

RHYTHMIC CYCLES WITHIN THE LIFE ENERGY OCEAN

THE HARMONY OF NATURAL FUNCTIONS

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To Stefanie and all of the children of the future,  
May she and they learn to live in harmony with the  
functional processes of the primordial life energy.

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PREFACE

Two hundred years ago, Goethe tried to alert his contemporaries to the danger and utter folly of a scientific approach to the world that is based strictly upon mechanical principles. He observed, "Man himself, inasmuch as he makes use of his healthy senses, is the greatest and most exact physical apparatus; and that is just the greatest evil of modern physics - that one has, as it were, detached the experiment from man and wishes to gain knowledge of nature merely through that which artificial instruments show." This impassioned plea against the excesses of a mechanistic Weltanschauung met deaf ears. Today, the prospect of nuclear war and the pollution of the biosphere is the double-edged sword that threatens to destroy life and the Earth. Mankind totters above the abyss of total annihilation. The notion of evil, under these circumstances, deserves attention. It is not 'evil' in the moralistic sense of the word that has brought us all to the brink of self-destruction. Goethe's evil refers to a quest for knowledge from which the subjective perception of objective reality has been excluded. Wilhelm Reich's bio-energetic research has disclosed that: "Truth is inseparably linked up with the streams of life within the organism and its perception." Therefore, both Goethe and Reich knew that only the undistorted perception of the living processes within the human being hold the key to a rational understanding of nature. However, since people in our culture become desensitized to these living processes, the ability to recognize and to define the common functioning principles within ourselves and within nature has disappeared. The result is a science that interprets everything in mechanical terms. Interestingly enough, the spelling of *live* in reverse yields *evil*. Life impulses that become smothered likewise reverse themselves and turn into rage and sadism. Here, then, expressed very clearly in everyday language, is the fact that the regression of live functions (whether in action or in scientific outlook) inevitably leads us into the domain of evil.

The conscientious reader of RHYTHMIC CYCLES WITHIN THE LIFE ENERGY OCEAN will be confronted with Reich's dictum: "To think functionally, one must live functionally." In order to 'live functionally' one must be healthy. Health, in the bio-energetic sense, means the free flow of life energy within, through and beyond the organism. Such an unimpeded energy metabolism allows for genuine, contactful interactions with people, processes and nature. I place great emphasis upon bio-energetic health because as accurate and logical as functional science is; its essence will remain more or less incomprehensible if our experience excludes the perception of living functions. For instance, mass-free energy pulsation, streamings, currents and field to field excitation are crucial natural functions. A description of these processes, however elaborate it may be, fails, ultimately, to convey their palpable reality. When these life energy functions are imperceptible within oneself, their existence in 'external' nature is simply ignored and denied. All efforts to debunk the functional approach to the universe are provoked by this incapacity to make contact with nature's fundamental processes. The attempt to slander and to discredit those who are engaged in research must be exposed as being the pathological reaction that it is. Nietzsche, who was well aware of our need to cultivate bio-energetic health, advised, "It is decisive for the fortune of nations and of mankind that one should inaugurate culture in the right place, not in the 'soul'; the right place is the body, demeanor,

diet, physiology; the rest follows. This is why the Greeks remain the supreme cultural event of history - they knew, they did what needed to be done. "It is high time, since our very survival depends upon it, for man to acknowledge his bio-energetic origin. Realization that life is governed by functional rather than by mechano-mystical laws will finally end the deadlock of human evolution. Greek wisdom boils down to "Know thyself". History, especially the traumatic 20th century, proves that wisdom does not rule "homo sapiens". Do we dare to continue to disregard the Greek challenge as we march, equipped with the weaponry of Armageddon, into the twenty-first century?

Life energy investigation has been referred to as being a "musical science". The fact that bio-energetic functions are characterized by pulsation, rhythmic movements and tempo (rapidity) of the energy metabolism provides the basis for such a viewpoint. Schopenhauer proclaimed that, "Music gives the innermost kernel which precedes all forms or the heart of things." This eminent philosopher, who was not conversant with the objective bio-energetic processes that are cited above, subjectively perceived music per se, as being the creative 'force' that shapes and is embodied in the physical world. Significantly, great music, for the functionalist, constitutes a direct expression of bio-energetic streamings, that is, the flow of emotion. Hence, Schopenhauer correctly interprets the sensations of vitality and pleasure, which coincide with a deep feeling for music, as the creative 'force'.

Wilhelm Reich came to see health and disease in terms, respectively, of the harmonious or disharmonious bio-energetic functioning of the organism as a whole. My own designation of functional harmonics with respect to the dynamics of natural phenomena is based upon this insight. A rational, healthy perception of nature and the universe is possible only if we are able to discern the harmonious interaction and interdependence between a physical entity and the underlying life energy environment.

GERHARD WEBER  
New Jersey, April 1984

"Ascending souls congratulate each other on the admirable harmonies of the world." - Emerson

HARMONY = RATIONAL = CREATIVE PROCESS

Johannes Kepler, the German scientist who discovered and formulated the three fundamental laws of planetary motion, published, in 1619, HARMONICES MUNDI. Although his astronomical laws are monumental and invaluable contributions to mankind's understanding of planetary dynamics, Kepler personally regarded the 1619 'music of the spheres' manuscript as being his masterpiece, his crowning achievement. To the overly pragmatic mind of a present-day space program technologist, i.e., a technocrat who seeks very tangible, concrete results in his daily practical application of Kepler's laws, the ordinate pride in what is apparently a purely speculative treatise seems unjustified and misplaced. His priorities appear to be confused. However, this "confusion" must be viewed from the perspective of a human being who dedicated his life to a quest for knowledge that would reveal the Creator.

