

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 repression 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  
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## HARMONY = RATIONAL = CREATIVE PROCESS

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

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

what He played to her."

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.

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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 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 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.

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

atom or a group of molecules, possesses a specific *natural frequency*. This *natural frequency* is a ground state, i.e., a basic rate of vibration that 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 microcosmic realm. Here again we begin to discern the functional dynamics of an interconnected 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 planet's 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 subtile than air, and exceedingly more elastick and active? And doth it not readily pervade all bodies? And is it not (by its elastick 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,

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

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.

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.

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.

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.

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

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.

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.

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

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

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.

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.

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*.

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

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,

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 sonal 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 SPW 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 SPW 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 SPW 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 SPWs 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 SPWs that emerge are the excited state of the continuum. The SPW 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 SPW 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 SPW 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 confluence 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.



We are equipped, at this juncture, to explore in greater detail the functions of PE. Here, within the microcosmic 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.

#### ENERGY METABOLISM

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.

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.

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

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.

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*.

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?

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.

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.

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.

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 SPWSs, as shown in Fig. #1, are composed of successive, alternating *pulses* and *waves*. Those peaks of

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 = amplitude = quantity of concentrated energy.

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.

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.

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

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.

Let us see if we can translate the self-generative energy metabolism into the terminology of traditional energy concepts.

If we could capture the forward movement of PE SPW-1 on film, a successive appearance and disappearance of pulses, i.e., a discontinuous series of *energy quanta* would be seen. Every temporary quanta is distanced from the previous manifestation by regular intervals of space. We now focus in on an individual cycle, stop the film and freeze the frame in which only the generated pulse appears. An enlargement of this isolated pulse function reveals that it consists of a definite quantity of accumulated - concentrated mass-free energy. "Potential energy" is defined as: the *stored energy* of a body. The SPW's pulse resembles this "stored" energy. "Kinetic energy" is defined as: the energy *OF* motion. When the film is allowed to roll, the release of the frozen frame coincides with the SPW discharge phase, i.e., the motion of the film is synchronized with SPW forward movement. The viewing screen remains blank until the frame is reached wherein the next generated pulse appears. Here we stop the film and once more freeze the frame. It is important to note that within the blank interval between pulses, the *dispersion* (energy dissociation) and *confluence* (energy re-association) processes have taken place. In other words, "kinetic energy" in the PE SPW cycle is defined as: energy *IN* motion. Close scrutiny of the second pulse that is captured on the screen reveals that its capacity level is identical, equal to that of the previous pulse. *There has been no loss of energy even though movement across a distance of space has occurred.* The entropic metabolism:  
potential energy > kinetic energy > heat  
does not apply to the PE SPW cycle.

PE SPW-2, like PE SPW-1, is generated in a high PE potential level. On film, a comparison between the frames in which their respective pulse functions appear reveals the fact that the capacity level of SPW-2 is equal to the capacity level of SPW-1. Once the frozen frame of the SPW-2 pulse is released, the film's motion, as in the case of SPW-1, corresponds to this SPW's forward movement. After the passage of a certain number of frames, during which time the viewing screen remains blank, another SPW-2 pulse manifests itself. We stop the film and freeze this frame. Precise measurement of this capacity level reveals the fact that it has decreased in size, i.e., the quantity of energy embodied in this pulse is less than that of the original SPW-2 pulse. This loss of energy refutes our previous finding and points to the existence of an entropic process.

When we roll the film to the next pulse, it is disclosed that its capacity level is also less than that of the original SPW-2 pulse but it is equal to the previous (diminished) SPW-s pulse. Therefore we have discovered a loss of energy between the first and second pulses and no loss of energy between the second and third SPW-2 pulses. A situation in which both an entropic and a neg-entropic process takes place seems to confront us. We now recall and take into account that PE SPW-2 moves from a high to a low PE potential level. Therefore we are urged to ask, Is not the transition of SPW movement from a high to a low PE potential level being expressed in this change of capacity levels? This would be in full agreement with the fact that a greater capacity level is necessarily generated in a high PE potential region (in order to 'peak' above it) than in a low PE potential region. Granted this is what actually happens in the case of SPW-2, the crucial question of energy loss still remains behind to be answered.

The *wavelength* of a PE SPW is defined as being: *the distance measured from one pulse to the succeeding pulse*. The PE SPWs in Figure #2, which is entitled Rhythm of Movement and Metabolism, clearly illustrate this. Also depicted is the fact that wavelength changes as a SPW moves from a high to a low PE potential level.

When we count the individual frames that pass during the blank interval upon the viewing screen, i.e., the interval between the successive appearance of PE SPW pulses, we find: The number of frames between the second and third pulses of SPW-2 (those equal capacity levels that are generated after the transition from the high to the low PE potential level) is fewer than the number of frames that pass between the successive pulses of SPW-1. Since this blank interval between pulses corresponds to PE SPW forward movement, we can equate number of frames to wavelength. A fewer number of frames, which translates into a shorter distance, means that the wavelength of SPW-2 is shorter than the wavelength of SPW-1.

It is a well-known fact that wavelength is directly related to frequency. A definition of *frequency* is: the number of waves that pass a particular point per unit of time. If the number of frames that pass between pulses happens to be 10 in the case of SPW-1 and 5 in the case of SPW-2, then it will take twice as many seconds (units of time) for the wave function of SPW-1 to pass than for the wave function of SPW-2 to pass. We will observe, when both PE SPW films are projected simultaneously for 30 seconds, that six SPW-2 wave functions and only three SPW-1 wave functions pass during this same period of time. Here verified are the equations:

short wavelength = high frequency

long wavelength = low frequency

We are at a crucial crossroads. It will be necessary, before proceeding onwards, to consolidate our insights. Our *synthesis* takes the form of the following functional equations:

short wavelength  $\neq$  high frequency  $\neq$  large capacity level

long wavelength  $\neq$  low frequency  $\neq$  small capacity level

Given: Two identical, propeller-driven motor boats cruise, parallel to one another, across a lake. We distinguish one boat from the other by the designations, (x) and (y).

MBx's propeller turns at a rate of 60 rpm.

MBy's propeller turns at a rate of 60 rpm.

Both boats, under these circumstances, move across the water at an equal speed and remain together, neither one ahead of the other. Suddenly MBx's propeller is revved up to turn at a rate of 120 rpm. MBy's propeller continues to turn at 60 rpm. While MBy's speeds remains steady, MBx's speed increases. MBx moves forward twice as fast as MBy does and leaves the latter far behind in very short order. This shows that a change in frequency corresponds to and is simultaneous to a change in speed (=velocity). The equation that can be derived from this is:

*change in frequency = change in velocity*

Does this provide the key for the comprehension of a PE SPW's neg-entropic energy metabolism?

The speed of sound, i.e., longitudinal wave velocity, in the air is dependent upon temperature. It has been determined that for each one degree rise in temperature above 32 degrees Fahrenheit, the speed of sound in the air increases by 2 feet per second.

It is "normally" assumed that longitudinal wave velocity increases in warm air because faster-moving molecules bump into each other more often and can therefore transport the compression > rarefaction cycle in less time. Here even the mechanist acknowledges the fact that an increase in *metabolism* "causes" an increase in the speed of sound waves. Once again, since *metabolic rate = frequency*, we are face to face with the equation: change in frequency = change in velocity. We can, in order to bring the discussion back into the domain of PE SPW functioning, apply this equation to, the mass-free energy metabolism that underlies the particulate compression > rarefaction cycle of longitudinal waves.

Sir Isaac Newton offers this pertinent observation: "In spring and autumn, when the air is rarefied by gentle warmth of the seasons, and by that means its *elastic force* becomes somewhat more *intense*. But in winter, when the air is condensed by the cold, and its elastic force is somewhat remitted, the motion of sounds will be slower as the square root of the density and, on the other hand, swifter in the summer."

Newton's 'elastic force' refers to a tangible quality that he perceived in the Earth's atmosphere. The *mass-free energy field = atmospheric PE envelope* is indeed expansive in spring and contractive in winter. *The expansion of the PE envelope is palpable as energetic tension*. Just as a tense violin string generates a higher frequency tone than does a slack violin string; a high tension, expansive PE field generates higher velocity sound waves than does a low tension, contractive PE field.

I have digressed somewhat from the topic at hand in order to secure a firm foundation for what follows. It has been necessary to establish the lawfulness of the equation: change in frequency = change in velocity.

PE SPW-3, unlike SPW-1 or SPW-2, is generated in a low rather than in a high PE potential level. A comparison, on the films, between the frames in which their respective pulse functions appear, discloses the fact that the capacity level of SPW-3 is less than the initial capacity levels of the other two PE SPWs. After the passage of a certain number of frames another SPW-3 pulse manifests. We stop the film and freeze this frame. Measurement of this capacity level reveals that it has increased in size. When we roll the film to the next pulse, we see that its capacity level is also greater than that of the original SPW-3 pulse but equal to the previous (increased) capacity level.

What happens in the case of PE SPW-3 is, of course, the reverse of the process that was in evidence in the case of SPW-2. We must remember and take into consideration that the two separate SPWs move forward from and into opposite PE environments. Whereas SPW-2 moves from a high into a low PE potential level, SPW-3 moves from a low into a high PE potential level. We are, in both instances, confronted with the fact that *PE SPW movement from one PE potential level to another coincides with a change in capacity levels*.

Let us consider the projector that shows us the films of PE SPW forward movement as being geared to operate in accordance to the hypothesized speed of all radiant energies. The assumption is that all forms of radiant energy fit into the electromagnetic (EM) spectrum, i.e., regardless of differences in wavelength and frequency, velocity remains constant. This electromagnetic constant, 186,000 mps, is the so-called "speed of light".

Such uniform projection speed makes it impossible for us to determine whether or not the changes in frequencies and wavelengths that we have found in the various PE SPWs actually do correspond to changes in velocity.

Suppose we were to devise a way to run a properly modified film projector on Primary Energy. Now, instead of viewing the forward movement of the individual PE SPWs upon the screen, we observe that each harnessed PE SPW, in turn, rotates the spool shaft upon which the film usually rolls. If we count the number of shaft revolutions per unit of time, the speed of the three distinct PE SPWs can be calculated. The results are:

- 1.) The shaft powered by PE SPW-1 consistently revolves at a rate of 20 cycles per second.
2. The shaft that is powered by PE SPW-2 initially revolves at a rate of 20 cycles per second but then suddenly starts to revolve steadily at a rate of 40 cycles per second.
3. The shaft that is powered by PE SPW-3 initially revolves at a rate of 40 cycles per second but then suddenly starts to revolve steadily at a rate of 20 cycles per second.

Here, then, in the PE SPW cycle, the change in frequency = change in velocity equation is corroborated.

The diminution of capacity level that occurs in the case of PE SPW-2 is what had to be explained. Since the PE SPW cycle is governed by a neg-entropic energy metabolism, an apparent loss of energy had to be accounted for. Our investigation yields the following solution: There occurs, simultaneous with a PE SPWs movement from a high to a low PE potential level, a functional transformation. *The decrease in capacity level coincides with an increase in the PE SPW's metabolic rate.* We could say, in mechanistic terms, that the "potential energy" embodied in the capacity level is transformed into higher velocity "kinetic energy". In other words, the diminution in capacity level is 'offset' by an increase in PE SPW velocity. There is no loss of energy. The neg-entropic energy metabolism remains intact. The fact that the capacity level of PE SPW-3 increases while its velocity decreases during forward movement from a low to a high PE potential level demonstrates, predictably, the *functional transformation* in reverse.

We conclude this overview of the *functional harmonics* of the PE SPW cycle with the following mass-free equations:

small capacity level	↔	high frequency	↔	short wavelength	↔	high velocity
large capacity level	↔	low frequency	↔	long wavelength	↔	low velocity



## SOLAR RADIATION

"The whirling bubble on the surface of a brook admits us to the secret of the mechanics of the sky. Every shell on the beach is a key to it. A little water made to rotate in a cup explains the formation of the simpler shells; the addition of matter from year to year arrives at last at the most complex forms; and yet so poor is Nature with all her craft that from the beginning to the end of the universe she has but one stuff - but one stuff with its two ends, to serve up all her dreamlike variety. Compound it as she will, star, sand, fire, water, tree, man, it is still the one stuff, and betrays the same properties." - Emerson

### THE SUN: A STELLAR PE SYSTEM

The solar system's star, the sun, like every other stellar entity, is a Primary Energy system. A PE system, whether it be a non-living atom or a living cell, is composed of an inner *core*, an outer *periphery* and an enveloping *mass-free energy field*. Structurally, the sun's core is distinguished from the rest of its physical bulk by its enormous density. The density of matter near the star's center is estimated to be one hundred times greater than the density of water. The incandescent orb's gaseous composition (mainly hydrogen and helium) becomes more and more rarefied as the distance from center to periphery increases. Approximately 420,000 miles from the core, the periphery or photosphere is encountered. There arises, above the sun's surface, the gaseous atmosphere. This solar atmosphere is suspended within the all-encompassing energy field that we commonly refer to as the *corona*. Although the material contents of the corona are restricted to the close vicinity of the periphery, the sun's luminous, mass-free PE field extends about 900,000 miles out beyond into open space.

The sun, according to prevalent theories, is an isolated "fireball" that is surrounded by the vastness of cold, vacuous space. Existence under such forbidding circumstances seems to be a precarious affair. The star is perceived to survive not because of but rather despite the influence of the external environment. The sun supposedly relies wholly upon its own inner resources in order to sustain its existence. Hence, deep within its interior, where temperatures are calculated to exceed 27 million degrees Fahrenheit, the nuclei of hydrogen atoms are combined to form helium. Thermonuclear dynamics specify that when atomic nuclei fuse with each other to form larger nuclei, some of the mass is converted into energy. It is *believed* that the energy released by this process eventually forces its way through 400,000 miles (distance from core to periphery) of compact matter and then radiates freely out into space. Furthermore, it is postulated that this outward push of energy actually prevents the sun from collapsing in on itself due to the tremendous force of gravity!

A continual conversion of matter into energy means, of course, that stellar entities literally feed upon themselves! Therefore the sun is conceived as being, in essence a gigantic fusion reactor whose 'light' and 'heat' energy is generated solely at the expense of its own mass.

*The functional approach to nature views all phenomena in the context of the interaction and interdependence of a physical entity with its environment.*

The functions of a star that is *alleged* to exist in "empty space" differ radically from the functions of a star that is *known* to exist within a mass-free energy ocean.

The sun happens to be a potent, high level PE system that is surrounded by the primordial energy continuum. This star, originally engendered by the convergence and merger of two or more huge, *galactic PE streams*, the process of *superimposition* through which energy is transformed into matter) has reached, in its maturity, a definite capacity level. The sun, generated from and within the PE environment, has attained a specific size and density in accordance to the PE potential principle. This *basic functioning principle* (BFP) of Primary Energy dictates that a strong, high level system, that is, the proto-stellar entity, attracts and withdraws energy from the weaker, lower level PE substratum. Once maximum charge (=capacity level) has been generated, the stellar PE system stabilizes and functions in harmony with the four-beat **ENERGY FORMULA**:

attraction > charge > discharge > radiation

The charge > discharge energy metabolism is now fully operative. A *dynamic equilibrium* is maintained by the star via the continual absorption and emission of mass-free energy.

