Article

On the Interaction of the Schumann Waves with Human Brain

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Abstract

In this paper we developed new hypothesis on the nature of human brain waves and Schumann waves. To that aim we formulated Klein-Gordon equation for Schumann waves and simultaneously for brain waves We show that two new parameters high of potential barrier and relaxation time describe the interaction of Schumann waves with human brain. The interaction is governed by the Heisenberg type inequality. Assuming relaxation of brain of the order of 1 sec we obtain the high of human brain potential barrier of the order of 10-15 eV. The same value was obtained in our ealier papers for the temperature of the brain and Schuman waves.

Keywords: Brain , Schumann waves, relaxation time , potential barrier , Heisenberg inequality.

1. Introduction

Human consciousness has gone through several distinct permutations throughout history. These structural changes have been documented and supported by a wealth of anthropological, mythological, linguistic, artistic, philosophical, and scientific data. The human brain has not changed in over 200,000 years; yet human beings have developed in language, art, technology, and culture. These developments have stamped humans with a unique identity that is far different than any other species on the planet. Currently, there is a disagreement in theory as to how or why consciousness has shifted over time; however, there is overwhelming evidence that it is shifting again.

In the book, *The Ever Present Origin*, Jean Gebster[Gebster, 1983] puts forth a theory, which follows the progression and subsequent "mutation" of consciousness from the early hominid, to present day man, and into the future. These developments in consciousness, according to Gebser, occur because of the ever-changing relationship of human beings to space and time. Gebser argues that human consciousness is in transition; therefore, if consciousness mutated in the past, then it will, by simple logic, mutate again. Gebser's book effectively chronicles these changes in consciousness. Through his research into the past eras of human history, Gebser identifies four previous structures of consciousness: Archaic, Magic, Mythic, and Mental. He also states that

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human beings are in the process of mutating into a new structure that he termed Integral consciousness.

There is a direct link between these "structures" of consciousness and specific correlative brainwave states. This interconnection suggests that the human brain adapts to the new structure by adding a corresponding brainwave that aids in explicating and interpreting the new world coming into view. This suggests that the higher brainwaves in the known spectrum were yet dormant and inaccessible to early humans, and, as mutation occurred, there was a reciprocal unfolding of ever-higher frequency waves. This determination also reveals a profound relationship between the developmental growth of a human being, and the development of the species at large, shedding new light on the symmetrical recapitulation of ontogeny and phylogeny.

Based on data from Jean Gebser's model, the Archaic structure of consciousness is directly associated with Delta brainwaves. Furthermore, the Magic structure is associated with Theta brainwaves, the Mythic structure with Alpha brainwaves, and the Mental with Beta brainwaves. This suggests that the new structure on the horizon, which is deemed Integral consciousness, will be accompanied by its' very own set of brainwave patterns, those of the Gamma wave band. Human beings have acquired brainwave frequencies well up into the Beta range. These brainwaves have been proven to predominate at various stages of development. Human beings will also gain access to Gamma oscillations as their dominant frequency, which allow for higher mental cognition and neuronal synchronization. This will "integrate" the other brainwave states together; creating what philosopher Sri Aurobindo has termed the Supermind. Once this system comes fully online, it will enable a transparent vision of human history, sear the divisive lines of past and future, and bring complete clarity to the development of consciousness. This in turn, will unfold for each and every human being the very meaning of life.

The Archaic structure, which there is very little evidence of, can be thought of as a totally non-differentiated state where humans and nature are in a fused identity. Gebser states that this structure of consciousness was identical to biblical paradise and original wholeness. Keep in mind however, that this paradisiacal state was not a conscious heaven, but rather an unconscious hell. Gebser ties this structure to the early hominid, and to the unconscious, deep-sleep state.

The emergence of the Magic structure was, above all, a transition from zero-dimensional undifferentiated identity, to one-dimensional fused unity. In this stage of early development, the identity with Archaic consciousness began to wane. Men and women began to separate themselves from the grip of nature, and saw themselves instead, juxtaposed against an organic backdrop. There was an instinctual banding together during this period of pre-history. The people of this period began to form close knit communities that would mate, hunt, and protect one another from the ravages of nature. This period is best known for its' cave paintings. In part, these paintings tell a great deal about the consciousness during that time. One famous painting

shows a buffalo-hunting scene, where the arrows are all pointing intently towards a fleeing buffalo. According to Gebser, this scene represents magical unity, for in fact, the hunters, buffalo, and arrows, are all part of a unified field, which has the dimly lit consciousness spread out over the world into a group ego.

