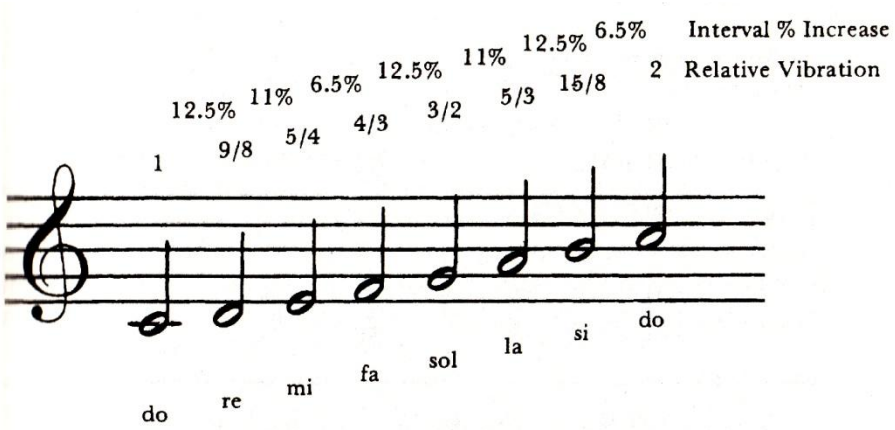
When an external force or energy enters a process between either notes *mi* and *fa* or between notes *si* and *do*, it enables the process to proceed to either a higher level (evolution) or a lower state (involution). In the descending cosmic octave of the Ray of Creation, the first interval between *do* (Absolute) and *si* (All Worlds) is filled by the "will of the Absolute." The second interval between *fa* (Solar System) and *mi* (Earth) is filled by organic life on earth, which functions as a medium or "transmitting station" of influences from a higher level (planetary) to the Earth.

The Law of Seven

In Gurdjieff's cosmological system, the Law of Three and the Law of Seven constitute the two fundamental principles governing the functioning of the universe. The Law of Seven describes the cosmos in terms of vibrations (such as light, heat, electromagnetic and chemical vibrations), which proceed and act through various levels and densities of matter (the Ray of Creation).

The Law of Seven manifests in many different forms: the seven colours of the visible spectrum, the ratio of distances between the seven known planets of antiquity, and the structure of the periodic table of the elements. It is even expressed in the sevenfold physiological hierarchy of the human body: (1) individual, (2) organ system, (3) organ, (4) tissue, (5) cell, (6) organelle and (7) molecule.

The Law of Seven is sometimes referred to as the Law of Octaves, based on the notes of the musical scale: do, re, me, fa, sol, la, si, do which link one octave to the next. There is a lawful discontinuity inherent in the musical scale whereby the relative vibration of successive notes has two unequal steps (or half-tones) between mi - fa and si - do. "The Law of Seven governs successions of events and states that whenever any manifestation evolves, it does so non-linearly. There is an orderly discontinuity in every progression of things, at whatever scale. This lawful discontinuity is preserved in our musical scale, which is composed of unequal steps." This relationship between successive notes is shown in the figure below:



THE MUSICAL REPRESENTATION
OF THE LAW OF THE OCTAVE[5]

The Law of Seven represents the organization and structuring of processes and events through a definite sequence of stages. Anthony Blake: "Seven quite different qualities or states have to be gone through to complete an action. This encompasses both steps in succession, in time and space, and steps in level of being or quality, either up or down a scale."

In the transition from one octave to another, the rate of vibration doubles, a ratio of 2:1. Pythagoras discovered that certain other ratios such as 3:2, 4:3 and 5:4 also produce harmonious tones as perceived by the human ear. Gurdjieff made a distinction between fundamental and subordinate octaves, using the analogy of the growth of a tree:

> In the study of the law of octaves it must be remembered that octaves in relation to each other are divided into *fundamental* and *subordinate*. The fundamental octave can be likened to the trunk of a tree giving off branches of lateral octaves. The seven fundamental notes of the octave and the two 'intervals,' *the bearer of new directions*, give altogether nine links of a chain, three groups of three links each. The fundamental octaves are connected with the secondary or subordinate octaves in a certain definite way. Out of the subordinate octaves of the first-order come the subordinate octaves of the second order, and so on. The construction of octaves can be compared with the construction of a tree. From the straight basic trunk there come out boughs on all sides which divide

> in their turn and pass into branches, becoming smaller and smaller, and finally are covered with leaves. The same process goes on in the construction of the leaves, in the formation of the veins, the serrations, and so on. (16)

Gurdjieff also introduced the idea of 'inner octaves,' by which each level of the universe is pervaded by the vibrations of higher worlds. As well, any given note of the octave, when viewed from another scale, contains a whole octave of its own: "Each note of an octave may at the same time be any note of any other octave passing through it. Just as each level of vibration is penetrated by all other levels of energy, so each note contains a complete inner octave and each note of the inner octave also contains an inner octave, much like a series of smaller and smaller Russian dolls embedded within a larger doll."