Kepler, who once considered becoming a theologian, was a deeply religious man. A child of the Protestant Reformation, he was strongly influenced by the revolutionary spirit of his age. This spirit found expression in the search for a less doctrinaire, more meaningful relationship between man and his Maker. Kepler, always conscious and awake to the fact that the natural realm and the entire universe were manifestations of God, opted to join the ranks of the seekers as a scientist. The sharp boundaries that have, in modern times, been drawn between science and religion did not exist for him. Therefore a systematic, logical investigation of nature was, in Kepler's eyes, a genuinely religious (religious in the true sense of the word, viz., a search for unity, oneness with the Creator) vocation.

The planetary laws, scientifically derived, gave credence to Kepler's conviction that the universe, being an embodiment of God, was rational and orderly. He perceived these particular laws as being secondary aspects of a primary creative process. To discover the essence of this creative process was to know the Creator.

The Greek mathematician, Pythagoras, who was one of Kepler's mentors, conceived of the heavens as being a grand scheme of concentric spheres whose ordered relations through the cosmos produces music. He proposed that the movement through space of the planets produced harmonies. Aristotle likewise pondered, "Do the stars give forth sounds which are modulated harmonically?" He came to the conclusion that such a notion was absurd and denied it. Kepler rejoined, "I grant that no sounds are given forth but I affirm and demonstrate that the movements are modulated according to harmonic proportions." Kepler, completely satisfied that his keen telescopic observations together with his precise mathematical calculations had proven the 'music of the spheres' thesis correct, celebrated the revelation of God in HARMONICES MUNDI. This would-be theologian turned astronomer reconciled science and religion in his functional equation:

HARMONY = RATIONAL = CREATIVE PROCESS = GOD

Kepler sums up the profound insights of a life-long quest: "The music that God made during the Creation, He taught Nature to play, indeed she repeats

According to Kepler, every planet, like every tuning fork, possesses a distinct pitch. This indigenous pitch corresponds to *frequency*. Modern science recognizes that each and every material entity, whether that be an

The space-time continuum, as conceived by prevalent physical theory, can be compared to an evacuated bell jar, i.e., it is virtually a vacuum. Space is hypothesized to be, except for the presence of a few widely scattered planetary and stellar entities, empty. If this is indeed the case, sound (even ultra-sonic) emanations as a result of planets in motion does not make any sense. Kepler's 'music of the spheres' idea then appears to be a poetic, unscientific construct. Let us, before we rush to conclusions, look at his concept from a different angle.

Kepler admits, of course, that the music emitted by the harmonic movements of the planets is inaudible to the human ear. The reason for this is obvious. Music is sound. Sounds are conveyed from their sources to the hearer through, for example, air or water. A simple experiment proves that sound is transmitted in the form of waves, waves that are propagated within and travel through some kind of existent *medium*. No sound can be detected from a vibrating tuning fork that has been placed within the confines of an evacuated bell jar. The physical motion of the fork is clearly visible. However, the conversion of the tuning fork's to-and-fro movements into audible sound is impossible in the absence of air, an 'elastic' medium that allows for the transmission of vibrations in the form of compressional waves.

The idea of a celestial symphony is ostensibly a sharp departure from Kepler's otherwise methodical research into nature. The assignment of a definite pitch to each planet, which supposedly accounts for the tones that are produced by the 'music of the spheres', appears to be an intuitive leap into the unknown. Kepler, confident and steadfast in his grand overview of the universe, applied his critical and analytical powers to this 'intuitive' conception. This pitch, he reasoned, was derivable from a planet's angular velocity. Pitch was periodically modulated, i.e., pitch varies with the changes in a planet's speed as its orbit approaches or recedes from the sun. Consequently, the celestial music, due to these cyclical increases and decreases in a planet's velocity, would not be just a single, monotonous melody but rather an ever-changing symphony. This harmonious inter-relatedness within the solar system demonstrates the creative process. Here was proof for Kepler that the creative process (=God) was rational. The question is: Can we, sophisticated mortals of a technological age in which our science has taken us to the moon, take seriously Kepler's concept? He assured his own contemporaries, "I care not whether my work be read now or by posterity. I can afford to wait a century for readers when God Himself has waited six thousand years for an observer. I triumph. I have stolen the golden secret of the Egyptians. I will indulge my sacred fury."

Kepler's intellectual stature, i.e., his prowess as an original thinker and scientific investigator, is undeniable. Sir Isaac Newton, yet another titan of physical theory, owes his elaboration of gravitational attraction to Kepler. It was Kepler's laws that suggested to Newton the existence of a central "force" whose strength varies inversely as the square of the distance.

what He played to her."

atom or a group of molecules, possesses a specific natural frequency. This distinguishes one element from another. Frequency can and does fluctuate over a wide range in accordance with degree of excitation and/or change in the environment. On the one hand, the pitch of a planet increases upon close orbital approach to the sun. Such an increase in frequency is generated by excitation, i.e., by heightened solar radiation. On the other hand, the pitch of a planet decreases when the orbital path recedes from the sun. Such a decrease in frequency is generated by the diminution of solar radiation. Kepler has, with his assignment of pitch to the planets, applied to the macrocosmic realm the principle of natural frequency; a principle that has long been demonstrated and verified in the microscopic realm. Here again we begin to discern the functional dynamics of an inter-connected solar system.