*The explanation for the sun's radiative power is by no means shackled to a conversion of mass into energy.* The direct connection and interaction between the stellar entity and the PE substratum leaves no doubt as to what the basic source of energy is. Whether or not a large-scale conversion of hydrogen into helium actually occurs; the quantity and intensity of solar radiation is strictly dependent upon the mass-free energy metabolism of the sun. The mechanist's need to equate the sun's core with a thermonuclear reactor (in which a fusion process releases the "counterforce" to gravity) in order to account for why a star does not collapse reveals the fact that *conventional ideas about gravity are incomplete and even erroneous.*

The (BFP), PE potential principle, constitutes gravitational attraction. The energy field, in which the molecular hydrogen and helium content of the sun is suspended and held together, was generated by this attraction and withdrawal of energy from the low to the higher level process. A continual build-up of pressures sufficient enough to collapse a star in upon itself is impossible in this *self-regulatory* process wherein, once maximum capacity level is reached, a charge > discharge energy metabolism becomes operative. The field strength, i.e., the intensity and energy concentration of the field, requisite to keep the physical entity intact, is now maintained by the absorption > emission functions. The mass-free energy that is constantly absorbed from the encompassing PE environment permeates deep into the star's interior. The extremely dense core, i.e., the PE system's strongest component, continually attracts energy to itself from the weaker peripheral and field components. It is the inward streaming of energy that maintains and determines the cohesiveness of the sun's gaseous contents. This attraction is concretely manifested at the sun's surface. The solar disk is inundated by an uninterrupted inflow of energy from the PE continuum. The fact that these PE currents and their influence are confined to the near vicinity of the sun allows ~~the~~ us to recognize and define *gravity* as being a *localized phenomenon*. If the Earth were ever to somehow approach close enough to establish *field to field contact*, i.e., planetary PE envelope with solar corona, with the sun, we could then begin to speak in terms of a gravitational attraction between them. However, under the conditions that now prevail, an

attraction between sun and Earth, or between the sun and the other planets of the solar system is a false assumption.

The mass-free energy emitted from the charged core is the primary source of the sun's enormous output of radiant energy. Let us, before we examine the dynamics of solar radiation, briefly address the questions of the sun's heat, magnetic field and the lumination of its PE field = corona.

*Heat, per se, is not energy.* Heat is produced, i.e., it is the result of "kinetic energy" being blocked. The resistance that is offered by a star's molecular composition to the otherwise free, unimpeded flow of both incoming and outgoing PE currents naturally results in the production of heat. The relationship between density, resistance and heat is straightforward. *The greater the density, the more is the resistance and the higher is the temperature.* The increases in temperature with depth (from the sun's periphery to the core) are directly proportional to the increases in the sun's material density in that direction. Therefore, a special "heat engine" or thermonuclear reactor is not needed to stoke the sun's fire.

The technical devices, meters and other sophisticated electronic hardware that scientists use to detect energy phenomena on Earth, are geared and calibrated to measure only those effects that fit into the EM spectrum of radiation. All of the data thus compiled has proven that a magnetic field, which is somehow generated by a geodynamo within the planet, exists and surrounds the physical globe. This narrow preoccupation with geomagnetism (electricity and magnetism are merely secondary, functional transformations of PE) has blinded us to the existence of the far more important and essential energy field, viz., the Earth's mass-free PE envelope. Space probes that are launched out toward the sun disclose only the presence of *magnetic anomalies*. Surprisingly enough (at least to those who insist that the universe must be governed by EM processes) these refined solar expeditions have shown that only very weak magnetic fields, widely interspersed, occur here and there over the star's surface. Contrary to expectations, the sun's weak fields reveal that they vary in a complicated, quite disorganized fashion and *produce no general, overall magnetic field*. The focus of attention is upon secondary field anomalies while staring us right in the face is that cohesive PE field, the sun's corona.

The corona, like the Earth's atmospheric PE envelope, is the mass-free energy field that permeates and extends far out beyond the sun's physical sphere. This corona, viewed telescopically and with the naked eye during eclipses, is seen to be luminescent. It forms a bright, mobile, irregularly shaped halo around the solar disk. This phenomenon of coronal luminescence is very significant because *lumination* is a basic functioning principle (BFP) of PE. We will not, at this point, discuss in detail the functional dynamics of light except to state that *light is generated whenever high concentrations of PE are excited*. Controlled, repeatable experiments together with keen observations have revealed that this excitation consists of field to field action. When a *moving* field (be it another PE field, an EM field, etc.) establishes contact with an area of concentrated PE, lumination is triggered. Since the emitted radiant energy and the absorbed energy of the sun continually interpenetrate and therefore *excite* the corona, the trigger for the local lumination of this dense PE field is quite evident.

To have to ascribe coronal light to a 'scattering' mechanism by "free electrons" and interplanetary "dust" is ad hoc theory par excellence.

#### THE DYNAMICS OF SOLAR RADIATION

The sun, having been engendered from and within the PE continuum, functions in accordance to the metabolic charge > discharge process. A constant absorption and emission of mass-free energy, in sharp contrast to the mechanistic, entropic scenario of stellar self-consumption, is a neg-entropic process that allows the sun to exist in dynamic equilibrium with its environment. These facts compel us to confront yet another major misconception, i.e., the assumption that any and all radiant energy is transmitted through space in the form of EM waves.

Figure #4, entitled, The Dynamics of Solar Radiation, shows that the sun is surrounded by a local, intense PE field = corona. The physical solar sphere, suspended and held together within the coronal energy matrix, revolves upon its N-S axis along with this rotating PE field. *Space, the environment in which the sun functions, is not an empty, vacuous void. Space is the primordial energy continuum of the universe.* It is only within the framework of this uninterrupted, mass-free energy medium that the question of solar radiation can be considered. Briefly, the mechanistic hypothesis of solar radiation reads:

A thermonuclear reactor in the sun's core converts hydrogen into helium. The energy released by this fusion process must slowly force its way out to the star's surface. It takes this 'post-atomic energy' a million years (if the energy is not absorbed or turned back by inevitable collisions with the 400,000 mile thickness of the solar mass) to percolate topside. Once there, the unexpended "kinetic energy" is immediately transferred to the atoms and molecules that populate the inner coronal atmosphere. These particles are thereby induced to vibrate very rapidly. This molecular vibration within the solar atmosphere, in turn, creates an oscillating EM force field. It is this EM force field (= solar energy) that propagates through "empty space" at the "speed of light".

*Functionalism* has not been 'invented' in order to oppose the mechanistic view of life and the cosmos. Mechanistics and electromagnetism, within very narrow limits, work. However, natural processes, although they are 'lawful' and definable, exhibit constant and even unpredictable variability. *The self-regulatory, self-generative, metabolic aspects of the substantive Primary Energy simply transcend the prevalent mechano-mystical concepts of the physical world.* The EM force field = solar radiation equation, in any case, does not deserve our further attention.

The attraction of energy to the high level core, the accumulation of charge and the subsequent radiation of energy out to the star's periphery and beyond constitutes the sun's energy metabolism. PE SPW propagation from the sun's interior to its periphery is neither turned back by collisions with the compact solar mass nor is it absorbed by atoms and molecules. The fact that all matter, regardless of density is permeable to PE SPWs accounts for this ability to penetrate the sun's materiality. The speed of PE SPW forward movement through the underlying PE matrix that binds dense aggregates of matter together is relatively slow. The decrease in the density of mass from the star's center to its periphery corresponds

to a decrease in concentration of the PE matrix in that direction. Hence, as one follows a PE SPW's transition from dense to less and less dense strata, the speed of its forward movement will be seen to increase.

Figure #4 depicts the radiation of a single PE SPW from the sun's surface. We assume, based upon our knowledge of Earth's atmospheric PE field, that the concentration of energy within the coronal PE field diminishes in direct proportion to distance away from the physical solar disk. Therefore, the corona's luminescent inner layers (in which a gaseous solar atmosphere is suspended) are high PE potential levels while the outer layers (where luminescence gradually dims and fades out as energy concentration decreases and finally reaches the level of the general PE continuum) are low PE potential levels. Since the speed of PE SPW forward movement is dependent upon the PE potential level of the energy substratum, the velocity of the SPW in Fig. #4 constantly increases as it travels from the sun's surface to the outer limits of the coronal PE field.

The corona to open space transition, in terms of energy concentration, is probably very gradual. How far away from the sun a constant diminution of energy concentration prevails is unknown. In any case, for as long as there is a decrease in PE potential level, a continual acceleration of PE SPW forward movement will be generated. Perhaps the energy level of interplanetary space is actually quite uniform for most of the distance between the sun and the Earth. The acceleration of solar radiation, within the confines of such a uniform PE potential environment, ceases; the velocity of the PE SPW becomes consistent and remains steady.

A "static" pause in the functional transformation of solar radiation once again changes into a dynamic situation as soon as PE SPW forward movement comes under the influence of the Earth's extensive PE envelope. To this point, the transformation of solar radiation has been expressed as a continual acceleration of PE SPW forward movement. The PE SPW's propagation, from surface to outer corona, from corona to interplanetary space, has been characterized by the constant transition from higher to lower PE potential environments. To repeat: *PE SPW movement from high to lower PE potential levels coincides with an increase in the SPW's energy metabolism.* This increase in metabolic rate (= frequency) in turn corresponds to an increase in the velocity of solar radiation. This process functions in accordance to the equation:

$$\text{change in frequency} = \text{change in velocity}$$

The schematic of Earth and its atmospheric PE envelope, as it appears in the figure, is comparable to the sun and its coronal PE field. The material planet, like the material star, is suspended and held intact within a concentrated mass-free energy matrix. The spinning of Earth upon its N-S axis is governed by the PE field's west to east rotation. The Earth's PE envelope, like the sun's corona, is layered. In other words, the PE potential levels within the atmospheric PE envelope diminish in direct proportion to their distance away from the physical globe.

The approach of solar radiation toward the Earth's PE envelope again triggers a succession of transformations in PE SPW forward movement. However, in this instance, the PE SPW encounters a situation in which the mass-free energy continuum starts to become more and more concentrated instead of less and less concentrated. This means that PE SPW forward movement is now from lower to higher PE potential environments.

Such a reversal of environmental conditions immediately expresses itself as a change in the PE SPW's energy metabolism. *The energy metabolism that generates PE SPW motion decreases as the SPW moves from a low to a higher PE potential level. This decrease in metabolic rate is functionally identical to a decrease in velocity.* Consequently, the velocity of the solar radiation that is illustrated in the figure steadily decreases as the PE SPW travels from open space to the surface of the Earth.

## "SPEED OF LIGHT"

The definition of light, according to current theory, reads: Light is the visible part of the EM spectrum. It is assumed that this portion of the sun's radiant energy constitutes the Earth's natural light. This light supposedly travels from the sun to the earth at a steady, invariable speed of approximately 186,000 miles per second. The "speed of light" (= 186,000 mps through a vacuum) is an inherent parameter of EM radiation. As such (since all forms of radiant energy are thought to be electromagnetic) "speed of light" is considered to be, like the law of entropy, a *constant* in nature. The sun is said to emit not only visible light but also infrared (= thermal radiation) and ultraviolet (= high energy) EM waves. The difference between visible light and these other two forms of EM radiation is frequency. Infrared possesses a lower frequency while ultraviolet possesses a higher frequency than visible light. This fact, namely, low frequency waves propagate through "empty space" at the same speed as do high frequency EM waves, distinguishes EM from PE. The static EM equation: difference in frequency = NO difference in velocity is wholly inapplicable to the PE SPW cycle.

Our functional definition of light is: The Earth's light is the result of an interaction between two mass-free energy fields. Lumination is generated within the confines of the planet's indigenous PE envelope whenever direct contact with solar radiation, i.e., a *moving* field of PE SPWs, is established. *Light is understood as being a local phenomenon. Light is not transported from the sun to the Earth. The sun is merely the source of the excitation that triggers lumination.*

The hypothesis of a "speed of light" constant in reference to solar radiation would make sense only if:

- a.) The sun's radiant energy is an oscillatory electromagnetic force field which
- b.) is transmitted to the Earth across the "vacuum" of space.

However, since space is a PE continuum and the sun's prodigious output of radiation depends upon this stellar entity's interaction with its mass-free energy environment, the "speed of light" constant cannot be applied to solar radiation. Interestingly enough, lab tests have shown that high concentrations of PE do luminate in the presence of an EM force field. This finding implies that the equation: solar radiation = EM radiation might still be valid! We discount this possibility because the functions of stars, planets and the cosmos as a whole are strictly governed by well-defined PE processes. Furthermore, a "speed of light" constant is tenable only if the energy substratum in which EM radiation propagates were uniform in concentration throughout. Then the influences and interference from the medium would be part and parcel of this speed calculation. The PE continuum could, in effect, be ignored.

The fact is that the concentration of mass-free energy within the continuum varies. Whenever we speak about the speed of solar radiation, the changes in PE SPW velocity that coincide with the transitions from one PE potential level to another have to be taken into consideration. We are obliged to assume that the velocity of solar radiation, within the low PE potential level(s) characteristic of interplanetary space, far exceeds 186,000 mps. Once the outermost layers of Earth's PE field are reached, the speed of incoming solar radiation will have decreased.

#### TRANSMISSION OF "HEAT" FROM THE SUN

The sun, according to current theory, emits photons (= energy packets) with the energy of a body that has a surface temperature of 100,000 degrees Fahrenheit. These photons do not lose energy as they travel through the "vacuum" of space. Consequently, photons strike the Earth's atmosphere in full force. The impact of these heat photons (=infrared EM radiation) upon the molecules of our planet's gaseous atmosphere and terrestrial surface results in a *transfer* of energy. The infrared radiation is converted into the "kinetic energy" of particles. This increased random motion of molecules causes a rise in temperature.