> In order to better understand the significance of the law of octaves it is necessary to have a clear idea of another property of vibration, namely the so-called 'inner vibrations.' This means that within vibrations other vibrations proceed, and that every octave can be resolved into a great number of inner octaves. Each note of any octave can be regarded as an octave on another plane. Each note of these inner octaves again contains a whole octave and so on, for some considerable way, *but not ad infinitum*, because there is a definite limit to the development of inner octaves. These inner vibrations proceed simultaneously in 'media' of different densities, interpenetrating one another; they are reflected in one another, give rise to one another, stop, impel, or change one another . . . Each note of the vibrations of a coarser substance contains a whole octave of the vibrations of a finer substance. If we begin with vibrations of world 48 [earth], we can say that one note of the vibrations in this world contains an octave of seven notes of the vibrations of the planetary world. Each note of the vibrations of the planetary world contains seven notes of the vibrations of the world of the sun. Each vibration of the world of the sun will contain seven notes of the vibrations of the starry world, and so on. The study of inner octaves, the study of their relation to outer octaves and the possible influence of the former upon the latter, constitute a very important part of the study of the world and of man. (17)

The chief characteristic of the Law of Seven is the discontinuity of vibrations and the deviation of forces. Octaves can interrupt each other; either intersect and reinforce or divert another octave from its original direction. Gurdjieff: "Nothing in the world stays in the same place, or remains what it was, everything moves, everything is going somewhere, is changing, and inevitably either develops or goes down, weakens or degenerates, that is to say, it moves along either an ascending or descending line of octaves. In the actual development of both ascending and descending octaves, fluctuations, rises and falls are constantly taking place."

> Whatever sphere of life we take we can see that nothing can ever remain level and constant; everywhere and in everything proceeds the swinging of the pendulum, everywhere and in everything the waves rise and fall. Our energy in one or another direction which suddenly increases and afterwards just as suddenly

> weakens; our moods which 'become better' or 'become worse' without any visible reason; our feelings, our desires, our intentions, our decisions – all from time to time pass through periods of ascent or descent, become stronger or weaker. And there are perhaps a hundred pendulums moving here and there in man. These ascents and descents, these wave-like fluctuations of moods, thought, feelings, energy, determination, are periods of the development of forces between 'intervals' in the octaves as well as the 'intervals' themselves. Upon the law of octaves in its three principal manifestations depend many phenomena both of a psychic nature as well as those immediately connected with our life. Upon the law of octaves depends the imperfection and the incompleteness of our knowledge in all spheres without exception, chiefly because we always begin in one direction and afterwards without noticing it proceed in another. (18)

In Gurdjieff's formulation of the Law of Seven, vibrations are discontinuous, at times speeding up or slowing down: "The rate of vibrations doubles between the Do of one octave and the Do of the next higher octave. But the rate of increase is not constant from note to note through-out the octave. At two places in the octave, where the semi-tone is missing, the rate of increase is slowed."

This discontinuity in the octave has remarkable consequences. The 'broken symmetry' of the Law of Seven enables the universe to exist in the way it does. Anthony Blake elaborates: "It makes processes in the universe interdependent in that any given process requires 'outside help' to develop properly. The partial breaking of symmetry results in a cornucopia of new phenomena and leads to our world, perched precariously between the two extremes, of perfectly symmetrical absolutely empty and eventless spacetime, and completely asymmetric and irregular total chaos."

The two points in the octave that contain the 'intervals' where the increase in the rate of vibration between notes slows down are of great significance in the functioning of both the external world of phenomena and the inner world of human psychology. They explains why, in any developmental process, there is a deviation from the original course unless an additional impulse is provided at these critical points to maintain the original momentum:

> The law shows why straight lines never occur in nature, or in our activities. Why, having begun to do one thing, we in fact constantly do something entirely different, often the opposite of the first, although we do not notice this and continue to think that we are doing the same thing that we began to do. All this and many other things can only be explained with the help of the law of octaves together with an understanding of the role and significance of 'intervals' which cause the line of development of force constantly to change, to go in a broken line, to turn round, to become its 'own opposite' and so on. Such a course of things, that is, a change of direction, we can observe in everything. After a certain period of energetic activity or strong emotion or a right understanding a reaction comes, work becomes tedious and tiring; moments of fatigue and indifference enter