The analogy between tuning fork and planet is wholly appropriate in respect to the indigenous pitch = frequency that is possessed by both. However, is a comparison between a tuning fork that resides within the vacuum of a bell jar and a planets' existence in the solar system accurate? This comparison is valid if and only if space is actually the void that we currently believe it to be. This empty space belief was not shared by Kepler. He believed that the divine essence manifests itself and is embodied throughout the physical universe. Therefore, our sterile, deadening notions would have been repugnant to all of Kepler's thoughts and feelings. He worked out his astronomical laws in the context of an omniscient creative process, a process that is expressed in the functions of an all-pervasive medium. He observes, "And since by means of that virtue of its body the sun has laid hold of the planet, either attracting or repelling it, or hesitating between the two, it makes the planet also revolve with it and together with the planet perhaps all the surrounding ether."

Lest the reader presume that the ether is merely an ad hoc hypothesis used by Kepler to explain his findings, I submit Newton's views about an ether medium. Isaac states, "That gravity should be innate, inherent and essential to matter so that one body may act on another at-a-distance through a vacuum, without mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity that I believe no man who has in philosophical matters a competent faculty of thinking, can ever fall into it." Newton further elaborates, "Is not the heat of a warm room convey'd through the vacuum by the vibrations of a much subtler medium than air, which after the air was drawn out remained in the vacuum? And is not this medium the same with that medium by which light is reflected and refracted and by whose vibrations light communicates heat to bodies? And is not this medium more rare and subtle than air, and exceedingly more elastic and active? And doth it not readily pervade all bodies? And is it not (by its elastic force) expanded through all the heavens?"

We are, granted that the notion of "empty space" is false, obliged to reconsider the tuning fork in a "vacuum". The question that now arises is: Why then isn't the tuning fork's sound communicated to the ears? A logical answer that comes to mind is: Just as there is within the spectrum of light a visible range, so likewise there is within the spectrum of sound an audible range. If the frequency of sound is too high, our organs for hearing become insensitive to these ultra-sounds. The absence of air



in an evacuated bell jar eliminates a physical obstruction to the movement of sonic vibrations. Therefore, could we not assume that extremely high frequency sound waves are generated under these circumstances?

Interplanetary space is, like the evacuated environment within a bell jar, air-free. Also, a planet exists within and moves through an ether medium. Hence, the analogy between what occurs (in terms of wave propagation) in a bell jar and in interplanetary space appears to be less and less far-fetched. The case in favor of Kepler's 'music of the spheres' idea is considerably strengthened if we acknowledge:

a.) An indigenous rate of vibration for each planet that fluctuates in accordance to changes in excitation and/or environment.

b.) The medium for the conveyance of the planet's natural frequency, that is, a ubiquitous ether.

These facts constitute a foundation upon which Kepler's theoretical edifice could be erected. His theory would be secure whether or not the celestial symphony is ever heard by the sensate inhabitants of Earth.

Let us compare the planetary spheres of the solar system to the strings of a violin. Each violin string like each individual planet possesses its own specific *natural frequency*. The violin functions as a musical instrument because the harmonious interaction of its separate string vibrations produces a unitary, rhythmic flow of 'sonal energy'. The planets together with the sun also function as an integrated whole = solar system. Perhaps their varied and distinct *natural frequencies* also interact harmoniously! The individual components of the solar system, although separated by open space, are nonetheless interconnected within the ether continuum. Kepler conceived the radiations that are emitted by the planets as being rhythmic currents that constantly flow and spread throughout the solar system.

Newton finally had to reject the concept of an all-pervasive ether. He reluctantly abandoned the ether because his astronomy accounts for the motions of the planets with great mathematical precision only if there is no resistance from a medium. The ascendancy of the mechanistic interpretation of the world that Newton inaugurated and championed made Kepler's 'music of the spheres' thesis look like a naive conceit espoused by a superstitious believer of astrological lore. Kepler, who knew and foresaw that his harmonic, interconnected Weltanschauung might well be misconstrued and be dismissed as being just another occult belief, urged: "While rightly rejecting the superstitions of the astrologers, we ought not throw out the baby with the bath water. Everything that happens in the visible sky is felt in some hidden fashion by Earth and nature."

Our adoption of the triumphant mechanistic world view, in which "vacuous, empty space" has found a secure refuge, has turned Kepler's harmonic notion into an ignored, wayward orphan. The functional equation: harmony = rational = creative process has been ousted and supplanted by the mechanical equation: determinism = rational = cause > effect. Kepler's *dynamic* formula takes a back seat to Newton's *static* formula. On the one hand, Newton saw the motion of planets as being the permanent effect of an initial cause, i.e., angular momentum was imparted, once and for all time, to a planet during its formation. On the other hand, Kepler recognized that the movement of a planet is generated by an ongoing interaction between the planet and the ether. The ether that Sir Isaac Newton abandoned was mistakenly perceived by him as being a stationary,

I am sure that if I were to approach an accomplished conductor or musician with this physical description of *LIFE ENERGY*, he would be very

The direct visual observation of *LIFE ENERGY* in the atmosphere reveals a translucent, wavy medium that moves above and beyond the surface of the Earth in a west to east direction. Often enough seen by people, this phenomenon is wrongly identified as "heat waves" even though it is witnessed in below freezing temperatures. The velocity or tempo of this stream of *LIFE ENERGY* that envelops the planet is faster than that of the material globe's rotation otherwise this medium's forward flow could not be discerned. Simultaneous with this uninterrupted flow (which changes tempo frequently) a vigorous pulsation animates this all-pervasive mass-free energy envelope.