Like visible light photons, specific heat photons are allegedly transported to Earth. Here again we are confronted with a mechanistic view that fails to comprehend the difference between the local phenomenon of heat and the excitation that triggers it. The lumination, which is generated when solar radiation establishes contact with the Earth's PE envelope, is not the result of either the conversion or transfer of energy. In other words, the atmospheric PE envelope does not first have to absorb packets of energy in order to luminate. A highly concentrated energy field is already in place. The generation of light is solely a matter of the excitation of an energy field by another energy field. Likewise, heat is produced when solar radiation establishes contact with an energy field in which great quantities of atoms and molecules are suspended and held together. Mass-free PE SPWs do not collide with individual particles thereby causing an increase in their motion through a transfer of "heat energy". Instead, since PE SPW currents are known to excite areas of concentrated Primary Energy but pass more or less unimpeded through aggregates of matter, the increase in the random motion of molecules is actually the result of the excitation that is triggered within their encompassing energy field by solar radiation. *"Heat energy", in the form of infrared EM radiation, is not transported from the stellar PE system to the planetary PE system. The sun is merely the source of the excitation that triggers a localized generation of heat in the Earth's atmosphere, crust and inner core.*

To repeat: The generation of heat and light is governed by field to field interactions. This excitation process of an in place, local energy field by solar radiation does not involve either a conversion or a transfer of energy. Therefore, the PE SPWs that constitute solar radiation, move forward *through* both the Earth's gaseous atmosphere and its solid material crust without losing energy. Solar radiation, contrary to prevalent notions, does not come to an abrupt halt once it meets the planet's surface. Solar energy is not absorbed by by the Earth's crust. Although passage through the planet's successively denser and denser inner material strata (which correspond to higher and higher PE potential levels)

certainly affects PE SPW velocity, solar radiation eventually penetrates all the way to the Earth's center.

The Earth's continuous rotation upon its N-S axis is believed to be the effect of the angular momentum that was originally acquired during the planet's genesis. This angular momentum has remained relatively constant because the physical globe moves unimpeded through the "vacuum" of space. An initial 'force' has been imparted to the earth and the subsequent conservation of that 'force' is supposed to account for planetary spin. The fact that both the angular momentum and forward movement of the Earth are generated by the *ongoing* interactions between planet, sun and the mass-free energy continuum completely eludes mechanistic thinking.

Like planetary movement, the Earth's internal heat is perceived as having been caused by the mechanical processes that were responsible for the creation of the planet. The most recent genesis scenario, based upon a detailed computer analysis, credits iron-rich planetismals, i.e., meteorites, as having been the 'building blocks' of Earth. These sophisticated computer studies have determined that if great numbers of meteorites could have accreted fast enough, the radiation of heat would have been relatively inefficient and as a consequence the planet would have gotten hot as it grew. It is the accumulation of this "primordial heat" that seems to be the explanation for the Earth's internal heat. Analogous to the planet's acquisition of "spin force", a definite quantity of heat has, for all time, been consigned to Earth. However, unlike angular momentum within a vacuum, heat is subject to the law of entropy. A conservation of 'heat energy' is impossible. The internal heat of the Earth is destined to diminish and sooner or later the fire must die out altogether. Again, the functional insight that both the surface and internal heat of Earth are generated by ongoing interactions between the planet, its PE field and solar radiation eludes mechanistic thinking.

The secondary field of the Earth, the geomagnetic field, is presumed to be generated by the dynamo effect of the heat-driven convection currents in the Earth's fluid, metallic outer core. Such a thermally-driven flow requires that the molten metal be heated by a local source of energy. A quest for this elusive source of energy has come up with:

- 1.) The decay of radioactive isotopes such as uranium 238 or potassium 40 which are both present in the Earth's mantle and core.
- 2.) The hypothesis that the solid iron inner core is 'freezing' out of the surrounding liquid metal. Therefore, enough heat from the latent heat of crystallization could exist to power the geodynamo.

Our science confines and accumulates Primary Energy in an apparatus which we refer to as being a *PE accumulator*. This apparatus accomplishes this because it functions in a manner that allows it to take advantage of the specific interaction between metals and PE. Experiments have proven that metallic structures strongly attract and then promptly reflect mass-free energy. It is the reflection of PE SPWs by metal that has made it possible to obtain high concentrations of PE. In addition, the reflection of PE SPWs within the accumulator's metallic enclosure generates heat. The significance of such findings to the questions of a local energy source and the production of heat in the Earth's interior is clear.

The solar radiation that has penetrated to the planet's center finally encounters a material stratum, i.e., the solid inner core, that hinders and



reflects PE SPW forward movement. If "heat-driven" convection currents were indeed responsible for the generation of the geomagnetic field, their source of energy would now be quite obvious. However, since functional science has determined that *iron derives its magnetism from the action of PE currents*, the geomagnetic field of the Earth is in all likelihood generated by the rotation of the PE field that permeates the entire physical globe and its atmosphere.

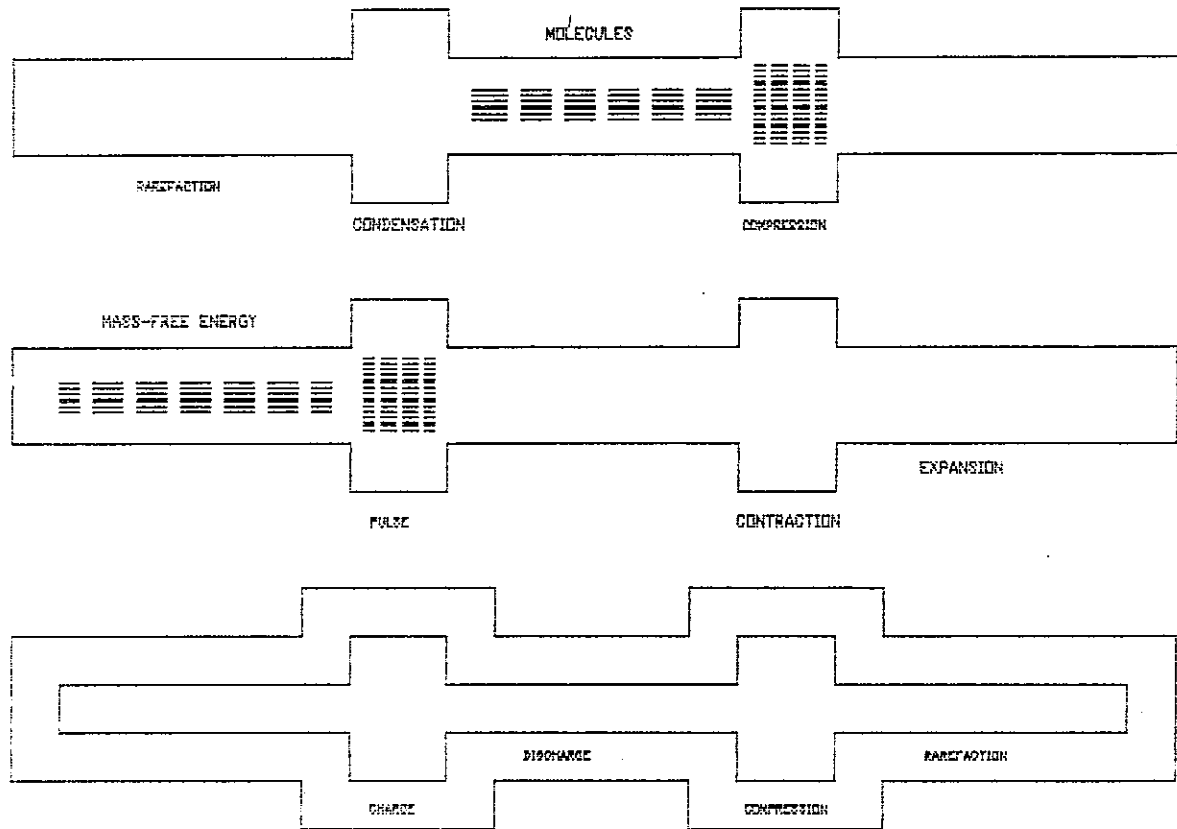
#### SOLAR WIND

The universal PE substratum has often been described as being an *energy ocean*. This undulating medium is, analogous to the Earth's oceans, inundated by intense, high velocity currents, e.g., solar radiation. In addition to distinct, rectilinear PE SPWs, the sun generates concentric, radially-spreading waves. The mass-free energy field of every PE system, living or non-living, vibrates as a whole. This pulsation, i.e., the field's constant alternation between expansion and contraction, is a direct expression of the sun's energy metabolism. The sun, we assume, sets into motion 'standing waves' that propagate through interplanetary space. These waves are probably the basis for the solar wind phenomenon.

The Van Allen radiation belts are PE fields. Their existence has been attributed to the blocking influence of the Earth's magnetic field upon the incoming tides of solar wind. However, a buffer zone potent enough to obstruct the flow of a solar wind whose velocity can range from between 220 and 500 miles per second, is not produced by the weak magnetic tension that supposedly exists at a distance of over 40,000 miles from the planet's surface. What probably does occur is comparable to the head-on collision between two water waves. Hence, the 'standing waves' set into motion by Earth's pulsatory PE field spread radially outward to meet the solar wind. The encounter between these two wave fronts cancels out both their forward movements and gives rise to the *Van Allen PE fields*..