Just as the Archaic structure was an expression of zero-dimensional identity and original wholeness, and the Magic structure, an expression of one-dimensional unity and merging with nature, so is the Mythic structure the expression of two-dimensional polarity. Once human beings extracted themselves more fully from nature, and consciousness began to dwell in the individual, a huge shift came about in the way they operated in the world. The emphasis for them changed from being in the world to having a world. This period is best known for the birth of the Myth. These cosmogonical stories tell of mankind's origins, ancestors, parents, as well as, eternal parent figures that came in the form of Gods and Goddesses.

With the advent of this new world-view, mankind is so effectively removed from the grip of nature that for the first time they were able to see it, study it, and in a certain sense, measure it, utilizing it to their advantage. This period is synonymous with the birth of agriculture in Egypt, the rise of the calendric system in the Mayan civilization, and the birth of contemplative religions around the world. It is interesting to note that Gebser also equates this structure with the beginning of recorded history, and so the beginning of time in consciousness. While, according to Gebser, the liberating struggle against nature in the Magic structure brought about a disengagement from nature, and an elementary awareness of the external world, the Mythic structure lead to the emergent awareness of the internal world of the soul, and bore the stamp of the imagination.

Scarcely five hundred years ago, during the Renaissance, another unmistakable reorganization of consciousness occurred; the discovery of perspective in painting, which opened up the three-dimensionality of space. This period, which Gebser deemed the Mental structure, marked the birth of the Ego, which has been symbolized by a narcissistic and materialistic attitude that has indeed, become synonymous with modern culture and society. The discovery of perspective also brought time into its contemporary maturity. Before the Mental structure appeared, the cyclic nature of the universe had been observed meticulously. The seasons had been mapped and agriculture was flourishing. However, there was another distinct yet surreptitious segregation of time as the polar days and nights, and the cyclical calendar, was broken into a further ratio of hours, minutes, and even seconds.

This division of time, this quantifiable measuring of moments, brought with it a host of other methods of measuring, namely the sciences of the world. Once time was instituted and mastered, mankind proceeded to measure and label the world until everything and everyone in it was segregated. This severing of original Archaic wholeness, one-dimensional Magical unity, and

even two-dimensional Mythic polarity, gave rise to three-dimensional Mental duality. This duality effectively took polar compliments and rendered them as diametric opposites. So the cycle of day/night gave way to the dialectic adage, "different as night and day." Time was also sequestered and spatialized into a past, a present, and a future...the three familiar dimensions of every day life.

Presently, according to Gebser, mankind is coming to the deficient phase of the Mental structure. When a structure of consciousness is no longer fit for survival, a new "mutation" with more complexity and organization will enter to take its place. Gebser stresses the word mutation in lieu of evolution. In Gebser's model, consciousness is not a biological process bound by the laws of natural selection and progress, but rather a spiritual phenomenon that is always existing and ever-present. What is to come next Gebser terms the Integral structure of consciousness. This structure will be beyond space, beyond time, and beyond the purely mental conceptions of our present day modern/post modern world. This unique structure, according to Gebser, will have the ability to make the other structures transparent, thereby integrating them and rendering them available to consciousness.

The evolution of a large, complex brain has been the defining feature of the human lineage - although human brain size has not changed over the past 200,000 years.[i] So, what is it that has evolved? Looking carefully again at Gebser's model of consciousness, there are distinct correlations between the description of the structures of consciousness and the description of brainwave states. For example, if the Archaic structure of consciousness and the Delta brainwave state are viewed as amalgams of one another, it begins to shed light on the possible inner workings of consciousness and evolution. The most important defining characteristic of this thesis is that during the Archaic structure, the dominant brain wave state available/accessible to early humans was the Delta wave. And, as mutation through the other structures of consciousness occurred as a result of deficiency, the human brain evolved by accessing other mutually supporting brainwaves. These new brainwaves would allow humans to not only be able to adapt and survive, but also to create a mental map of each new world into which he or she mutated. Now, taking into account the previous subsequent brainwave additions up until the Mental structure, then by simple logic, it can be postulated that a new brainwave will become dominant in the newly emerging Integral structure. Based on the evidence, the new brainwave will be the recently discovered Gamma brainwave.

2. Brainwaves and Consciousness

This theory is in part, based on the comparative analysis of the ontogenetic and phylogenetic development of brain structures and functions, the evolution of different brainwave spectrums, and their correlations with different structures of consciousness.