The argument could be made that a mechanistic interpretation of the universe was an extreme reaction against a mystical perception of nature. Kepler's religious orientation was a tinted lens through which the observable phenomena of nature were in danger of being distorted. Newton, very conscious of his own strong inclinations to be mystical, deliberately imposed upon himself a strict adherence to the scientific method and to rigid mathematical formulations. His machine model of the world was the result of a reduction of the universe into individual component parts whose interplay was determined by predictable laws of motion. Through this mechanistic lens, a music of the spheres' thesis is viewed as being a mystical vision. Loathe to argue on behalf of either mysticism or mechanism, functionalism provides an alternative view; a view through a clear lens that, for the first time in man's quest for knowledge, reveals an undistorted reality. Exactly to what extent Kepler's harmonic notion corresponds to the dynamics and principles of the *LIFE ENERGY* that Reich discovered remains to be explored.

It requires clear, lucid subjective observations that are followed up by controlled, repeatable objective experiments and incisive research in order to transform a hypothesis into an empirical fact. Once the properties and the functional dynamics of the ether become well-defined, a coherent theory can be constructed. Subsequent discoveries of practical uses for the theory will then establish its veracity. Kepler, unaware that a revolutionary confrontation between the mechanical and functional world views loomed on the horizon, felt no need to bring the ether under the close scrutiny of the rigorous scientific method. It took over three hundred years before another functional thinker did just that. This brilliant human being, Dr. Wilhelm Reich, brought the principles and dynamics of the *mass-free energy medium* that permeates the cosmos into sharp focus. The natural-scientific findings that have been disclosed by Reich now provide a home for the wayward orphan; a home in which the harmonic conception can again appeal to the rational mind and stir the feeling heart.

Kepler never, even in his wildest dreams, imagined that the ether, which to him was a self-evident reality, would be dismissed by his scientific heirs as having been a chimerical fancy. Albert Einstein, the "father" of twentieth century physics, refers to the ether as being the 'enfant terrible' in the family of hypothetical substances.

rigid medium. Kepler correctly perceived the ether as being a vibrant, formative and mobile medium.

Very impressed. Words like rhythm, tempo, vibration and harmony could allude, in their thoughts and experiences, to nothing other than music. This individual might well look askance at me and comment, "Your description of this *LIFE ENERGY* is incomplete. Indeed, you've left out its most pertinent attribute, namely, the sound it made!" In other words, the musician, being quite unfamiliar with *LIFE ENERGY* and its tangible, visible manifestations, would have to assume that I, in my imagination, had somehow "visualized" the auditory experience of music.

## FUNCTIONAL HARMONICS

"I climb along the harmonic scale of the celestial movements to higher things where the true archetype of the fabric of the world is kept hidden. Follow after, ye modern musicians, and judge the thing according to your arts, which were unknown to antiquity. Nature, which is never not lavish of herself, after a lying-in of 2,000 years, has finally brought you forth in these last generations, the first true images of the universe." - Kepler

### INTERACTION BETWEEN WAVE MOVEMENT AND ENVIRONMENT

Wave movement, by definition, constitutes motion within and through a physical medium. The type of wave movement is, therefore, dependent upon the properties and dynamics of the medium in which it occurs. *Movement and environment are inseparable and condition one another.*

We stand before an expanse of calm, mirror-smooth water that extends for miles in all directions. It is noted that, without any sudden gusts of wind, rainfall or any other physical disturbance, the water's surface remains placid. However, as soon as a single raindrop from a cloud above the lake hits the surface the situation changes markedly. The weight of the raindrop pushes down on the water and a depression is created. Since water is virtually incompressible, the downward push is simultaneously accompanied by a ring of raised water. This ring of raised water in turn pushes the water underneath and throws up a wider ring of water farther out from the original ring. This action continues with concentric rings being formed farther and farther out from the raindrop's original point of impact. We have here witnessed the excitation of an environment, i.e., the water, which results in the propagation of those wave forms typical of this fluid medium.

Waves that are propagated in a fluid medium such as water are referred to as *transverse waves*. Transverse wave motion is defined as: A wave in which the vibrating element moves in a perpendicular direction to the direction of the advance of the wave.

One observes that waves steadily progress across the water's surface and so it appears that a particular volume of water is being transported outward. But this is not the case. What actually happens is that the water molecules oscillate up and down *in place* while only the excitation expands ever outwards. If we were to substitute solid billiard balls for the H<sub>2</sub>O molecules, this phenomenon would be visibly evident. We position five balls in a row; each is in contact with the other. The end ball is tapped. Four balls vibrate *in place* while only the fifth ball (left free to move) at the opposite end rolls forward to testify to the force of the excitation that has been transmitted.

Given: A tuning fork is brought outside into the open air. Two investigators of sound perform an experiment. One of them stays with the tuning fork while the other walks a few hundred yards away. Once in position, he signals his partner to strike the instrument. The fork's distinctive pitch is heard by the man who has stationed himself at a distance from the source of the sound.