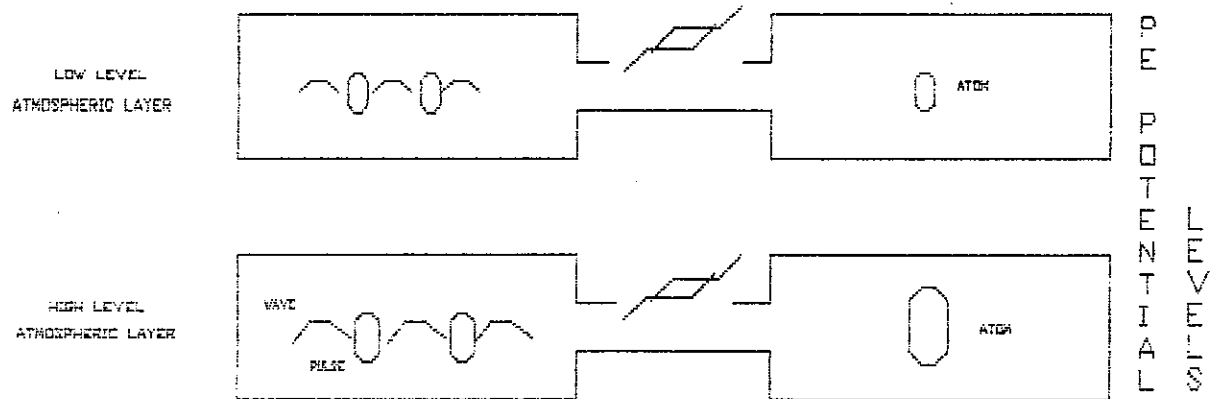
# FUNCTIONAL HARMONICS

## LONGITUDINAL AND PE SPINNING WAVE DYNAMICS



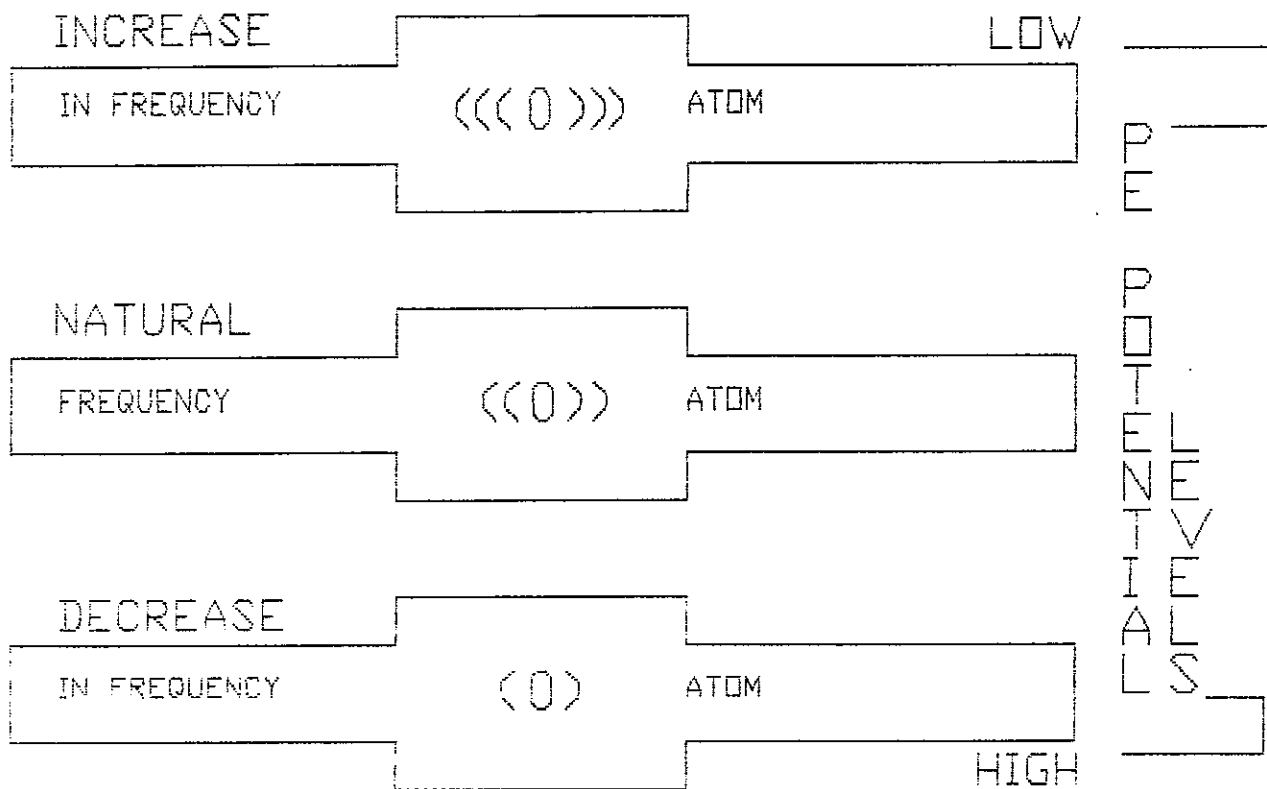
# FUNCTIONAL HARMONICS

## CREATION OF THE ELEMENTS



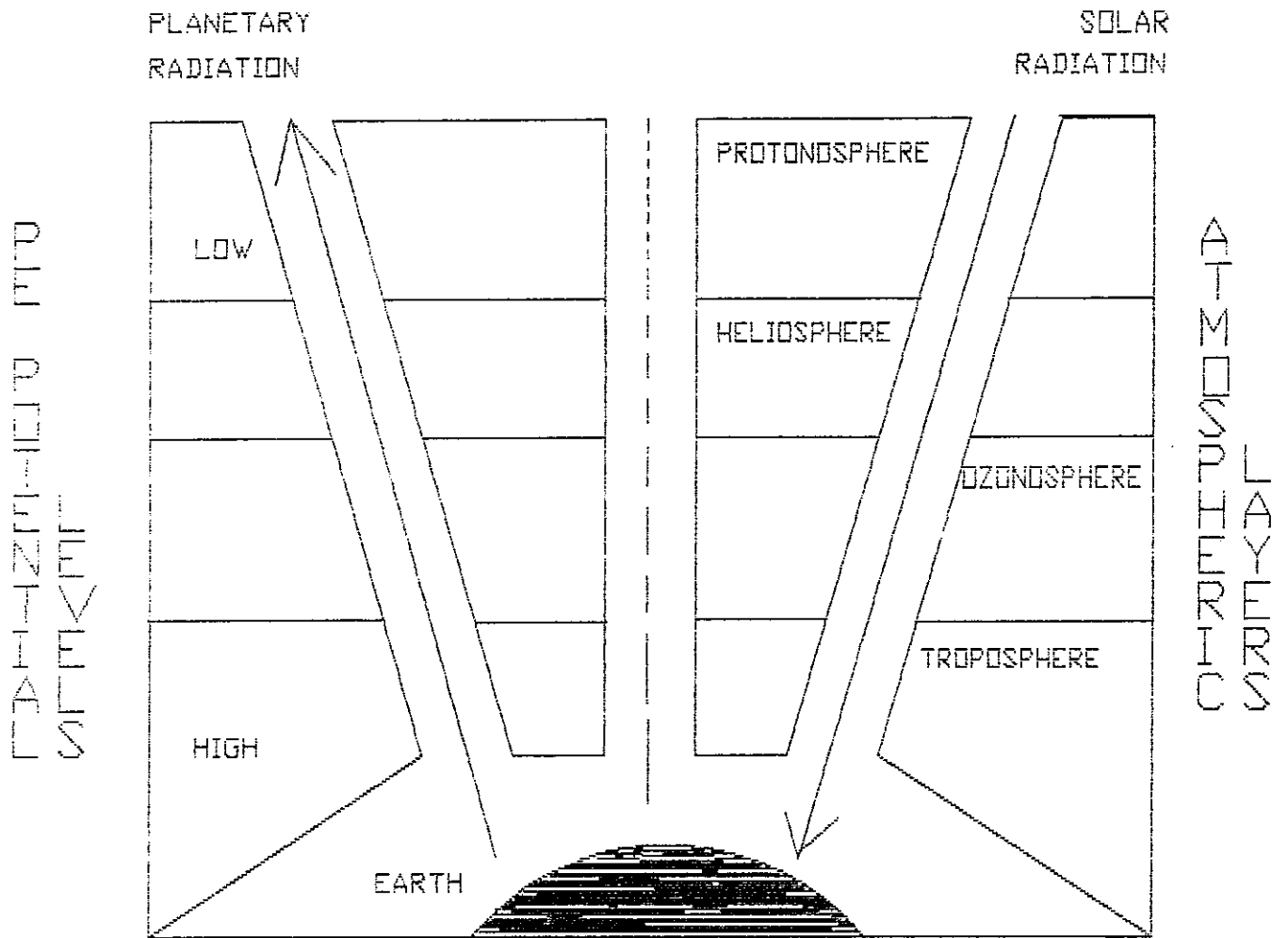
# FUNCTIONAL HARMONICS

FREQUENCY SHIFT  
IN A GRAVITATIONAL FIELD



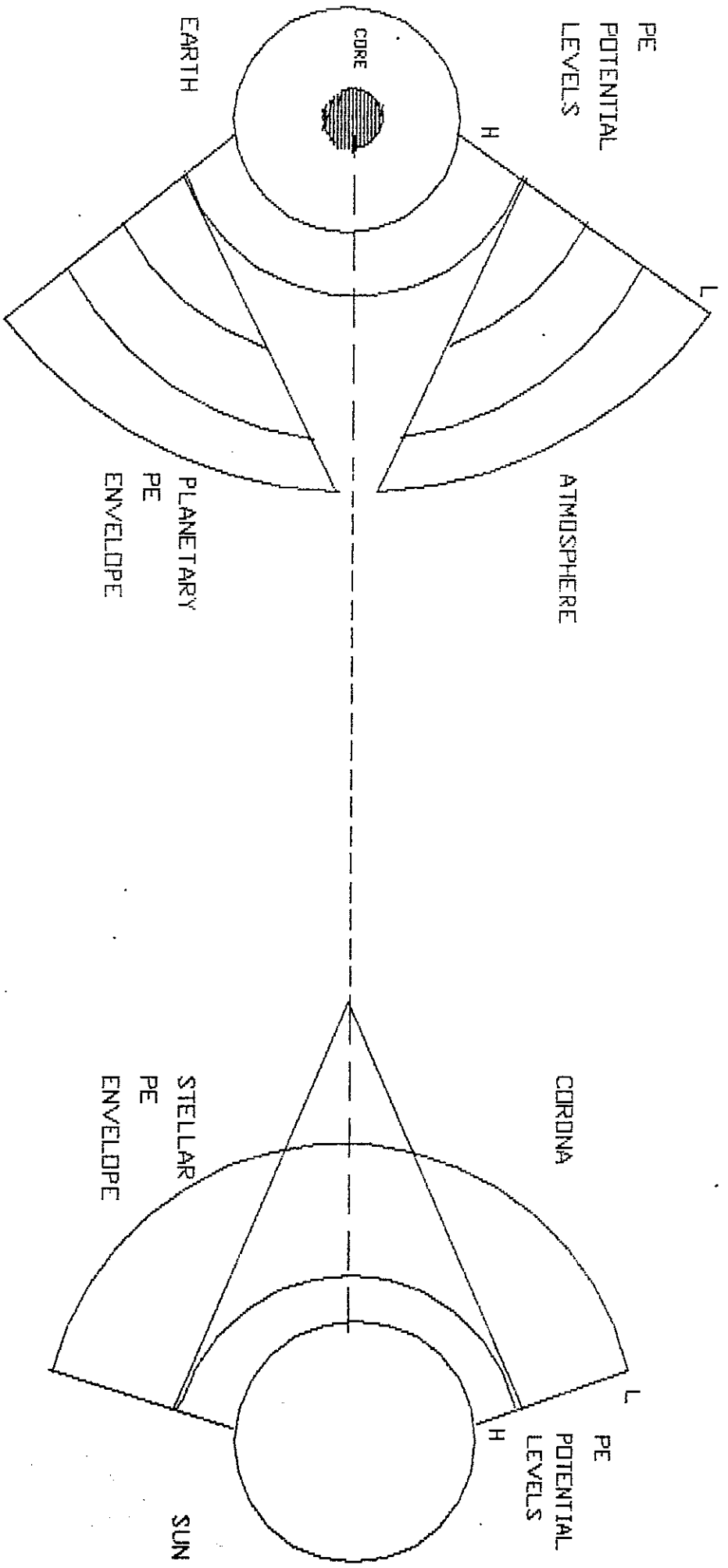
# FUNCTIONAL HARMONICS

## ATMOSPHERE AS A RADIATION FILTER



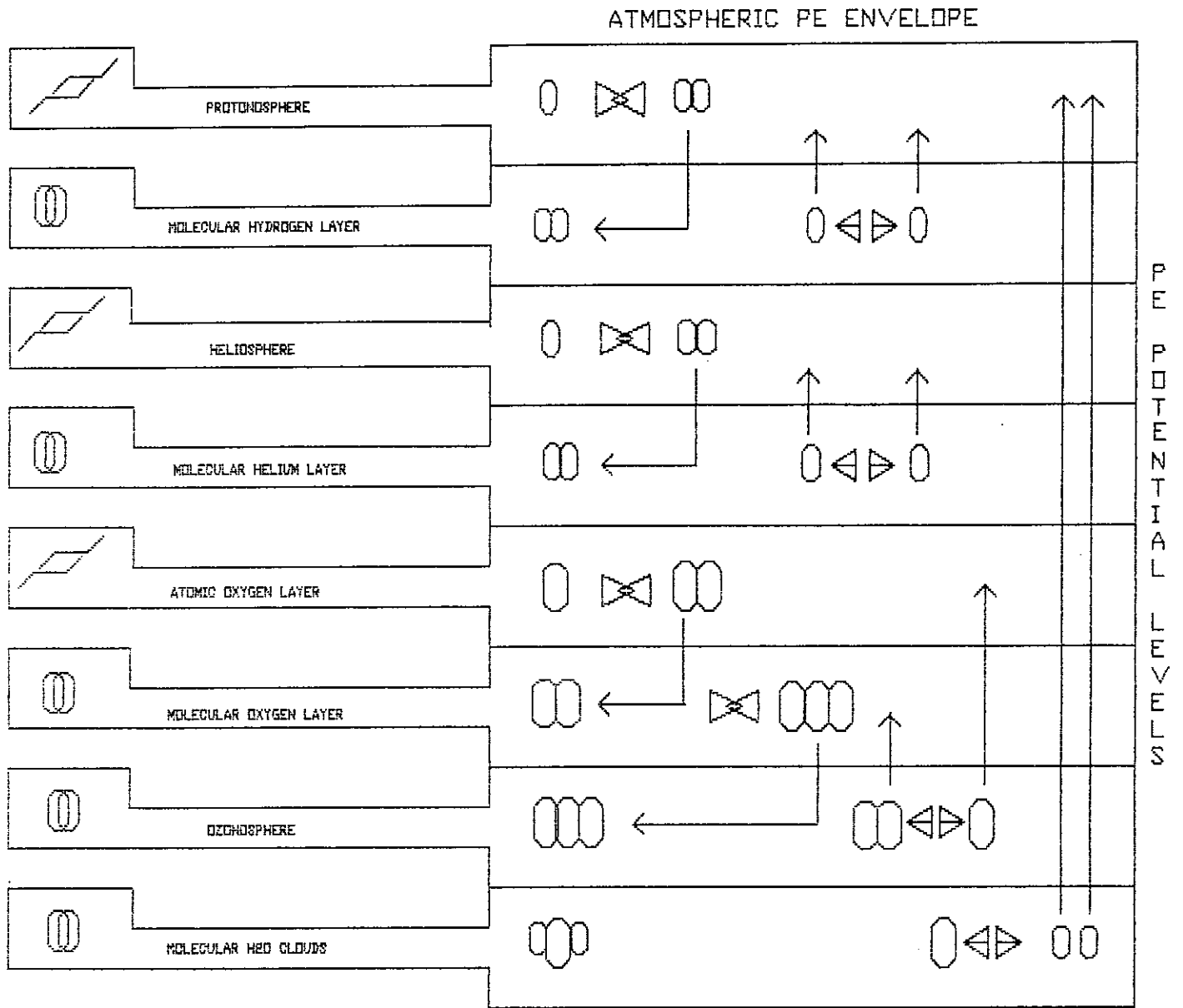
# FUNCTIONAL HARMONICS

## THE DYNAMICS OF METABOLIC SOLAR RADIATION



# FUNCTIONAL HARMONICS

ORIGIN AND EVOLUTION OF THE EARTH'S GASEOUS ATMOSPHERE



PE SPV SUPERPOSITION  
 ATOMIC SUPERPOSITION

MOLECULAR ASSOCIATION  
 MOLECULAR DISSOCIATION

## THE LAYERED ATMOSPHERIC PE ENVELOPE

"The universe is singing and this symphony of frequency is what keeps every part of the universe and every atom in its proper orbit." - T.H. Moray

The atmosphere was, less than a century ago, thought to be simply the mixture of gases that surrounds the physical globe. The reason why this air medium remains suspended above the Earth's surface was and is attributed to gravitational attraction. Early exploratory expeditions into the atmosphere were carried out by manned hot air balloons that rarely reached altitudes much higher than the limits of the troposphere. The scientific data thus gathered disclosed the following:

- a.) The atmosphere's gaseous content thins out with increasing altitude.
- b.) Temperatures drop on the average 3.6 degrees Fahrenheit for each 1,000 foot climb in altitude.

These facts were expected and were welcomed by scientists because they confirmed what had already been verified in regard to the behavior of gases. A smoothly thinning atmosphere fit in perfectly with the observation that molecules of gas move very rapidly and tend to even out differences in both temperature and density. This explanation, for as long as atmospheric investigations were limited to the troposphere, remained satisfactory.

Today, of course, we know that the troposphere is only the first of several atmospheric layers. Whereas this particular layer rises to a maximum altitude of 11 miles at the equator, the outermost boundary of the atmosphere is actually over 600 miles from the planet's surface. A continual rarefaction of gases and a constant drop in temperatures does not occur as one proceeds from the troposphere into the stratosphere. Instead, after temperatures plummet to a minimum of -80 degrees F. at the 'roof' of the troposphere, a steady increase in temperatures occurs in the stratosphere. Indeed, temperatures comparable to those found at ground level are reached in the outer stratosphere. Temperatures decrease in the mesosphere and increase again in the ionosphere. It is this characteristic, namely, difference in temperature, that is currently used to distinguish one layer from the next. Common sense demanded, even before the mechanistic model of a gaseous atmosphere became invalid, that there should be no such sharp transitions or layers. One naturally expected the atmosphere to thin out and finally to merge imperceptibly with outer space. Although a mechanical approach to the layering can describe it in terms of transition zones, densities and thermodynamics, only functional insights into the underlying PE processes that determine this structure can explain such layering.

The Earth, as seen from the vantage point of the space shuttle or an orbiting satellite, could be likened to both a living cell or to a non-living atom that is being viewed through a high magnification microscope. All three entities Earth, cell and atom are PE systems that are composed of a nucleus, periphery and mass-free energy field. When the Earth's PE envelope is brought into sharp focus, the complex structure of this energy field becomes visible. It has been described as follows: The atmosphere is arranged in a succession of halos. These halos are all closest to the planet at the poles. They gradually rise to higher altitudes toward the equator. Their heights vary somewhat from day to day. The luminescent layers expand in the spring and they contract during the winter season.

Lumination as well as pulsation, i.e., alternations between expansion and contraction, happen to be (BFP)s of the Primary Energy. Therefore, the objective, verifiable data cited above testifies to the fact that atmospheric dynamics are governed by PE processes. Geomagnetic field influences do exist but they are very minor in comparison to the well-defined functions of the Earth's PE envelope.

The eminent Danish physicist, Niels Bohr, came up with an explanation of the atom and its functions that seemed so logical that it won for him a Nobel prize. Pertinent to our presentation is Bohr's concept of specific *shells* in which "electrons" orbit around an atom's nucleus. These orbital shells are successive, concentric layers that spread outward from the nucleic center. Every atom, regardless of size (atomic mass) is so structured. If a single "electron" of an oxygen atom is excited, it jumps from the innermost shell, e.g., shell (w), to one of the outer shells, e.g., (x), (y) or (z). Activation by low energy radiation results in a jump from (w) to (x) while activation by high energy radiation may result in a jump from (w) to (z). The degree of the electron's stimulation determines the extent of the jump. Orbital shells, in effect, express an "electron's" energy level. This brings us to a functional model of the atom.