> into feeling; instead of right thinking a search for compromise begins; suppression, evasion of difficult problems. But the line continues to develop though now not in the same direction as at the beginning . . . The same thing happens in all spheres of human activity. In literature, science, art, philosophy, religion, in individual and above all in social and political life, we can observe how the line of development of forces deviates from its original direction and goes, after a certain time, in a diametrically opposite direction, *still preserving its former name*. A study of history from this point of view shows the most astonishing facts which mechanical humanity is far from desiring to notice. Perhaps the most interesting examples of such change of direction can be found in the history of religion, particularly in the history of Christianity if it is studied dispassionately. Think how many turns the line of development of forces must have taken to come from the Gospel preaching of love to the Inquisition; or to go from the ascetics of the earlier centuries studying *esoteric* Christianity to the scholastics who calculated how many angels could be placed on the point of a needle. (19)

Spiritual Traditions and Vibration

The vibratory nature of the universe has been a primary teaching of many of the world's spiritual and religious traditions. The Bible describes the creation of the world in these terms: "In the beginning was the Word, and the Word was with God, and the Word was God." (John 1:1). Other ancient traditions speak in similar terms of a primary vibration or ripple which, through a process of differentiation, creates the manifest phenomenal world.

In Hindu cosmology, AUM (or OM) is the Sanskrit sound of the divine energy at creation: "When creation began, the divine, all-encompassing consciousness took the form of the first and original vibration manifesting as the sound 'OM.' Before creation, there was the Void in which everything existed in a latent state of potentiality." Sound vibrations are called *nadas* in Sanskrit, and through their hidden energy they are believed to connect the outer world with the inner world.

In ancient Greece, Pythagoras of Samos was fascinated with the mystical symbolism of numbers and their relationship with planetary motion, which he called "the music of the spheres." According to tradition, he played a seven-string harp made of tortoise shell and experimented mathematically with harmonies of the vibrating strings. He discovered the remarkable similarity between musical intervals and the spacing of the planets. His contemporary Hippolytus wrote: "Pythagoras maintained that the universe sings and is constructed in accordance with harmony; and he was the first to reduce the motion of the seven heavenly bodies to rhythm and song."

Pythagoras also discovered the harmonic mean which expresses a pitch ratio between neighboring musical notes. He understood that the musical quality of a string derives from its free vibration pattern matching its natural harmonies so perfectly in frequency that when its

fundamental tone is struck, its harmonies respond as well. He envisioned a harmonic order of creation based on vibration and sympathetic harmonic resonance:

> It was the fortune of the harmonic mean that it came to appear to Pythagoras as one of the most divine endowments of nature, not only in music and the heavens but in flowers and hills, in moving animals and waves of the sea. Even the abstract cube was held sacred because its eight corners form the harmonic mean between its six faces and twelve edges. And other known means and proportions and harmonies all had their special significance as symbols of the integral order in the universe – a concept that was almost wholly intuitive, since no one in those days knew how to analyze a flower or measure a moving wave or count the wingbeats of a sparrow or the musical vibrations of the lyre. (20)

Contact with a higher spiritual energy is an integral part of the process of inner development and transformation that Gurdjieff transmitted to his students. He taught that every human being experiences both an outer world and an inner world. The role of attention and presence is to connect the two worlds through a harmonizing of their vibratory energies and qualities. Jeanne de Salzmann, a senior student of Gurdjieff, relates her experience of contacting an energy of a higher cosmic order in *The Reality of Being*: "My sensation becomes more and more subtle as the attention purifies and concentrates, penetrating the body and permeating everything that surrounds me. There is a sensation of very special energy which I feel is life itself. I am a particle of the highest."

> I wish to become conscious of my existence. If my attention is as usual, dispersed, I feel myself as a form, as matter, a person. When my attention becomes finer and my perception keener, I feel myself as a mass of energy in movement, a body of energy. Currents of moving particles pass through me, whose movement does not stop. I sense myself no longer as matter with a solid form, but as energy animated by vibrations that never cease . . . For finer energy to penetrate and be absorbed, a kind of space must appear in which reactions do not arise, a zone of silence that allows this Presence, this second body, to expand with its subtle vibration. I need a circulation of energy that is free, that is stopped nowhere. I do not intervene. The energy is distributed according to an order beyond my understanding. This free circulation takes place through the breathing, which nourishes this Presence by the air bringing active elements we are not aware of. This breathing is a participation in the forces of the universe. But it is not just any kind of breathing. It is very light and subtle – as if this Presence were breathing. (21)

Gurdjieff stressed the importance of distinguishing two currents of vibration, one on a lower level and the other on a higher, more subtle level. Each has different influence on our being: "Through the breathing, by opening voluntarily to a mysterious life-giving force, I can become conscious of this finer current, which opens me to possibilities latent in myself." Opposing this is the lower vibration of inertia which reflects ordinary thoughts, emotions and sensations which usually define our normal sense of self."