Although transverse and longitudinal waves differ in form and movement, they nevertheless share a common denominator. Both of these waves are propagated within and travel through a particulate, mass-containing environment. Their respective fluid and gaseous mediums are composed of measurable quantities of molecules. This particulate environment,

#### WAVE MOVEMENT IN THE LIFE ENERGY CONTINUUM (=) PRIMARY ENERGY CONTINUUM

The movement of transverse waves across the surface of a fluid medium lends itself rather well to a mechanical interpretation. Ostensibly, this phenomenon can be accounted for in terms of weight and displacement. The movement of longitudinal waves within a gaseous medium can be accounted for in terms of mechanical pressure and "counterforce". However, the long and arduous journey toward a genuine perception of nature has led the functionalist to conclude that: accurate descriptions of a physical event in no way constitutes an explanation.

Those waves, propagated in a gaseous medium such as air, are referred to as *compression or longitudinal waves*. Longitudinal wave motion is defined as: A wave in which the individual particles of a medium vibrate back and forth in the direction in which the wave travels. Just as in the case of transverse waves, so also in the case of longitudinal waves, a specific volume of air is not being transported outward. The air molecules oscillate back and forth *in place* while only the excitation expands ever outward and is audible as sound.

Let us consider the mechanics of the activated tuning fork within the air environment. The prong of the fork moves back and forth. This rapid, periodic movement is visibly discernible as being the instrument's vibration. A single right to left sequence can be equated to a *cycle*. The number of cycles per second defines the tuning fork's pitch (=frequency). When the prong moves from left to right, the molecules of air to its immediate right are crowded together. The result is the formation of a volume of compressed air. The pressure within this small compressed volume is greater than in the air adjacent to it. The molecules within the compressed volume spring apart and push against this adjacent volume of more rarefied air and thereby, in turn, compresses it. This new volume of compressed air, as it springs apart, compresses the volume of rarefied air next to it, and so on. Here, again, we have described the excitation of an environment with the result that wave forms, typical of a gaseous medium, are consecutively propagated.

Transverse waves cannot be transmitted by gases under any circumstances because:

- Transverse waves are (in fluids) surface waves. Gases possess no definite surface.
- Transverse waves require a cohesive medium with a definite volume. Gases are loosely combined and have no definite volume.

This experiment proves that sound waves are propagated and transmitted in the gaseous air medium. However, unlike water waves, these sound waves are much more mysterious because they are invisible. Moreover, since the properties of a gaseous environment are not the same as those of a fluid environment, the form and movement of waves in air cannot be described in terms of waves in water.

regardless of the degree of molecular cohesion and concentration to be found in it, constitutes a relatively uninterrupted continuous transmission of wave forms would, of course, be impossible without such an 'uninterrupted' medium.

Wave movement in the *Primary Energy* continuum, in contradistinction to transverse and longitudinal waves, occurs within the context of a *mass-free* environment. This would seem to imply that PE waves are confined to inter-planetary space. However, one must comprehend the following:

- 1.) The PE continuum is, in essence, the mass-free energy substratum of the universe.
- 2.) Primary Energy functions everywhere; it is ubiquitous.
- 3.) Each and every material entity, whether it be a molecule, living cell, planet or star, is permeated and easily penetrated by PE.

Consequently, PE wave movement pervades not only space but also Earth's atmosphere, oceans and land masses. The PE continuum is, without any qualifications, an unrestricted, uninterrupted medium.

This PE continuum, although mass-free, is nonetheless palpable and substantive. Physical properties like tension and density together with the functions of constant forward movement and pulsation are embodied in Primary Energy. The overall mass-free energy substratum, which is never static, may be said to exist in a state of *dynamic equilibrium*. Distinct, 'excited' wave movement is generated within and through this 'unexcited' continuum.

A comparison between the longitudinal wave and PE wave processes should provide insight into the physical properties of the mass-free environment. Let us, before we make the analogy, point out another important difference between wave motion that occurs in a fluid and in a gas. On the one hand, the waves that travel over water are in the form of successive *crests* and *troughs* which move ever outwards. This rise and fall of fluid is perceived as being a strictly mechanical process. On the other hand, the waves that move within and through the air are in the form of successive *compressions* and *rarefactions* which spread ever outwards. Since a gaseous medium is extremely compressible, the mechanical push action so readily observable in the case of water waves does not apply to the propagation of sound waves in the open air. The introduction of a 'counterforce' in compressed volumes of gas, which makes a mechanical *description* of this process possible, is unacceptable. The functional thinker, aware of the fact that the mechanics of any physical phenomenon are merely secondary aspects of a primary, underlying energetic process, knows that the transmission of sound is tied to a mass-free energy process. The 'counterforce' must itself be generated from and within the PE continuum.

#### PE SPINNING WAVE CYCLE

The longitudinal wave's movement is in the form of a two-phase cycle. Figure #1 entitled, Longitudinal Wave and PE SPW Dynamics, illustrates that a tuning fork's vibrations are expressed as a succession of alternating compression > rarefaction phases. If we substitute a spring for the air that is in contact with the fork, the prong's vibration, i.e., its right to left motion, would be translated into a contraction > expansion of the flexible spring. Since compression = contraction and rarefaction = expansion, we observe that the sound wave's two-phase cycle corresponds to

Pulsation. Pulsation is a basic functioning principle of Primary Energy. Therefore, a functional interpretation of sound waves considers the mechanics of molecular compression and rarefaction to be the expression of the underlying mass-free energy process.