I demonstrate in my book, **KEY TO THE UNIVERSE**, that an attraction between the negatively-charged "electrons" and the positively-charged "protons" of an atomic nucleus does not occur. *Particulate* electrons that move from shell to shell do not exist. Instead, the orbital shells themselves constitute energy levels. We assume that an atom's PE field consists of a series of graduated (PE potential levels increase toward the nucleus) mass-free energy *layers*. The cohesion of the PE system, atom, is governed by the PE potential principle, i.e., the weaker PE field remains attracted to the strong nucleus. Bohr's orbital shells were still tied to the old planetary model of the atom in which planets (= electrons) are attracted to and revolve around the sun (= nucleus). *A new planetary model of the atom*, which is based upon the observable bio-energetic functions of the Earth and of its layered atmospheric PE envelope, can become a practical tool that could revitalize all branches of knowledge. *The recognition of the functional identity of macrocosmic and microcosmic PE processes is the key to the future.*

#### THE DEVELOPMENT OF ATMOSPHERIC LAYERS

Given: A planet with a PE field in which no gaseous atmosphere is as yet suspended. High concentrations of energy are encountered near to the physical globe's surface. Lower and lower concentrations of PE are met with as the outer extremes of the mass-free energy field are reached. In other words, predictably and 'lawfully', the PE potential layers of this PE field gradually decrease with altitude.

(Note: Offered here are a more or less static set of circumstances. The actual formation of a gaseous atmosphere surely coincides with the genesis of the material planet. These 'ideal' conditions are given so that we can isolate and focus in on the specific PE functions that are at work in such a developmental process.)

The forward movement of solar radiation, i.e., of PE SPWs, within and



through a planetary PE envelope, in which no gaseous atmosphere is present, produces no heat. A random motion of particles (= heat) simply does not occur in such a completely mass-free PE field. As solar radiation progresses from lower to higher PE potential levels, temperature differences between energy layers are not produced. However, the passage of these PE SPWs from low to high energy concentrations generates the following transformations:

- 1.) An increase in the PE SPW wavelength
  - 2.) A decrease in PE SPW metabolic rate (= frequency)
  - 3.) A decrease in PE SPW velocity
  - 4.) An increase in the size (=capacity level) of the PE SPW pulses
- This interdependence between PE SPW motion and environment and the 'lawful' relations among the various functions has already been adequately discussed. These aspects should be kept in mind as we delineate the *evolution* of a gaseous atmosphere.

The relatively uniform, low PE potential levels that characterize open space are conducive to the generation of high velocity solar radiation. High velocity PE SPWs are always expressed in the form of rectilinear forward movement. A planet's PE envelope, in sharp contrast, is a whirling vortex of concentrated energy. *If the PE currents that travel between sun and planet are analogous to fast flowing water, then the PE envelope is comparable to a huge eddy in that stream.* Observation of water reveals the fact that numerous smaller eddies are spawned within the confines of a large eddy. Likewise, the rotating PE envelope provides an environment in which countless 'energy eddies' are generated. Whereas neither the divergence from a linear trajectory nor the convergence of two or more PE SPWs is likely to occur in open space, precisely such SPW processes are facilitated and encouraged within a swirling PE field. Hence, the existence of this dense, whirling PE field is the prerequisite for the *superimposition process*, i.e., for the transformation of mass-free energy into matter.

The PE SPW cycle reveals how temporary, discontinuous pulses (= *quanta*) are constantly engendered during a SPW's forward movement within and through a PE substratum. Superimposition is the process in which the temporary quanta of two or more SPWs converge, merge and begin to rotate on the spot and are thereby transformed into a permanent quantum.

Let us divide the planetary PE field into two successive, concentric mass-free energy layers. The outer one is designated layer (B) and the inner one (closest to the planet) is layer (D). Layer (B) constitutes a low PE potential level while layer (D) is a high PE potential level. PE SPWs that superimpose in layer (B) are characterized by:

high frequency  $\neq$  high velocity  $\neq$  small quanta

Those PE SPWs that superimpose in layer (D) are characterized by:

low frequency  $\neq$  low velocity  $\neq$  large quanta

This difference in PE SPWs is directly reflected in the 'elementary particles' that are engendered in the respective layers.

A transformation of mass-free energy into matter coincides with the following functional changes:

- a.) Temporary PE SPW quanta into a permanent capacity level
- b.) Frequency (time required for the SPW charge > discharge process) into metabolism, i.e., the rate of a particle's absorb > emit process.

c.) PE SPW linear velocity into an elementary particle's *spin* (= angular momentum)

The capacity level (size) of the elementary particle that is created by the superimposition of two SPWs in layer (D) will be greater than the capacity level that is created by the superimposition of SPWs in layer (B). Two large SPW quanta necessarily yield a greater capacity level than do two smaller SPW quanta. These particles that emerge within their specific energy layer are complete, functional PE systems. They correspond to the chemical elements and the atoms known to classical and contemporary physics. Superimposition within layer (B) generates elementary particles that are characterized by:

high frequency  $\neq$  fast spin  $\neq$  small capacity level

Superimposition within layer (D) generates elementary particles that are characterized by:

low frequency  $\neq$  slow spin  $\neq$  large capacity level

The Newtonian concept of gravity, i.e., action-at-a-distance attraction, and the Einsteinian concept of gravity, i.e., "force-free" motion in "curved space", dictate that:

a.) A larger mass attracts a smaller mass.

b.) The closer together two masses are, the stronger the attraction.

If the *modus operandi* of gravity were as is stated above, then as soon as miniscule particles are formed in the PE envelope they would come under the attractive influence that is exerted by the gigantic mass of the planet. However, in our functional model of a two layer atmosphere, the elementary particles (atoms of gas) that emerge therein completely defie the 'gravitational pull' of the massive globe. Instead of 'gravitating' down toward the planet, these particles remain suspended within the confines of their respective layers. In order to understand an elementary particle's attraction to and suspension within an energy level, one has to become conversant with the following facts:

1.) *GRAVITY is a localized function.*

2.) Gravity is a function of the interaction between mass-free energy fields.

3.) GRAVITY  $\neq$  VIBRATION

Before these insights can be applied, the question of *natural frequency* has to be addressed. Just as each elements possesses a different atomic mass, so too every elements also possesses its own unique natural frequency. *Natural frequency* can be defined as being: The specific frequency (= rate of the absorption > emission energy metabolism) that characterizes an element. It may also be defined as being a *ground state*. A mass-free energy layer is not a static region. Motility, in the form of wavy movement and pulsation, is an indigenous property. Therefore, *the layers of the planetary PE field also possess distinctive frequencies.* Layer (B) is a low PE potential level, i.e., low energy concentration and weak tension prevail here. Layer (B) is characterized by high frequency. Layer (D) is a high PE potential level, i.e., high energy concentration and strong tension prevail here. Layer (D) is characterized by low frequency.

The atomic mass of hydrogen (H) is less than the atomic mass of helium (He). Translated into the language of a PE system, hydrogen's capacity level is lower than helium's capacity level. Consequently, we can designate hydrogen as being the elementary particle that is generated in

layer (B) while helium is generated in layer (D). The suspension of hydrogen and helium atoms within the confines of their respective layers unequivocally demonstrates the local nature of gravitational attraction.

All PE systems inherently tend to function in dynamic equilibrium with the particular PE environment in and from which they are originally engendered. Therefore, a spontaneous tendency on the part of either hydrogen or helium to 'gravitate' down towards the planet does not occur. Hydrogen's natural frequency *resonates* in harmony with the frequency of layer (B). Helium's natural frequency *resonates* in harmony with the frequency of layer (D). *Mass to mass attraction does not enter into the picture at all!* An elementary particle's pulsatory PE field and the atmosphere's energy level form a *resonance bond* which makes the suspension of mass within a mass-free energy field possible. This *interaction between two mass-free PE fields* demonstrates the fact that gravitational attraction is a field (= vibrational) function.

The superimposition of PE SPWs within the planetary PE envelope is an ongoing process. The countless individual hydrogen and helium atoms thereby generated steadily accumulate within their respective PE environments. Eventually, 'shells' of concentrated elementary particles evolve. The existence of distinct hydrogen and helium 'shells' allows us to speak in terms of atmospheric layers. There were, prior to their formation, only graduated (low to high) PE potential levels. These energy levels were not characterized by the observable temperature differences that are now evident in atmospheric layering. Heat, i.e., the random motion of particles, is produced only after sufficient quantities of atoms are present within a PE field. The excitation of a field, i.e., the mass-free energy matrix in which atoms are suspended, by a field, i.e., the incoming solar radiation, results in an increased motion of particles.

Since the production of heat is dependent upon the degree of particulate concentration (which corresponds to the degree of PE field density), two higher PE potential layers, that are flanked by lower PE potential levels, have evolved. Our simple two-layer model has been transformed into a more complex multi-layered atmospheric PE envelope. If we designate the outermost concentric layer, layer (A), we have the following sequence:

Layer (A) Low PE potential level between the hydrogen layer and open space  
Layer (B) Hydrogen layer  
Layer (C) Low PE potential level between the hydrogen and helium layers  
Layer (D) Helium layer  
Layer (E) Low PE potential level between the helium layer and the planet

This configuration of higher PE potential layers that are flanked by low PE potential levels 'lawfully' develops. The strong hydrogen and helium layers attract and withdraw energy from the adjacent weaker layers. Temperature differences among the various layers develops hand in hand with the emergence of the gaseous contents of the atmospheric PE envelope.

#### TRANSFORMATION OF ATOMS INTO MOLECULES

Given: A PE potential level in which the superimposition of PE SPWs generates the elementary particle, oxygen.

The elementary particles that emerge within the confines of this atmospheric layer are always in the form of single units, viz., atomic oxygen (O-1). A constant production and steady accumulation of these oxygen atoms eventually creates the conditions under which so-called "chemical reactions" are likely to occur. The preliminary stage is, of course, the aggregation of numerous atoms within an oxygen layer. The presence of dense aggregations of oxygen within a concentrated energy field is the precondition for a transformation of atoms into molecules. Both the close proximity of atom to atom, which is necessary before the bonding process can take place, and the intense, highly excitable energy field now exist. In order for "chemical reactions" to commence under such favorable circumstances, only a catalyst is needed.

The mechanistic interpretation of the "chemical" bonding process reads: When a volume of gas, oxygen, is activated by a catalyst, e.g., heat, the individual atoms absorb energy. The heightened temperature of these atoms causes a significant increase in their kinetic energy. This increased motion, in turn, causes substantial quantities of oxygen to come into close proximity to one another. Upon *collision*, a pair of oxygen atoms combine to form molecular oxygen, (O-2).

Our functional explanation of "chemical" bonding is, as usual, based upon the PE dynamics that underlie all mechanical phenomena. To begin with, the catalyst (= source of excitation) that triggers the bonding process in the various atmospheric layers is not heat but rather solar radiation. Since solar radiation does not constitute a transference of heat from the sun, "heat energy" is not absorbed by individual oxygen atoms. Indeed, the need to increase the motion of particles in order to make possible the "collisions" that result in a bonding of atoms does not even arise in the functional process. Solar radiation is neither absorbed nor converted during its propagation through an atmospheric layer. Solar radiation merely *excites* the field in which oxygen atoms are already closely held together. An ongoing emergence and accumulation of oxygen atoms generates a more and more concentrated energy field. The denser the PE field, the greater its tension and the more responsive to excitation it becomes. Incoming solar radiation, therefore, increases the pulsation of the oxygen layer. In other words, the catalytic function of solar radiation consists in the stimulation of pulsation in the energy field. A transformation of two separate, individual oxygen atoms into an oxygen molecule (O-2) constitutes, like the transformation of PE SPWs into an elementary particle, a superimposition process. Superimposition is initiated when the PE fields of two atoms establish contact. This PE field contact is facilitated by pulsation, that is, each contraction of the energy field literally squeezes atoms closer together. Briefly, the atomic superimposition process consists of:

- a.) Contact (field to field) between two individual atoms
- b.) Mutual excitation
- c.) Generation of charge
- d.) Resonant (field to field) bond formation
- e.) Discharge of excess energy
- f.) Oxygen molecule (O-2)

( Note: The functional view of "chemical" bonding is based upon the PE potential principle. A stronger PE system attracts a weaker PE system. In this case, the tendency for oxygen atoms (PE systems of *equal strength* to approach one another is absent. Therefore, contact is facilitated by solar radiation. )

## THE DEVELOPMENT OF A MOLECULAR ATMOSPHERIC LAYER

The figure entitled, The Layers of the Atmosphere, shows a schematic of Earth and its atmosphere. I have, for the purposes of our discussion, divided the PE envelope into seven successive, graduated PE potential levels and four distinct atmospheric layers. The conventional designations for the atmospheric layers are: troposphere, stratosphere, mesosphere, ionosphere and exosphere. What I depict as being a *protonosphere* is actually the layer of hydrogen that exists at the outer edge of the exosphere. A *heliosphere*, i.e., a layer of rarefied helium, actually occurs at altitudes of between 200 and 600 miles up in the exosphere. The *ozonosphere* is, of course, the layer of ozone (O-3) molecules that exists within the stratosphere.

The hydrogen and helium layers that are present within the Earth's extensive PE envelope are clear-cut examples of atomic layers. The protonosphere constitutes the PE potential level wherein elementary particles, hydrogen atoms, are engendered. The heliosphere constitutes the PE potential level wherein elementary particles, helium atoms, are engendered. The ozonosphere is composed of oxygen molecules, that is, ozone (O-3). Since the superimposition of PE SPWs generates only atomic entities, the presence of a molecular layer within the atmosphere requires a different explanation. An oxygen layer in which "chemical" bonding takes place has already been described. We start her in order to trace how and why a molecular layer evolves.

To repeat: A PE system tends to function in dynamic equilibrium with the particular PE environment in which and from which it is originally engendered. The PE system's natural frequency functions in harmony with the frequency of a PE potential level. A PE system's pulsatory field and the pulsatory energy level form a resonance bond which makes the suspension of mass within a mass-free energy field possible.

The PE system, oxygen molecule (O-2), does not originate from the PE substratum in which it suddenly finds itself. Instead, the superimposition of two oxygen atoms has produced a PE system that is characterized by:

- A larger capacity level than that possessed by an oxygen atom
- A lower frequency than that possessed by an oxygen atom

Hence, the natural frequency of an oxygen molecule functions in *disharmony* with the frequency of the PE potential level. Since the formation of a resonance bond is precluded under such circumstances, the attraction of the oxygen molecule to the mass-free energy field, in which it has suddenly found itself, is impossible. Viewed in terms of 'weight' (capacity level), the *density* and *tension* extant within this atmospheric layer are insufficient to keep a 'heavy' molecule suspended. Consequently, (O-2) molecules drop out of this particular PE environment, i.e., they move toward a PE potential level wherein they can function in dynamic equilibrium. Eventually, they encounter, at some distance below the (O-1) layer, PE potential levels whose functional dynamics are compatible with their own. Here a subsequent accumulation of these oxygen molecules gives rise to an (O-2) layer.

An atmospheric layer composed of molecules is, in comparison to a layer that consists of atoms, relatively unstable. On the one hand, the hydrogen and helium atoms are *attuned*, so to speak, to the highly energetic solar

excitation that prevails within their respective PE potential levels. Although some of these atoms do combine to form molecules, individual elementary particles are not subject to dissociation. This population of stable atoms guarantees the continued existence of a well-defined atomic layer. On the other hand, oxygen molecules (O-2) are always subject to dissociation. The *field to field resonance bond* that holds two oxygen atoms together can readily be disrupted. Once the PE field tension, i.e., the tension that keeps a molecule intact, weakens; the individual atomic components will spontaneously separate.