It is well known that the brain is an electrochemical organ; researchers calculate that if all 10 billion interconnected nerve cells discharged at one time that a single electrode placed on the human scalp would record something like 5 millionths to 50 millionths of a volt.Even though this electrical power is very limited, it does occur in very specific ways that are characteristic of the human brain. Electrical activity emanating from the brain is displayed in the form of brainwaves. These brainwaves are measured using a process called electroencephalography, or simply EEG, which is the recording of electrical activity along the scalp produced by the firing of neurons within the brain.

It has been documented that the EEG dimensions in humans steadily increase with age. Simply stated, experiences accumulated in the brain over time, form into cortical cell assemblies. These cell assemblies cause more organizational complexity throughout the brain, which require higher frequency brainwaves to operate. Thus, the "wisdom of old age" may find its neurophysiological basis in greater complexity of brain dynamics compared to younger ages.

It has also been shown that certain brainwaves predominate at certain developmental stages. These waves slowly increase over time to accommodate for various learned behaviors, as well as genetic development. Through this development unfolds a corresponding "world view", or picture of reality. It is this picture of reality that Jean Gebser equated directly to his structures of consciousness. Taken one step further, it would be completely plausible to assume that if the ontogeny forms through the successive addition of brainwaves, then too should the corresponding phylogeny develop in the same manner.

3. The model Schuman and Brain waves

The measured frequencies of Schuman and brainwaves are nearly the same. [Persinger].In Fig 1. we present our calculations of the spectra . It is worth to underline that both calculated curves give a rather good description of the measured frequencies of Schuman and brain waves [Marciak-Kozlowska 2013, 2015]

In this paper we developed hypothesis that the human brain waves and Schuman waves are the same electromagnetic waves with different amplitudes only. Moreover the ratio of the amplitudes are independent of frequencies , Fig.1

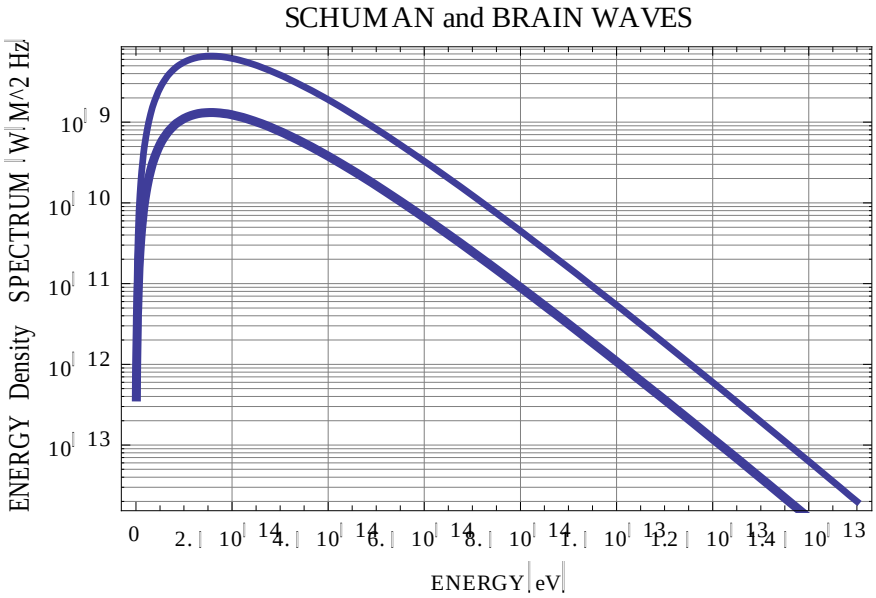

Fig.1 The energetic spectra of the Schumann and brain waves [Marciak-Kozlowska, 2015]

3. Our hypothesis

1 Brain waves and Schumann waves are the same waves with Schumann waves of a greater amplitude.

2. Brain waves are result of interaction of the Schumann waves with neurons

In the following, we consider one-dimensional Schumann wavet transfer phenomena (Marciak-Kozlowska, 2011). In this monograph the hiperbolic master equation for Schuman wave phenomena was formulated

$$(\frac{1}{\upsilon^2}\frac{\partial^2}{\partial t^2}+\frac{m}{\hbar}\frac{\partial}{\partial t}+\frac{2Vm}{\hbar^2})\Upsilon=\frac{\partial^2\Upsilon}{\partial x^2}. \tag{1}$$