We are obliged to distinguish between the physical manifestation of longitudinal wave forms in a gaseous medium and the actual transmission of sound. Molecular compressions and rarefactions are not equivalent to sound. Just as transverse waves convey excitation (energetic impulses) across the water, so longitudinal wave convey excitation (pulsatory sound impulses) through the air.

The PE spinning wave, like the longitudinal wave, functions in accordance to a two-phase cycle. Figure #1 illustrates that PE SPM forward movement is generated by a succession of alternating charge > discharge phases. Charge, like compression, constitutes a phase that concentrates. The compression phase of a longitudinal wave concentrates the gas molecules of its particular environment while the charge phase of a PE SPM concentrates the energy of its mass-free environment. Discharge, like rarefaction, constitutes a dispersion phase. Here, then, the similarities of the two wave cycles are readily apparent.

Compression, if viewed as being a mechanical phenomenon, presupposes activation by some kind of external impulse. A physical action "causes" a physical reaction. The tuning fork's vibrating prong provides the push (exerts the pressure) that induces a volume of air to compress.

The dynamics of the PE SPM cycle have been presented in detail in my book, KEY TO THE UNIVERSE. I provide here an excerpt that shows the difference between mechanical compression and energetic charge.

"Observation of the mass-free energy continuum in the laboratory reveals an undulating substratum in perpetual motion. The wavy, foglike or cloudy condition of the continuum constitutes its 'unexcited state'. Individual PE SPMs are engendered when this substratum is excited. This excitation, unlike an external physical force (the push) is, in the strictest sense, an activation of energy by energy. Primary energy, even when it is in equilibrium, i.e., in the 'unexcited state', is self-activated. Excitation by electromagnetism or solar radiation merely increases PE pulsation. The distinct SPMs that emerge are the excited state of the continuum. The SPM accumulates the energy that comprises its charge phase in accordance to the PE potential principle. The PE potential principle dictates that a high level system attracts and withdraws energy from a low level system. The high level SPM literally develops at the expense of the lower level PE substratum."

The charge phase, unlike the compression phase, is not "caused" by an external push. Instead, an excitation of energy by energy generates an accumulation of energy. The schematic of the PE SPM that is depicted in Fig. #1 equates this charge phase with the confluence of energy. This confluence of energy is governed by the PE potential principle. The association of molecules (compression phase) is ostensibly "caused" by a mechanical push while energy confluence (charge phase) is a self-generative process.

The longitudinal wave's rarefaction phase is identified as being

equivalent to a dissociation of molecules. The PE SPW's discharge phase is identified as being equivalent to a dispersion of energy. Hence, both wave cycles possess analogous association and dissociation phases.

The mechanist, in order to account for the transition from compression to rarefaction, introduces an energetic component into his description of longitudinal wave movement. The rarefaction phase is the "effect" of a 'counterforce', a 'counterforce' that "causes" a compressed volume of gas to dissociate. Discharge in the PE SPW cycle is the spontaneous dispersion of energy that was accumulated as charge. The continuous, self-generative process: association > dissociation > association charge > discharge > charge is the basis for PE SPW forward movement.

SIMULTANEITY OF THE MECHANICAL AND PE SPW CYCLES

When a tuning fork is struck, the prong's back and forth motion is accompanied by mass-free energy pulsation. This simultaneity is dictated by the fact that all physical entities exist within the underlying PE substratum. We might conclude, since the compression > rarefaction phases of longitudinal waves correspond to the charge > discharge phases of PE SPWs, that sound transmission is the result of a superimposition of these two wave forms. However, a superimposition of waves poses problems. The PE SPW is, by definition, mass-free. Therefore, to avoid confusion, the individual PE SPWs must be distinguished from the charge > discharge energy metabolism that provides the functional basis for the compression > rarefaction phases which are manifested in the particulate air medium.

PE SPWs generate forward movement independent of and without the influence of matter. Although the mass-free energy metabolism of charge > discharge, epitomized in the PE SPW cycle, is operative in sound wave propagation, the process here is inextricably bound to mass. Energy confuence underlies molecular association and energy dispersion underlies the dissociation of molecules. The self-generative charge > discharge energy metabolism is the basis for sound wave conveyance.

The common denominator shared by both transverse and longitudinal waves is: Neither the water molecules nor the gas molecules of their respective mediums are transported along with the movement of the waves. The particulate environment functions, in effect, as a medium for the transmission of an excitation. Wave dynamics, viewed solely in terms of the physical description of movement and structure, are divided into (1) a transmission component, viz., the wave and (2) an excitation component, viz., the impulse. A mechanical interpretation can account for neither the nature of the excitation nor of how transmission and excitation are related.

The critical difference between PE SPWs and both transverse and longitudinal waves is: The forward movement of PE SPWs is generated by a self-regulated, metabolic charge > discharge process. PE SPW movement is, by definition, the forward motion of mass-free energy. Therefore, measurable quantities of energy do move from place to place. Transmission and excitation, the components that are usually separated in mechanical descriptions of waves, are inseparable, integrated functions of a PE SPW cycle.