An ongoing dissociation process results in a mixture of oxygen *atoms* and oxygen *molecules*. The liberated atoms, now in a situation analogous to that which confronts molecules in an atomic layer, suddenly find themselves within a PE potential level that neither attracts them nor keeps them suspended. Like a molecule, the atom tends to function at its natural frequency. This is impossible for a high frequency atom that is now within the confines of this dense, low frequency PE environment. A self-active atom, under such circumstances, is similar to a metal spring that is being compressed by external pressure. Just as the spring actively pushes in order to stretch out to its full length, the oxygen atom proceeds toward the lower PE potential level that will allow it to function in dynamic equilibrium. Instead of descending (as is the case in an oxygen molecule's migration *down* from the atomic layer) the oxygen atom *ascends*. A downward movement of these atoms does not and *cannot* occur. ( Note: Details of an atom's self-active, self-generated upward movement are available in **KEY TO THE UNIVERSE**. )

While some oxygen atoms no doubt pass unhindered through the (O-2) layer, most of the atoms encounter oxygen molecules with which they readily combine to form (O-3). The "chemical reaction" that transforms an oxygen atom (O-1) and an oxygen molecule (O-2) into an ozone (O-3) molecule is governed by the PE potential principle. Attraction spontaneously occurs, provided that field contact has been established, whenever a field potential difference exists between two distinct PE systems. Once field contact is established, *the weaker atom is attracted to the stronger molecule*. The two PE systems superimpose and remain united by the formation of a resonance bond. The large ozone molecules thus engendered suddenly find themselves in a PE potential level that neither attracts nor is able to keep them suspended. Consequently, (O-3) molecules *descend* to a PE environment whose functional dynamics are compatible with their own. There, an accumulation of these molecules results in the formation of an *ozone layer*. An atmospheric ozonosphere has developed.

#### TROPOSPHERE: THE "SPHERE OF CHANGE"

Protonosphere, heliosphere and ozonosphere are all definable in terms of their respective atomic or molecular contents. Those layers constitute permanent aggregations or gaseous particles that exist at specific altitudes within the Earth's PE envelope. Contrariwise, the troposphere cannot be defined in terms of the existence of a *permanent, homogeneous* gaseous layer. The troposphere, unlike the other relatively stable atmospheric layers, is a turbulent region. The presence of huge quantities of active nitrogen, oxygen and carbon molecules within the troposphere's boundaries prohibits the emergence of any rigid stratification. The uniform PE potential levels that characterize the hydrogen, helium and

ozone layers are absent within a region where an admixture of diverse particles predominates. Although tropospheric PE potential levels do change (from higher to lower) with altitude; this PE stratification corresponds to the decrease in density of the *heterogeneous* gas content in that upward direction.

The formation of clouds within the troposphere can be compared to the emergence of a molecular atmospheric layer. A *cloud* is defined as being: An aggregation of water vapor molecules that are suspended and attracted within a concentrated PE field. This definition could, of course, be just as easily be applied to an atmospheric layer. *Cloud formations*, since they are constantly generated and then dissipate again, are, in effect, *temporary layers*. The functional process that generates clouds reveals obvious similarities between the *temporary* and *permanent* atmospheric layers. Hence:

An area or pocket of concentrated PE forms in the otherwise evenly distributed atmospheric PE field. This high PE potential level arises, for example, due to a more intense solar excitation of this area. The creation of a PE potential difference now brings the PE potential principle into effect, i.e., mass-free energy is attracted (*drawn*) from the surrounding weak PE substratum to the strong PE pocket.

Water molecules, which are usually diffusely distributed in the air and which function as separate PE systems with no tendency to combine, are suddenly drawn into the energy currents that flow into the high PE potential pocket. Therefore, a confluence of mass-free energy is accompanied by a confluence of water vapor. A steady accumulation of water vapor within the pulsatory PE field compacts individual (H<sub>2</sub>O) molecules into dense aggregations. Every *contraction* of the pulsatory PE field literally squeezes, fuses contiguous water molecules into large raindrops. The cloud formation grows and expands. It continues to grow for as long as the influx of energy persists and there is sufficient water vapor in the vicinity.

The main difference between the temporary and permanent layers is that the bonding process that occurs in the latter results in the creation of new molecules whereas the combinations of water vapor that occur in the former yield only larger and larger water droplets. However, the departure of newly formed molecules from an energy matrix that neither attracts nor suspends them is wholly analogous to the fall of water molecules in the form of raindrops. Hence, rain occurs and clouds dissipate when the tension and concentration of the PE field is no longer high enough to keep water molecules suspended.

To summarize:

- 1.) Atmospheric layers develop within the framework of Earth's mass-free energy field = PE envelope.
- 2.) PE potential levels are, in essence, "orbital energy shells". These levels decrease with altitude, i.e., high PE potentials are met with close to the planet while low PE potentials are found toward the PE envelope's outer extremes.
- 3.) The elementary particles are generated by the superimposition of two

or more PE SPWs. A small capacity ("light weight") atom is engendered within a low PE potential level. A large capacity ("heavy weight") atom is engendered within a high PE potential level.

- 4.) Protonosphere and heliosphere constitute the "shells" wherein the PE systems, hydrogen and helium, continually emerge. The resonance bond between PE system and PE potential level keeps hydrogen and helium atoms attracted and suspended within their respective layers. The ongoing PE SPW superimposition process guarantees the permanent existence of these atomic layers.
- 5.) The "chemical reactions", i.e., the association of individual atoms to form molecules, are activated by solar radiation once enough atoms have accumulated within an atmospheric layer. Newly formed molecules suddenly find themselves in a PE potential level that neither attracts nor is able to keep them suspended. Consequently, molecules *descend* from the atomic layer.
- 6.) The ozonosphere is a molecular atmospheric layer. It is not generated by PE SPW superimposition. The ozonosphere has evolved as a result of the descent of (O-3) molecules into this PE potential level, a level that is compatible with the functional dynamics of ozone. The "chemical reaction" most common to the ozone layer is the dissociation of the (O-3) molecule into an (O-2) molecule and an individual oxygen (O-1) atom. These liberated components of ozone both find themselves in an incompatible PE environment. Therefore, the "light weight" PE systems *ascend* to those PE potential levels wherein they can function in dynamic equilibrium.
- 7.) The troposphere, a volatile region that is composed of a mixture of various gases and their compounds, contains no *permanent*, homogeneous atomic or molecular layers. Nevertheless, the clouds, that constantly form and then disperse again, can, in every respect, be considered as being *temporary* atmospheric layers.

#### THE FUNCTIONAL TRANSFORMATION OF SOLAR RADIATION

Mechanistic science recognizes the practical importance of the Earth's various atmospheric layers, i.e., the fact that they function as complex screens and filters. The atmosphere has been described in terms of a translucent skin that protects the planet from the raw impact of solar radiation. The upper atmosphere, especially the ozonosphere, is viewed as being a molecular layer that shields life, i.e., the *biosphere*, from the harmful effects of high energy ultraviolet radiation. It is assumed that ozone (O-3) gas molecules effectively absorb and thus deplete solar energy as it passes through the atmosphere. Indeed, ozone is so efficient in its absorption of short wavelength EM radiation that virtually no UV radiation is transmitted to Earth. Ozone "captures" UV radiation and converts it into heat and "chemical energy". The mechanist views the atmosphere as being an energy-free domain populated by atoms, molecules and "ions". "Heat energy", "chemical energy" and "light energy" all have to be transported into the atmosphere via solar radiation.

The functionalist knows that the atmosphere is essentially an energy field in which particles are suspended. Heat, light and "chemical energy"



is generated within (not transported to) the Earth's PE field. Solar radiation is merely the source of the field to field excitation that produces lumination, an increase in the random motion of molecules, etc. The mechanist postulates a 'cause and effect' relationship between matter and energy to describe how the atmosphere influences solar radiation. The functionalist understands that the atmospheric influence upon high energy radiation is governed by the interdependence and interaction between PE SPWs and the mass-free PE field of Earth.

The electromagnetic theory of solar radiation divides it into discrete high and low energy packets, i.e., ultraviolet and infrared photons, that are transported intact from the sun to the Earth. When a UV photon collides with an ozone molecule it is absorbed. When infrared photons collide with the water molecules in clouds or with the planet's surface they are likewise absorbed. The absorption and depletion of solar energy is thus accounted for.

The figure entitled, Atmosphere as Radiation Filter, demonstrates the following:

- 1.) Solar energy is transmitted to the Earth in the form of PE SPWs.
- 2.) High energy solar radiation is equivalent to high velocity PE SPW forward movement. Low energy solar radiation is equivalent to low velocity PE SPW forward movement.
- 3.) The PE SPW cycle is a metabolic process, i.e., the metabolic rate (= frequency) of solar radiation is dependent upon the interaction between SPW and PE substratum. The frequency of a PE SPW decreases as it moves forward from a lower into a higher PE potential level.
- 4.) Graphically depicted in the figure is the fact that changes in the wavelength (= frequency) of solar radiation correspond to the transitions from one PE potential level to another. Since change in wavelength and frequency is equivalent to change in velocity, the high speed SPW of open space changes into the slower speed SPW that is generated within the atmosphere.
- 5.) The functional transformation of PE SPW motion within PE potential levels (not the absorption and conversion of solar radiation into "chemical energy" and heat) constitutes the 'filtration' function of the atmospheric layers.
- 6.) The first atmospheric 'filter' of high energy solar radiation is alleged to be the 'ionized' layer of oxygen (= ionosphere) that lies directly above the ozonosphere. In the figure we see that the protonosphere and the heliosphere are actually the first 'filters'.
- 7.) All matter is permeable to PE SPWs. Neither the gaseous contents of the atmosphere nor the Earth's solid mass obstructs or depletes solar radiation. Solar energy penetrates the planetary crust and reaches the core.
- 8.) This solar energy charges the Earth's metallic core and is then forthwith reflected by it. PE SPW emission from the core constitutes planetary radiation.

- 9.) The figure illustrates the fact that the outgoing planetary radiation *reverses* the process of the incoming solar radiation. The wavelength of a PE SPW *decreases* with forward movement from the Earth's core to open space. Low velocity PE SPWs are generated in the atmosphere proper (= troposphere) while higher speed PE SPWs develop farther out.
- 10) A continual incoming and outgoing ( charge > discharge ) of Primary Energy is the basis for Earth's dynamic *radiation equilibrium*.

#### THE DISTRIBUTION OF OZONE

The ozone layer is not a completely uniform stratum. The number of (O-3) molecules that are found over different global sectors varies. The largest total quantities of ozone are always present at the higher latitudes. It is observed, for example, that on a typical day the amount of ozone over Minnesota is 30% greater than over Texas. These facts are hard to reconcile with the following mechanistic scenario: High energy UV radiation collides with oxygen molecules (O-2) and breaks them down. Newly liberated, single oxygen atoms (O-1) combine with intact oxygen molecules to form ozone. Since the splitting of (O-2) molecules depends directly upon the intensity of the solar energy; the greatest rate of ozone production occurs over the tropics. Therefore, ozone, according to this scenario, should be more abundant in the tropics than in the temperate zone. However, since the opposite is true, another explanation had to be found. Hence, "wind circulation patterns" have been injected into the ozonosphere. It is these "winds" that are supposed to ferry the ozone-enriched atmosphere away from the equator.

The functional comprehension of ozone distribution is as follows: The ozone layer does not occur at the same altitudes around the globe. Instead, its position follows the same profile as does the altitude of the troposphere. As such, the ozonosphere lies closest to the Earth over the poles and rises to a maximum height over the equator. Field to field interaction between the Earth's PE envelope and solar radiation excites the atmospheric energy matrix, i.e., it expands as a whole. The extent of this expansion is dependent upon the degree of excitation. The intense solar radiation that prevails at the equator excites maximum expansion there. The much less intense solar radiation that prevails at the poles excites minimum expansion there. As a direct consequence, the altitude of the ozonosphere, which is held suspended within the PE envelope, gradually diminishes from the equator toward the poles. It is required, before the bonding process that engenders ozone can take place, that:

- a.) There be a sufficiently large aggregation of both oxygen atoms (O-1) and oxygen molecules (O-2) within the PE field.
- b.) Contact ( field to field ) between these components of ozone must be established.

The individual molecules and atoms within an *expansive*, diffuse energy field are farther apart than are the molecules and the atoms within a more *contractive*, dense energy field. *Contact is much more easily established in a contractive than in an expansive atmospheric PE envelope.* Therefore, ozone is naturally produced more readily and in greater amounts within the contractive ozone layer that exists above the temperate latitudes.

## ATMOSPHERIC REFLECTION OF SOUND WAVES

The upper portion of the ozone layer possesses a mysterious property: it reflects sound waves. It is assumed that this reflection is caused by thermodynamics, i.e., the existence of a "heat barrier". Just as the ozone layer, a particulate 'belt' that would measure a mere eighth of an inch thick if it were to be compressed, cannot be assigned the task of protecting the *biosphere* from harmful radiation; a "heat barrier" is an unlikely cause for sound wave reflection. The fact is that the ozonosphere is held suspended within the confines of an energy field. Since controlled, repeatable experiments reveal that a *strong PE field can disrupt and impede even EM wave propagation*, the functional view is: When sound waves encounter the ozonosphere's high tension, concentrated PE field, they are reflected.

## LONG DISTANCE RADIO TRANSMISSIONS

A radio station's ability to transmit over long distances is attributed to the atmospheric reflection of EM waves. The ionosphere, where it is assumed that (O-2) molecules are dissociated into single oxygen atoms ("ions") by high energy ultraviolet radiation, has been identified as being the reflective layer. The ionosphere is said to be populated by numerous positive (+) "ions" and "loose electrons". On the one hand, "loose electrons" are able to *reflect* radio waves which explains why broadcast stations far away can be heard *at night*. On the other hand, *during the daytime*, long distance radio transmission is not so good because there is just too much "ionization" within the lower ionosphere, i.e., "loose electrons" now *absorb* the radio waves on their way up to the reflecting layer.

This reflection at night and absorption during the daytime of radio waves by "loose electrons" seems to be a very nebulous and confusing hypothesis. These phenomena are easily understandable one it is recognized that EM radiation is affected by high concentrations of Primary Energy. During the daytime, the Earth's PE envelope, as a whole, and the atmospheric layers, individually, are triggered into *expansion* by solar radiation. At night, this atmospheric PE envelope, in the absence of solar excitation, *contracts*. An expansive PE envelope constitutes a more even, diffuse distribution of mass-free energy than does a contractive PE envelope. During the daytime, EM waves pass through the diffuse PE field. At night, radio waves are reflected by the contracted, dense PE field of the "ionospheric" layer.