In order to open to Presence, a person must pass from a lower to a higher state of vibrations. This requires a deep letting go to create a void or place free of tension which transcends our ordinary sense of 'I' or self. De Salzmann: "I feel the fineness of this sensation in a state of immobility where there is no tension in my body, and I feel the fineness of the psyche when the thought becomes passive, simply a witness that registers what happens without reaction or comment."

> My intelligence has to understand the meaning of my tensions, and something in me needs to leave more and more space – not out of obligation but from necessity, a necessity of my being. I seek to understand this state without tension which brings me closer to the void, to my essence. I become aware of a world of finer vibrations. I feel them, I have the sensation of them, as if certain parts of me were irrigated, vivified, spiritualized, by them. Yet I am still not entirely under the influence of these vibrations. I realize this. But I feel an ever greater need not to resist them. My usual "I" has lost its authority and, as another authority makes itself felt, I see that my life has meaning only if I am attuned to it. In working for this accord, I feel as though situated in a closed circuit and that, if I could remain here long enough, the miracle of my transformation would take place. (22)

A state of stillness and tranquility attracts a higher quality of vibrations which awaken a pure, free energy. This is a deep process of spiritualization in which spirit penetrates matter and transforms it. "When I come to a quiet state, free of all tension, I discover a very fine vibration, a reality I could not perceive before. It comes from another level to which I am usually closed. I can be related to the highest energy if I accept voluntarily opening to it. Then a force from above can act and my state is transformed."

Gurdjieff taught his students a number of exercises designed to create a quiet relaxed state which facilitates contact with higher vibratory energies. In *Inner Octaves*, his student Michel Conge describes the purpose and effect of these exercises:

> The sitting exercise, deep relaxation, and the silence we find should allow us to make contact with very fine and much more conscious impressions, only so that, afterward, we may descend once again into the life of manifestation with a new intelligence, an intelligence enlightened by this contact. The sitting exercise is not intended to produce any extraordinary state. Even though this may occur, that is not its purpose. The aim is to enable us to live an ordinary life consciously. Our ultimate task is, by a transformation of our being and the appearance of a Presence (as yet virtual), to allow higher forces to pass through us at last and to illumine the darkness of our lower nature . . . Feel this emptiness, taste it, and you will finally discover that it is alive. In this emptiness reside the most real, but also the most subtle, aspects of your being – *mind*, *real feeling*, and *conscious intelligence*. Once you have recognized this, if only for a second, you will no longer be afraid, and you will understand that you have to relax in order to perceive it more

> deeply, every day more deeply, to receive help from it for going about your ordinary life – but in a new way. Open to silence, to the fertile emptiness of reality. Then go out into life and start seeing how you understand your functions, all your actions. (23)

A highly sensitive quality of attention is required to resonate with the higher order vibration of the universe and sustain a contact with it. This spiritualized energy or vibration has a very special quality – love. When touched and sensed with all aspects of our being – body, feelings and mind – we can achieve a state of completion which is in harmony with the spiritual essence of the universe. Jeanne de Salzmann:

> A call from the depths of oneself is always here. It becomes more and more insistent, as if a different energy were wanting to be heard, seeking a relation. In a state of immobility, in stillness, the relation can be better established, but this requires opening to a different inner density, to another quality of vibration. Sensation is the perception of this new quality. I need to feel the Presence of the spiritual in me. The spirit penetrates matter and transforms it. I need this act itself, to be spiritualized. The creative action of the life force appears only where there is no tension, that is, only in the void. If I wish to develop my being, I must come to this point of no tension, which I feel as a void, as unknown. It is void of my ego, but is open to my essence – my real being. I perceive emptiness because the fineness of vibrations is beyond the density in myself that I usually know. At this moment I touch on the wish to *be*, the will to be what I am beyond form and time. (24)

The importance of energy and vibration in the growth and evolution of humanity and the universe is also a fundamental tenet of Sufism. In *The Teachings of Kebzeh*, Sufi teacher Murat Yagan writes:

> The Life in this Universe came to existence as a reflection of a creative power which is the source of everything, and which exists without beginning and without end. This power is electromagnetic in nature with an intelligence and will of its own. Because it is electromagnetic in nature it manifests itself in vibrations. Every single thing or form of life in existence, exists as an entity of vibration peculiar in frequency and length of wave to this thing or form of life; and this particular vibration makes its determination in Cosmic Mind and manifestation in the material Universe at the same time simultaneously and remains constant. This creative power, electromagnetic in nature, establishes its connection and relationships with all existing entities through a phenomenon electrochemical in nature (DNA). Once an entity comes to existence with a vibration peculiar to potential manifestation of self it enters the World of Creation and starts its cycle of evolution. Every entity which came to existence in creation evolves until ultimately the end of its evolution comes to be One with the very thing it originated from – the Eternal Self. (25)

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