If we were to accept, without further investigation, this description, then longitudinal like transverse waves would be just another example of a phenomenon that is governed by the mechanical energy potential. However, we have established the fact that sound waves epitomize phenomena in which mechanical and functional processes occur simultaneously. I have deliberately chosen to emphasize only the mechanistic aspects of transverse

The mechanical interpretation of the waves that are engendered when a tuning fork vibrates in the open air is: The energy of the impulse that activates the instrument is converted into the kinetic energy of the prong's back and forth motion. The kinetic energy of the vibration is, in turn, conveyed to the air and moves through the gaseous medium in the form of successive compression > rarefaction phases. As these sound waves spread outward, the intensity of these phases gradually diminishes. Eventually, an alternating compression and rarefaction of volumes of air ceases altogether, that is, the waves die out. In other words, the loudness of the transmitted sound fades out more and more until finally the tone emitted by the tuning fork is inaudible. Longitudinal waves are no longer engendered because with each compression and rarefaction of air some of the kinetic energy is being consumed in overcoming the particulate medium's resistance to pressure. This expended energy is continually being converted into heat.

The mechanical interpretation of the waves that arise when a raindrop strikes the water's surface is: The gravitational potential energy of the falling raindrop is converted into the kinetic energy of wave movement. One observes, as transverse waves spread outward, that crest heights gradually diminish. Eventually the alternating rise and fall of water ceases altogether, i.e., the waves die out. Waves are no longer engendered because with each rise and fall of water some of the energy is consumed in overcoming the internal friction of the particulate medium. In other words, movement is continually being converted into heat. Here we are confronted with what is referred to as the *mechanical energy potential*. This potential is governed by the *law of entropy*. This mechanical potential dictates that *energy is always directed from the high to the low level*. In this instance, high level gravitational potential energy is converted into the low level random motion of molecules, i.e., into heat. Energy metabolism, in the case of transverse waves, seems to be restricted to this one way, entropic process. An alternating charge > discharge energy metabolism is inapplicable to any phenomenon that happens to be governed by such ever-increasing energy dissipation. Therefore, the movement of transverse waves across the surface of water is, ostensibly, not the result of a self-generative energy metabolism.

ENERGY METABOLISM

We are equipped, at this juncture, to explore in greater detail the functions of PE. Here, within the microscopic domain of mass-free energy, we will be able to discern and appreciate the harmonious inter-connection and interaction of:

- a.) Function
- b.) Structure
- c.) Environment

These diverse elements are wholly *interdependent*. They constitute an integrated, functional whole.

A region, within the all-pervasive PE continuum, of evenly distributed quantities of mass-free energy may be designated as being an environment that exists in a state of *dynamic equilibrium*. Excitation of this energy substratum generates a wave form that also rises above and falls back toward the level of equilibrium. PE SPWS, as shown in Fig. #1, are composed of successive, alternating *pulses* and *waves*. Those peaks of

An atmosphere in which the air is relatively evenly distributed may be designated as being an environment that exists in a state of equilibrium. Excitation of this gaseous medium generates a wave form that rises and falls below (in terms of the degree of molecular concentration) the level of equilibrium. The concentrated volume of air is the compression phase and the diluted volume is the rarefaction phase. Compressions and rarefactions are measured in relation to the level of equilibrium, i.e., the average molecular density of the air medium. The compression phase's degree of concentration above the equilibrium level is the amplitude of the longitudinal wave.

The smooth, unrippled surface of an expanse of water may be designated as being an environment that exists in a state of *equilibrium*. Excitation of this fluid medium generates a wave form that rises above and again falls below this level of equilibrium. The point at which the water reaches its maximum upward thrust is the wave crest. The point at which the water reaches its maximum downward plunge is the wave trough. *Crests and troughs* are measured in relation to the level of equilibrium. The vertical distance from the equilibrium level to either a crest or a trough constitutes the amplitude of the transverse wave.

To begin with, let us consider what determines the loudness of a sound. A tuning fork is capable of producing a tone that can fluctuate over a wide range in terms of loudness. When we strike the tuning fork lightly, it emits a soft sound; struck harder, the instrument emits a tone identical in pitch (=frequency) but with a much louder sound. The lightly struck prong, from the perspective of wave mechanics, moves over a small arc; the harder struck one moves back and forth over a larger arc. The harder struck prong compresses the air more violently. A louder tone differs from a softer tone in that the compressed volumes of the former are more compressed than those of the latter. We derive from these facts the equation: loudness = amplitude. We must, as a prelude to a functional explanation, define and compare 'amplitude' in all three wave forms.

A gradual diminution and an inevitable cessation of wave motion is implicit in a process that functions in accordance to the entropic mechanical potential. We are confronted, since sound waves function according to the *neg-entropic* PE potential principle, with the question: How does one explain the fade-out of sound if a *neg-entropic energy metabolism* is active in longitudinal wave movement?

The self-generative charge > discharge energy metabolism is governed by the *PE potential principle*. PE potential, contrary to mechanical potential, dictates that *energy flows from the low to the high level*. A *stronger system attracts a weaker system and draws energy from it*.

Waves in order to bring into sharper focus the similarities and differences between processes. Mass-free energy processes happen to be inherent to all physical events. Transverse waves are no exception.