## TEMPERATURE DIFFERENCES WITHIN THE ATMOSPHERE

When one reads a standard science or meteorology textbook, the following statements are often met with:

- a.) It is a curious fact that the *coldest* temperatures are found about 50 miles over the tropics.
- b.) The *hottest* temperatures occur above the frozen arctic lands where a band of diffuse and active matter flickers and glows by its own fluorescent light.

Solar radiation is most intense in the equatorial regions, i.e., infrared EM radiation (= "heat energy") is received in the greatest abundance here.

The existence of the coldest temperatures above these tropical latitudes seems very peculiar and is incomprehensible to the conventional scientist. Here we are confronted with the difference between:

- a.) Mechanistic view: "Heat energy" is transported from the sun to the Earth.
- b.) Functional view: Solar excitation of an *in place* planetary energy field, in which quantities of matter are suspended, generates heat.

The world's coldest temperatures occur in what is usually referred to as the mesosphere. This mesosphere, specifically the mesopause, is a transition zone. It is a low PE potential level that is sandwiched in between two major atmospheric layers. Above it lies the "ionosphere" (the high PE potential (O-2),(O-1) layer) while below lies the stratosphere, that is, the high PE potential (O-3) layer. Both of these high level flanking layers withdraw, in accordance to the PE potential principle, energy from this low level transition zone. Whereas countless particles are held suspended within their concentrated energy fields, very little matter exists within the weaker, diffuse PE field of the mesosphere. Hence, high temperatures are generated above and below this 'cold' transition zone. The intense solar excitation that is prevalent in the tropics produces maximum strength atmospheric layers and a correspondingly minimum strength transition zone. This set of circumstances dictates that the *coldest temperatures* will occur precisely above these tropical latitudes.

Solar radiation is least intense in the polar regions. The existence of the *hottest temperatures* above the arctic latitudes stymies the mechanist. Again, the functional insight, excitation of an energy matrix in which particles are suspended generates heat, explains the situation. Hence, maximum field excitation at the poles is generated by the interactions that take place between an extremely contracted, dense atmospheric PE envelope, solar radiation and the polar magnetic field.

Finally, the statement, "active matter flickers and glows by its own fluorescent light", has to be addressed. The light that is observed above the poles, in the form of *undulating, pulsating auroras*, is not a function of matter. Atmospheric lumination, like heat, is generated by field to field interactions.

## ADVENT OF A BIO-ENERGETIC COSMOLOGY

"Matter" and "particles"... we are finally getting away from these concepts as primary constituents of the universe... The existence of matter and particles, of course, is not denied. However, we do not place them any longer at the roots of the universe. Matter and particles are also variations of basic functions in the cosmic orgone energy ocean."

- W. Reich

Cosmology is defined as being the science that is concerned with the nature of the physical universe as a whole. Cosmological theories, in order to be considered more than mere speculations or philosophies, must conform to the laws of physics and be consistent with observable astronomical evidence. Presently, the conceptual picture of how the universe originated is based upon the so-called "standard big bang model".

The Big Bang theory envisions the universe as having been created by an embryonic stage, a stage in which all physical substance ('space-time' included) was concentrated within an *incredibly* dense matter and energy egg. It has been estimated that the size of this *primordial fireball* was only about four sun diameters in width. At time zero, the cosmic egg exploded. The force of this explosion was so tremendous that its fragments are today still hurtling away from one another in all directions. The pieces of the "egg" were not complete atoms but rather a kind of subatomic *plasma* composed of neutrons, protons and electrons. This high temperature plasma expanded outward from ground zero and became distributed into clouds of varying densities. The plasma, with the passage of time, began to cool. Simple atoms, like hydrogen, were soon able to form and they gradually filled the void. These hydrogen clouds, in those regions where they were densest, began to contract under the force of gravity. This contraction somehow produced whirlpools, i.e., spiraling galaxies began to form. Stars were engendered from the collapsing clouds of gas within the galaxy. Newborn stellar bodies became more and more compacted by gravity and heated up. When internal temperatures reached a critical value, thermonuclear fusion processes began to occur. Such nuclear reactions turn hydrogen into helium and produces impressive amounts of energy. This process takes place in all stars and is the source of the enormous amount of radiant energy that they pour forth.

Although a very brief version of the "big bang theory", the above description contains the major ingredients upon which this unique cosmogenesis is based. Those ingredients are:

- 1.) An 'a priori' existence of primordial, irreducible matter.
- 2.) A contraction, 'caused' by universal gravitational attraction, of this subatomic plasma into a dense fireball. The occurrence of a cataclysmic explosion, caused by the violent rebound action of the strong 'elastic forces' inherent in compressed matter, which creates the universe.
- 3.) The radial, outward expansion of the primordial, subatomic plasma into infinity. This is an ongoing process that eventually generates a *space-time continuum*.

- 4.) A gradual cooling of the hot plasma that effects condensation, i.e., the conditions under which the simplest atom, hydrogen, is formed.
- 5.) Massive clouds of hydrogen gas contract, (under the influence of gravity) begin to rotate and form whirlpools (= galaxies).
- 6.) Individual eddies within the swirling galaxies give rise to stellar entities.
- 7.) Nucleo-genesis (the creation of the complex, heavier atoms) is a fusion process that takes place within the high temperature core of all stars.
- 8.) The complete collapse in upon themselves (due to the force of gravity) of these hydrogen gas spheres (= stars) is 'counteracted' by the outward pressure of the radiant energy that is released from the core. It is this EM radiation that constitutes a star's energy output.

This particular cosmology is embraced by and appeals to the intellect of most orthodox scientists because it seems to be so eminently logical. Its complicated framework has, after all, been constructed upon the solid foundation of the known and *accepted* laws of physics. In addition, it appears to be supported by direct astronomical observations. The function of this book is not the refutation of the mechano-mystical Weltanschauung. The accent of all my work is *positive*. I have repeatedly stressed the fact that all mechanical phenomena are expressions of underlying, mass-free energy processes. However, at this juncture, nothing less than a drastic revision of some "accepted" laws of physics is needed in order to render an alternative view of creation. What follows is a very concise cosmology. It is designed to allow for a comparison between the mechanistic and functional perspective.

Space is, in essence, a mass-free energy continuum. *The substratum of the universe is the self-active, metabolic Life Energy.* Movement and superimposition are basic functioning principles (BFP)s of this primordial energy. The movement toward one another and the superimposition of two or more PE SPWs generates matter. Superimposition, within the microcosmic realm, creates the elementary particles (=atoms). The superimposition of several huge PE streams, within the macrocosmic realm, creates the multi-armed spiral galaxies. The interactions between such converging PE streams generates those PE potential levels in which various elements (initially hydrogen) can arise. The occurrence of the major galactic whirlpool is simultaneous with the emergence of gaseous atoms and with the excitation of myriad other, minor eddies. These minor eddies become dense with gas and develop into proto-stellar entities. Once it has reached a definite capacity level, an evolved star begins to function as a PE system in dynamic equilibrium with its environment. The star maintains its capacity level (size, volume) and luminosity by the constant absorption and emission of energy, i.e., by a charge > discharge metabolism. It is the radiation of PE SPWs that constitutes the source of the star's prodigious energy output.

A *cosmo-genesis* based upon the existence of the primordial, self-generative Life Energy continuum is clearly in sharp contrast to a cosmos that suddenly explodes into "empty space".

The differences between the functional and mechanistic cosmological models are irreconcilable. The observable, tangible PE functions and properties that govern the natural realm demand a reorientation of our perspective vis-a-vis the universe. Such a necessary and welcome *paradigm shift* will begin once it is recognized that we have misinterpreted many fundamental astrophysical processes. A detailed survey of the changes that are implied by a major paradigm shift is beyond the scope of this work. I choose, instead, to focus on several key concepts, i.e., those concepts that have prompted intelligent, well-meaning scientists to construct a "big bang" model.

#### "UNIVERSAL" GRAVITATIONAL ATTRACTION

The foundation upon which the current cosmological model has been erected is the idea of "*universal*" gravitational attraction. The assumption is that: Every particle in the universe attracts every other particle with a "force" that is directly proportional to the product of their masses and is inversely proportional to the square of the distance between them. The subatomic plasma cloud that was generated by the primeval explosion would disperse itself into infinity if a universal attractive force did not counteract the expansive momentum. The only visible explanation for the eventual contraction into separate, dense galaxies of this expanding subatomic cloud is an all-pervasive attractive force.

Gravity, as presently defined, constitutes the attraction of matter by matter; a large mass attracts a smaller mass to itself. However, PE research has disclosed the fact that gravitational attraction is already fully operative in the domain of *mass-free* energy. For instance, the *confluence* of energy that develops into a PE SPW's charge phase is governed by the PE potential principle. *The PE potential principle dictates a flow of energy from the low to the higher level.* Also, the convergence and fusion of a pair of PE SPWs during the superimposition process is another example. In other words, *gravitational attraction is neither dependent upon the existence of matter nor is it restricted to the interactions between matter.* Indeed, the (BFP) of mass-free energy, the PE potential principle, is the basis for, underlies gravitational attraction.

Again, according to the current definition of gravity, not only does the larger mass attract the smaller mass to itself but the strength of this attraction varies with distance. The closer together the masses are, the greater is the attraction. The existence of the Earth's atmosphere is attributed to the attraction that is exerted by the massive planet upon this gaseous mixture. However, our functional insights into the dynamics of atmospheric layering reveal the following: Neither a hydrogen nor a helium atom, while in close proximity to the Earth's surface, is attracted by the planet's mass. On the contrary, these gas particles rise to great heights above the material globe. The helium atom reaches the heliosphere to which it is 'attracted', while the hydrogen atom remains suspended even farther out within the confines of the protonosphere. This phenomenon demonstrates the fact that:

- 1.) These gas particles remain suspended within the outer reaches of the planetary atmosphere, i.e., attraction is strongest at long range rather than in the near vicinity of the Earth.

- 2.) The smaller masses, hydrogen and helium atoms, completely defy the 'gravitational mass-attraction' of the larger mass, Earth.

These facts obviously contradict prevalent notions about the nature of gravity. A functional (=energetic) comprehension of gravitational attraction is needed to explain them. Significantly and crucially, the retention of hydrogen and helium atoms within the Earth's atmospheric layers does not constitute the attraction of matter to matter. Instead, hydrogen and helium atoms are 'attracted' by and remain suspended within PE potential levels. *PE potential levels are gravitational fields.* This attraction between an atom and a gravitational field depends upon the formation of a *resonance bond*. Resonance and vibration being inseparable, the attraction between an atom and a PE potential level is basically a field phenomenon. *Gravitational attraction is strictly governed by mass-free energy processes, i.e., field to field interactions.*

The combination of two individual hydrogen atoms to form a single hydrogen molecule (H<sub>2</sub>) provides a crucial insight into the energetic nature of gravity. Whether hydrogen atoms exist at-a-distance or in close proximity to one another, there is no tendency for them to combine. There is simply no impetus for PE systems of equal strength to superimpose. This state of affairs will change drastically should one of the PE systems become excited. For instance, sudden exposure to intense radiation will heighten the charge > discharge energy metabolism of a hydrogen atom. An increase in metabolic rate (= frequency) means that this hydrogen atom is now a stronger PE system than is the other 'unexcited' PE system. Therefore, should field to field contact between it and an 'unexcited' hydrogen atom occur, the weak system will be attracted to the stronger system. Note that we are confronted here with the fact that *an increase in the strength of gravitational attraction is not necessarily tied to an increase in mass.* The following revelations of our functional science firmly establish that gravitational attraction is a function of mass-free energy and not of matter, per se.

- 1.) Gravitational attraction is equatable to the PE potential principle.
- 2.) Gravity is a *localized* function.
- 3.) Gravity is, in essence, a function of the interaction between mass-free PE fields.
- 4.) Gravitational attraction spontaneously occurs (provided that field to field contact has been established) whenever a PE field *potential difference* exists between two distinct PE systems.
- 5.) Gravity is functionally identical ( $\approx$ ) to *pulsation*.

#### CREATION OF THE ELEMENTS

The origin of hydrogen, and to some extent, helium, is ascribed to the initial cosmological "big bang". These simple, light elements purportedly condense out of the subatomic plasma cloud. The heavy elements are said to evolve gradually by astrophysical processes. Most heavier elements are supposedly synthesized by means of the nuclear fusion reactions that are generated within stars.



The mechanistic view of stellar genesis and evolution rests upon the assumption that heavy elements are formed a fusion of atomic nuclei. Stars are thought to form when sufficient matter accumulates in a galactic pocket. The concentration into a stellar body of such an aggregation of gas particles is determined by the effects of "universal" gravity. Each atom is said to be influenced by the gravitational "force" that is exerted by all the other neighboring atoms. This contraction of matter (according to "accepted" ideas about gravity) would continue unabated and could squeeze a proto-stellar entity into a miniscule, supra-dense mass. Indeed, precisely this type of compaction process is hypothesized to be the cause of gravitational anomalies like "black holes". Therefore, the development of an emergent stellar entity into an operative star requires a "counterforce", i.e., a "force" that will actively resist the contractive power of gravity. The energy released as a result of the thermonuclear fusion process, which occurs in a star's hot core, is alleged to be the source of this "counterforce". The pressure of outgoing radiant energy counteracts the inward pull of gravity. In other words, a transformation of light elements into heavy elements provides the only possible explanation for why a star does not collapse in upon itself.

The incidence of the spinning motion that transforms a cloud of gaseous atoms into a celestial sphere is attributed to the gravitational "force" that is exerted by matter. Matter, according to this interpretation, precedes and 'causes' movement. In reality, it is the convergence and merger of two or more self-generative PE spinning waves that produces rotational motion. Most of a star's mass, since the variegated PE potential levels emerge as a result of the interaction between mass-free energy streams, is generated only upon the commencement of this superimposition process. *A microcosmic generation of elements occurs at the same time as does the macrocosmic formation of the star.*

The overwhelming preponderance of hydrogen and helium in a star such as our sun can be attributed to the fact that the superimposition of PE streams has generated, in abundance, precisely those low PE potential levels in which these 'light' elements are created. Those higher PE potential levels in which the heavier elements arise were no doubt also generated, but to a much lesser extent. The gradual accretion into a dense mass of those heavy atoms produces the inner core of the mature star. It is the attraction exerted by this strong, high PE potential component upon the weaker, lower PE potential components that guarantees and makes possible the cohesion of the PE system, star. A relentless compaction of matter is actually and theoretically impossible in this functional process. An emergent stellar entity reaches a certain 'lawful' capacity level, develops into an integrated PE system and proceeds to interact harmoniously with its mass-free energy environment.

The star's energy metabolism, i.e., a continual absorption and emission of PE, not only maintains its equilibrium but also provides the explanation for the star's enormous output of radiant energy. The sun, for example, draws from an inexhaustible reservoir, i.e., the PE substratum within which it functions, and radiates this energy back into the solar system and beyond. A conversion of hydrogen into helium, i.e., the nuclear fusion process that releases energy, is not required in order to explain the source of solar radiation. The need to postulate the generation of a "counterforce" to gravity is unique to the mechanistic view, a view that is based upon the false concept of "universal gravitational mass-attraction".