In this equation m is the mass of the neuron, $\hbar$ - is the Planck constant, V is potential and v is the velocity propagation of the Schumann wave in thebrain.We seek a solution in the form

$$\Upsilon(x,t)=e^{-\frac{1}{2}\tau}u(x,t) \tag{2}$$

for the quantum equation (1).After substitution of Eq. (2) into Eq. (1), one obtains

$$\frac{1}{\upsilon^2}\frac{\partial^2 u}{\partial t^2}-\frac{\partial^2 u}{\partial x^2}+q^2u(x,t)=0, \tag{3}$$

where

$$q^2 = \frac{2Vm}{\hbar^2} - \left(\frac{m\upsilon}{2\hbar}\right)^2.$$

The structure of Eq. (3) depends on the sign of the parameter q^2.

For the initial Cauchy condition

$$u(x,0) = f(x), \qquad \frac{\partial u(x,0)}{\partial t} = g(x), \tag{4}$$

and the solution of the Eq. (3) has the form [Marciak-Kozlowska, 2013]

$$\begin{aligned} u(x,t) = & \frac{f(x-\upsilon t) + f(x+\upsilon t)}{2} \\ & + \frac{1}{2\upsilon}\int_{x-\upsilon t}^{x+\upsilon t} g(\varsigma) I_0\left[\sqrt{-q^2(\upsilon^2 t^2 - (x-\varsigma)^2)}\right] d\varsigma \\ & - \frac{\upsilon\sqrt{-q^2}\,t}{2}\int_{x-\upsilon t}^{x+\upsilon t} f(\varsigma)\frac{I_1\left[\sqrt{-q^2(\upsilon^2 t^2 - (x-\varsigma)^2)}\right]}{\sqrt{\upsilon^2 t^2 - (x-\varsigma)^2}} d\varsigma. \end{aligned} \tag{5}$$

When $q^2 > 0$ Eq. (3) is the *Klein – Gordon equation* (K-G), which is well known from applications in elementary particle and nuclear physics.

For $q^2 < 0$ Eq,3 is the modified Klein –Gordon Equation with the solution

$$\begin{aligned} u(x,t) = & \frac{f(x-\upsilon t) + f(x+\upsilon t)}{2} \\ & + \frac{1}{2\upsilon}\int_{x-\upsilon t}^{x+\upsilon t} g(\varsigma) J_0\left[\sqrt{q^2(\upsilon^2 t^2 - (x-\varsigma)^2)}\right] d\varsigma \\ & - \frac{\upsilon\sqrt{q^2}\,t}{2}\int_{x-\upsilon t}^{x+\upsilon t} f(\varsigma)\frac{J_0'\left[\sqrt{q^2(\upsilon^2 t^2 - (x-\varsigma)^2)}\right]}{\sqrt{\upsilon^2 t^2 - (x-\varsigma)^2}} d\varsigma. \end{aligned} \tag{6}$$

In formulae (5) and (6) Functions $J_n(x)$ and $I_n(x)$ are Bessel functions [Zauderer, 1989]

Both solutions (5) and (6) exhibit the domains of dependence and influence of the *modified Klein-Gordon* and *Klein-Gordon equation.* These domains, which characterize the maximum speed at which a disturbance can travel are determined by the principal terms of the given equation (i.e., the second derivative terms) and do not depend on the lower order terms. It can be concluded that these equations and the wave equation (for m =0) have identical domains of dependence and influence.

The special case is the q^2=0. In that case we obtain the relations between the relaxation time tau and potential

$$V\tau = \hbar \tag{7}$$

$$\tau = \frac{\hbar}{mv^2} \tag{8}$$

a nd τ is the relaxation time for nergy of the Schumann waves in neuron. Equation (7) is the Heisenberg iformula for Schumann- Brain waves in human brain

Potential V is the barrier for the „intruders" to neuron brain It can be calculated following the values of relaxation time for biological structures τ is of the order of 1 sec.From formula (7) we obtain

$$V = \frac{\hbar}{\tau} = 10^{-15} eV \tag{9}$$

and that potential Energy we obtained as the temperature of the brain wave source[Marciak-Kozłowska, 2013, 2015]

3. Conclusions

The human being is immersed in electromagnetic field of Schuman waves which influence the contemporary human evolution . It seems to me that Schumann wave are the carriers of the reach information , which for the moment are not know. One hint of existence of this information is the influence of the Schumann field on the psychics of the humans In the light of our study these psychics phenomena are correlated with Schumann wave due to possible interfernce of the Schumann and brain waves – both waves have the same frequencies and velocities= light velocities

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