Let us compare the ocean with the PE continuum. This flowing, undulating fluid medium is analogous to the PE continuum. One observes, here and there, as in the PE continuum, forward coursing streams, e.g., the rapid-moving, swirling Gulf Stream of the Atlantic Ocean. These oceanic streams (=excited states of the water medium) are comparable to PE spinning waves (=excited states of the mass-free energy substratum). Like the PE SPW, such a continuous, directional flow within and through the ocean constitutes a distinct, demarcated current in forward motion. Turning now to the Earth's atmosphere brings into view yet another cogent comparison between the PE continuum and this gaseous medium. The high velocity, meandering jet streams, generated as they are in both hemispheres of the globe, are functionally identical to oceanic streams and PE SPWs. This propagation of PE SPWs in the form of distinct, spiraling currents is, as in the case of transverse and longitudinal waves, dependent upon and are

Transverse wave structure is visible as being successive crests and troughs that spread outward across the surface of water in an ever-expanding circle. Longitudinal wave structure, although not visible in the open air, is demonstrated (by controlled experiments) as being successive compression > rarefaction phases that spread through the gaseous medium in an ever-expanding sphere. PE SPW structure, although not readily visible, is demonstrated (under lab conditions) as being successive pulse and wave functions that move forward within and through the mass-free energy substratum in a looping trajectory.

The fact that the loudness of sound is determined by the quantity of energy brings us back to the question of sound fade-out. To repeat, the activation of a tuning fork excites the PE substratum, i.e., a charge > discharge metabolism is generated. This mass-free energy metabolism, bound as it is to the molecular phases of the longitudinal wave, expresses itself as the spherical, outward spread of sound. The outward movement of the wave, in the form of an ever-expanding sphere, means that the total power (energy) of the sound wave spreads out and gradually weakens. Therefore, a decrease in loudness is proportionate to a sound wave's distance away from its source. It must be pointed out that a dilution of energy is not equivalent to the conversion / dissipation of energy that characterizes the entropic mechanical potential. A conversion of "kinetic energy" into heat does not cause a sound to fade-out. Sound fades out simply because the self-generative energy metabolism loses, at a certain distance, the capacity to stimulate the human being's auditory system.

The three wave forms, in terms of structure and environment, differ one from the other. However, they all have in common the function of amplitude. Amplitude in the liquid expresses itself as height, as density in the gas and as quantity of energy in the PE continuum. Significantly enough, the similarity between the amplitude of a longitudinal wave and of a PE SPW is obvious, i.e., a greater or lesser degree of compression corresponds to a greater or lesser accumulation of energy. We are now able to expand the mechanical equation, loudness = amplitude into: loudness = amplitude = quantity of concentrated energy.

charge, i.e., the maximum concentrations of energy that are reached during the self-generative confluence phase, are the pulses. The energy dissociation > re-association process that occurs between the peaks of charge is the wave. Pulses are measured in relation to the level of equilibrium. The quantity of mass-free energy (above the equilibrium level) accumulated in the pulse constitute the amplitude of the PE SPW. The three wave forms, in terms of structure and environment, differ one from the other. However, they all have in common the function of amplitude. Amplitude in the liquid expresses itself as height, as density in the gas and as quantity of energy in the PE continuum. Significantly enough, the similarity between the amplitude of a longitudinal wave and of a PE SPW is obvious, i.e., a greater or lesser degree of compression corresponds to a greater or lesser accumulation of energy. We are now able to expand the mechanical equation, loudness = amplitude into: loudness =

governed by the properties and dynamics of the specific environment in which they arise. We will now contrast the *pulses* that are engendered in sound waves with those that are generated in PE SPWs.

On the one hand, the outward spread of sound waves in the form of an ever-expanding sphere results in the dilution of energy. On the other hand, the forward movement of a PE SPW in the form of a directional current precludes an inevitable dilution of energy, i.e., a pulse's content does not diminish as a direct consequence of wave structure.

Given:

- a.) Solar radiation excites the generation of SPWs in a region of the PE continuum that is characterized by high concentrations of mass-free energy. This environment constitutes a high PE potential level.
- b.) Solar radiation excites the generation of SPWs in a region of the PE continuum that is characterized by low concentrations of mass-free energy. This environment constitutes a low PE potential level.

Pulses are, by definition, peaks of charge. A peak is an entity that rises above the level of its environment. If the energy density of the high PE potential level is six times greater than the energy density of the low PE potential level, the pulse generated within the former region must possess a capacity level at least six times greater than that of the pulse generated within the latter region. Here we establish the fact that SPW pulse size (*capacity level*) is regulated by the particular PE potential level within and through which the PE SPW moves. This insight, due to its ramifications, demands further consideration.

Given:

A PE SPW (SPW-1) is generated within a high PE potential level. The forward movement of SPW-1 occurs entirely within the confines of this uniformly dense environment. Another PE SPW (SPW-2) is likewise generated within a high PE potential level. PE SPW-2 moves from the dense into a dilute PE environment, i.e., from a high into a low PE potential level. Finally, a PE SPW (SPW-3) is generated within a low PE potential level. SPW-3 moves from the dilute into a dense PE environment, i.e., from a low into a high PE potential level.

To repeat: The generation of PE SPW pulses (=capacity levels) is governed by the PE potential principle. A PE SPW is a strong system that moves forward within and through a weaker energy substratum. The PE potential dictates the flow of energy from the weaker to the stronger system. The quantity of energy that accumulates to comprise a SPW pulse depends upon the environment. The pulses of the SPW that arises in a high PE potential level consists of a greater amount of energy than do the pulses of the SPW that is generated in a low PE potential level.

The pulses generated in the forward movement of PE SPW-1 constitute invariable, equal capacity levels. Equal capacity levels are characteristic of PE SPW movement that is generated within the confines of a uniformly dense energy substratum. This instance of undiminishing capacity levels despite forward movement across vast distances is in sharp contrast to longitudinal and transverse wave movement. A steadfast maintenance of capacity level points to a neg-entropic process.