A PE system, whether it be a star or an atom, does not attain and maintain its equilibrium through an opposition of forces.

The mechanistic and functional explanations for the creation of the elements are irreconcilable. On the one hand, the existence of elements, those heavier than hydrogen, is ascribed to *nucleo-synthesis*, that is, to a fusion of mass to mass process that takes place inside a star. On the other hand, the existence of *all* elements, hydrogen included, is ascribed to *nucleo-genesis*, a mass-free energy process that generates matter whenever PE SPWs superimpose within PE potential levels. Whereas the former process is restricted to an extremely dense, supra-hot environment, the latter process occurs readily whenever high concentrations of mass-free energy are generated within the PE substratum.

The functional perspective makes the evolution of a planet comprehensible. The conventional hypothesis of planetary formation states: Planets have to await the birth and death of countless high mass, high temperature stars. Stellar entities seem to be the only locales conducive to the creation of those complex elements that eventually form the structure of a planet such as the Earth. The act of stellar death (a supernova explosion) literally fertilizes interstellar space with complex atoms from which future stars as well as future planets can originate. Moreover, the explosion itself explains the production of those elements that are heavier than iron. Intermediate - weight nuclei, during the explosion, are fiercely jammed together and thus producing the heaviest elements of all. A proto-planetary cloud consists of an accumulation of these former stellar components. Planets, it seems, are collections of the fragments of disintegrated stars!

The functional insight is: Smaller eddies (= PE stream superimpositions) are generated in the vicinity and under the influence of the large vortex of an emergent stellar entity. These eddies are the proto-planetary entities. 'Light' elements arise within their initially low PE potential levels. The star reaches maturity, i.e., it becomes a functioning PE system, long before a planet fully coalesces. At this point, the self-generative process that produces the PE potential levels of an emergent planet begins to receive stimulation from an external source. The emission of radiant energy from the neighboring star now excites the generation of higher and higher PE potentials within the planetary PE field. The figure entitled, Creation of the Elements, illustrates the fact that the generation of ever higher PE potential levels coincides with the emergence of heavier and heavier elements. Therefore, the entire spectrum of complex atoms, that are to be found in the composition of a planet, is not provided by an extraneous source. On the contrary, both the 'light' and heavy elements originate *in place* and *simultaneous* to the actual formation of a planetary PE system.

#### FREQUENCY SHIFT IN A GRAVITATIONAL FIELD

Albert Einstein, in the framework of "The General Theory of Relativity", states:

"An atom absorbs or emits light of a frequency which is dependent on the potential of the gravitational field in which it is situated."

This hypothesis, which was originally formulated in 1916, is revolutionary. It constitutes a radical departure from the traditional conceptions of space and gravity. According to relativity theory, mass curves space and that which Newton called gravitational attraction is actually "force-free" motion in a geometric distortion of the space-time continuum. Einstein proposed that light would be affected by this curvature of space. Astronomical observations have since verified that light is indeed being deflected in the vicinity of the solar orb, i.e., under the influence of the sun's intense gravitational field. Einstein, since he firmly believed in the "speed of light" constant, could not allow himself to equate this deflection to a decrease in the velocity of light. Instead, he calculated that the deflection must be equivalent to a decrease in frequency. This effect of gravity is not limited to light. It influences the frequency of any periodic phenomenon, be it EM radiation or a clock. The verification of this remarkable effect of gravity upon periodic phenomena became the litmus test for the Relativity Theory.

Any 'experimentum crucis' in support of Einstein's hypothesis must be able to show that clocks really do run slower in a gravitational field. The stronger the "force" of gravity, the slower should the clock's measurement of time be. Note that a "clock" is anything that repeats itself in regular cycles. Atoms vibrate at a certain frequency. The most precise clocks available are atomic clocks.

A controlled determination of the fact that gravity does indeed slow these clocks has been achieved. One atomic clock is placed into an orbital trajectory out in space where gravity is weak. When it is returned back to earth, its elapsed time is compared to the elapsed time of an atomic clock that has remained on Earth where gravity is stronger. The observed time difference between the two atomic clocks is in agreement with Einstein's prediction.

The existence of a continuum and the interdependence and dynamic interaction between an atom and its environment are premises that are shared by both the relativist and the functionalist. However, the relativist's continuum does not correspond to the functionalist's continuum. Whereas the relativist operates within the *abstract domain* of geometry and "empty space", the functionalist investigates a *palpable domain*, i.e., a world and a universe that is vibrant with Life Energy. Therefore, in order to free the interactions between periodic phenomena and environment from the grasp of abstraction, we must begin to apply the PE principles and dynamics that govern gravity, matter and the mass-free energy continuum.

Given: Two electroscopes are energized. Electroscope (x) and electroscope (y) have been charged to an equal degree with PE. They are both placed upon a table.

A lab technician, equipped with a stop watch, monitors the experiment. It is observed that, after the passage of a certain period of time, the gold leaves of both electroscopes have fallen. Conclusion: Two instruments, equally charged and functioning under identical conditions, discharge at the same time.

Given: The two electroscopes are charged to an equal degree. Electroscope (x) is placed upon a table. Electroscope (y) is put inside a PE accumulator which rests atop the same table.

A lab technician, equipped with a stop watch, monitors the experiment. It is observed that, after the elapse of a certain period of time, the leaf of electroscope (x) has fallen. A check on electroscope (y) reveals the fact that its leaf still stands out at an angle. Only after the passage of many more minutes does the leaf of electroscope (y) finally fall. Conclusion: An electroscope that functions within the confines of a PE accumulator discharges at a slower rate than does an electroscope that functions out in the open atmosphere.

The electroscope has been defined as: An instrument that detects the presence of an "electric" charge or else is used for indicating and measuring the intensity of radiation.

Dr. Wilhelm Reich found, during his extensive *orgone energy* (= PE) researches and his experimental use of the electroscope, that *the charge retained by an electroscope is not electromagnetic*. Therefore, the functional definition of this instruments is: An electroscope, whether it is initially excited by electric tension or is directly energized by PE, retains a *PE charge*. This instrument is highly sensitive to and interacts with the mass-free energy continuum. The electroscope (= *PE meter*) measures a specific, tangible property of PE, viz., the *tension* of the energy substratum. This tension or cohesiveness is a qualitative function which is determined by the quantitative factor, density or concentration of energy.

The PE accumulator apparatus collects and concentrates mass-free energy. This device creates, within its confines, a PE potential level that is higher than the PE potential of the atmosphere surrounding it. Since a PE potential level is equivalent to a gravitational field, the PE accumulator, in effect, generates an enhanced gravitational field. A strong gravitational field is characterized by high tension while a weak gravitational field is characterized by low tension.

The application of these insights to the previous experiment establishes the following: An electroscope that functions within a strong gravitational field discharges at a slower rate than does an electroscope that functions within a weaker gravitational field. This interdependence of an electroscope and a gravitational field is a concrete example of the interaction between a periodic phenomenon (= rate of electroscopic discharge) and the environment (= PE potential level).

This *frequency* (= rate of discharge) *shift* of an electroscope in a gravitational field was *tentatively* explained by Reich in terms of the traditional equalization of potential difference principle. An electroscope, according to this principle, would predictably discharge less easily into an environment with high PE tension than into one with low PE tension. However, Reich soon enough dropped this assumption because it was in conflict with the PE potential principle. According to this principle, a charged electroscope, being a high level PE system, should be able to draw continuously from the lower level PE environment and thus maintain its charge. These contradictions can now be resolved.

Given: A pair of separate, discrete PE SPWs that are excited by the same source, for example, by solar radiation, under identical circumstances. We distinguish between the two by designating one as being SPW-1 and the other, SPW-2.

SPW-1 moves forward into a region of high PE concentration. SPW-2 moves forward into a region of low PE concentration. SPW-1 encounters a high PE potential level, i.e., a gravitational field that is characterized by strong tension. SPW-2 encounters a low PE potential level, i.e., a gravitational field that is characterized by weak tension.

The attraction > charge process (phase one of the PE SPW cycle) dictates that the high level SPW will attract and withdraw energy from the lower level PE continuum. The greater the PE potential difference between SPW and energy substratum, the more efficient is this metabolic process. Hence:

- a.) The dynamic interaction between SPW-1 and the high PE potential environment into which it has moved generates a *decrease* in the metabolic rate (= frequency) of this PE SPW cycle.
- b.) The dynamic interaction between SPW-2 and the low PE potential environment into which it has moved generates an *increase* in the metabolic rate (= frequency) of this PE SPW cycle.

The PE SPW cycle is strictly governed by the charge > discharge energy metabolism. This energy metabolism is expressed in the SPW's forward movement within and through the PE continuum. When forward movement change (during the superimposition process) into rotational motion on-the-spot, a functional transformation of the energy metabolism must accompany the change of *temporary* charge functions (= mass-free energy quanta) into *permanent* capacity levels (= atoms).

The rotating quanta that comprise the nucleus of an atom are no longer generated by the confluence of energy "units" in the forward movement of the PE SPW. Circular motion on-the-spot creates a distinct, demarcated PE field around the nucleus. The atom now simultaneously attracts (absorbs) and radiates (emits) mass-free energy. Instead of being a *linear* process, that is, a confluence and dispersion of PE that constitutes forward, rectilinear movement, this is a *radial*, in place process. It is an ongoing interaction between the PE system and the surrounding energy substratum. The atom, as an integrated whole, perpetually *vibrates*.

The vibrational rate of an atom corresponds to the PE SPW's frequency. This pulsation is *functionally identical* to the atom's metabolic rate. In other words, the atom's vibrational rate, like the PE SPW cycle's frequency, expresses the charge > discharge energy metabolism. I do not want to be redundant or insult the reader's intelligence but I think it warrants repeating that: The *quanta* of SPWs are temporary charge functions whereas the *nuclei* of atoms are permanent capacity levels. Therefore, since the frequency of a PE SPW can and indeed does fluctuate over a wide range, any reference to a well-defined, consistent cycle frequency cannot easily be made in the case of a SPW. However, in the case of an atom, vibrational rate (= frequency) is a basic characteristic. Vibrational rate defines the particular atomic entity and distinguishes it from every other element. Just as all elements possess a specific atomic mass; so each and every elements possesses a *specific natural frequency*.

Although an atom predictably and consistently tends to function at its natural frequency, this rate of pulsation is not a static, intransigent condition. Vibrational (=metabolic) rate is, by definition, a dynamic process that fluctuates, i.e., increases and decreases, in accordance to changes in the environment. Hence:

Given: Two individual sodium atoms. We distinguish between the two by designating one of them, Na-1 and the other, Na-2. Na-1 is placed many miles below the Earth's surface at the bottom of a mine shaft. Na-2 is suspended by a weather balloon high up in the Earth's atmosphere.

Na-1 encounters a high PE potential level, i.e., a gravitational field that is characterized by strong tension. Na-2 encounters a low PE potential level, i.e., a gravitational field that is characterized by weak tension. The *efficiency* of an atom's charge > discharge energy metabolism is governed by the PE potential difference that exists between the atom and the mass-free energy substratum in which its functions. Therefore:

- a.) The dynamic interaction between Na-1 and the high PE potential level (= strong gravitational field) into which it has been placed generates a *decrease* in the vibrational rate (= frequency) of this atom.
- b.) The dynamic interaction between Na-2 and the low PE potential level (= weak gravitational field) into which it has been placed generates *increase* in the vibrational rate (= frequency) of this atom.

These findings allow us to return once more to the question of electroscopic discharge.

The *modus operandi* of an electroscope's metal rod is governed by a metabolic process. A continual absorption and emission of mass-free energy pertains to this metal rod as well as to an individual atom. Like an atom, the metal rod's rate of absorption and emission depends upon whether it interacts with a high or a low PE potential environment. Again, like an individual atom, the metal rod of an electroscope possesses a natural frequency. To repeat: Natural frequency is a ground state in which absorption of energy is *balanced* by an equal emission of energy. When we charge an electroscope, this equilibrium is disrupted. The tendency of a PE system, be it an atom or a metal rod, is always to function at its natural frequency. The only way a *charged* electroscope can again function in equilibrium is for it to release the *excess energy* that it has acquired. Therefore, even though the charge > discharge energy metabolism continues; much more energy is now emitted than is absorbed. This predominance of emission over absorption expresses itself in the steady outward flow of PE currents. The visible confirmation of this *radiative force* is the observable fact that the electroscope's gold leaf is pushed out at an angle from the metal rod.

These insights into the dynamics of an electroscope (= *PE meter*) firmly establish the validity of the functional perspective which is based upon the solid foundation of:

- a.) The dynamic interaction between a PE system and the mass-free energy continuum.
- b.) PE potential principle
- c.) Energy metabolism
- d.) Natural frequency
- e.) The *frequency shift* of periodic phenomena in a PE potential level (= gravitational field).

The mechanistic principles:

- 1.) Equalization of potential difference, and
- 2.) Leaf deflection as a result of the repulsion between the metallic components that have been charged with the same electrical polarity

cannot explain electroscopic functions. The contention that "ionization of air" causes an electroscope's 'natural leak' is likewise unacceptable. A *self-regulatory* PE system spontaneously tends to function in equilibrium. 'Natural leak' constitutes the inevitable discharge of an electroscope's excess energy.

Sir Arthur Eddington, renowned astronomer and astrophysicist, correctly perceived that physics reflects the mode of interpretation which the scientist imposes upon the data of observation. It is precisely because we have *imposed* a mechanistic interpretation upon natural phenomena that we find ourselves today within a dark tunnel with no light in sight. We yearn for an *integration* of the various scientific disciplines; an integration which will finally confirm our deep conviction that *nature functions as a unitary whole*. The word, *universe*, is a direct expression of this innermost longing of humanity. It is ironic and tragic that Einstein's relativity theories, which embrace the unifying concepts:

- a.) continuum, and
- b.) environment <> phenomena interdependence and interaction

have made access to and an understanding of the creative, energetic process more difficult than ever before. This happens to be the case because we continue to *impose* static, abstract notions, e.g., "speed of light" constant, "curved, empty space", upon a dynamic cosmos that is, in reality, governed and permeated by a vibrant, palpable Life Energy.

The *paradigm shift* from a mechano-mystical view of the world to a functional perception of nature has begun. This re-orientation will take time. Evolution not revolution will accomplish this transformation. Future generations are destined to reap a bountiful harvest if we have the courage, heart and intellectual honesty to begin to explore and to develop the awesome potentials of Primary Energy. Henry Miller, one of the prophets of our terrible and propitious age, declares, "The law of the universe: If you don't accommodate your rhythm to the universal rhythm, you relapse, regress, become a vegetable, an amoeba or a satan incarnate." The challenge, *the greatest challenge ever to confront mankind* is to re-establish our harmony with the functional processes that govern both life and nature.