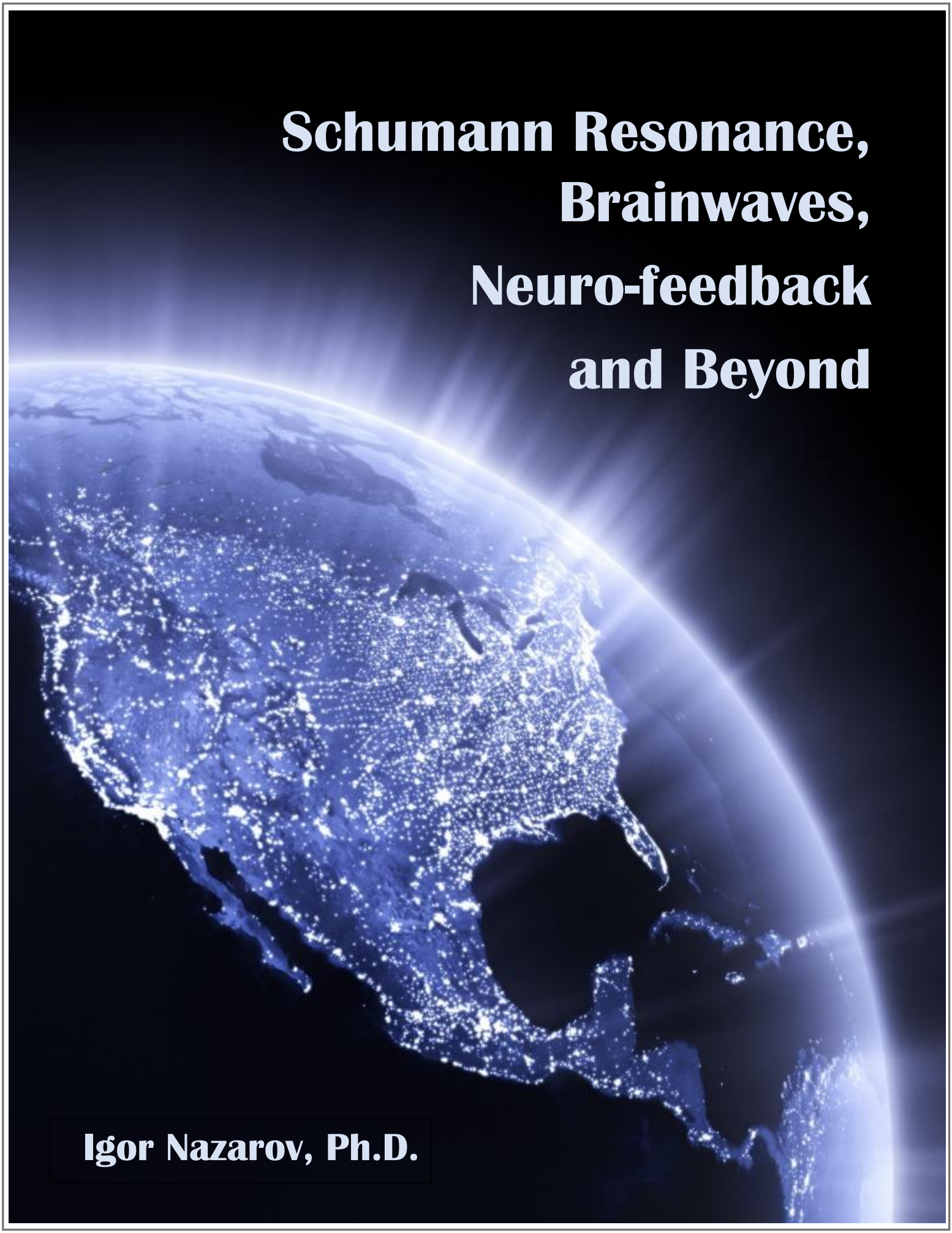
Schumann Resonance, Brainwaves, Neuro-feedback and Beyond



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Disclaimer

This paper is a part of the ongoing research into the connection between human well-being and electromagnetic phenomena and its effects in our everyday environment. The information in this textbook as well as ideas suggested are not intended to be a substitute for any medical diagnosis or/and treatment. This information should be in no way considered as a medical advice or a replacement for the consultation with a licensed physician or medical advisor.

CONTENTS

Abstract

This paper attempts to introduce the subject of subtle energy (or life force, prana, Chi)[1] through known phenomena, such as Schumann resonance, brain waves, neurofeedback, plasma, etc.[2] Materials focussing on these phenomena are widely discussed in public domain sources, easily accessible to the general public and published on the Internet. Furthermore, while it certainly can be useful, a scientific background is not required to develop or possess an understanding of the subjects discussed herein.

The basis for this paper's discussion is Schumann resonance, a natural phenomenon of standing, low-frequency electromagnetic waves manifesting themselves in the atmospheric gap between the surface of the Earth and the ionosphere. These waves come into existence mainly due to the intensive lightning activity in the atmosphere. Standing electromagnetic waves of Schumann resonance create a stable set of frequencies with an average base frequency observed at 7.8 Hz and harmonics at (approximately) 14 Hz, 20 Hz, 26 Hz, 32 Hz, etc. These rhythms correspond to the

[1] In this paper, we prefer to use the term "subtle energy," as it has been used by researchers referred to throughout this document This term, along with many others, is explained in detail in Claude Swanson's book, *Life Force, The Scientific Basis: Breakthrough Physics of Energy Medicine, Healing, Chi and Quantum Consciousness.* Poseidia Press. 2010.

[2] It has been shown that subtle energy (or whatever term is used to represent it) can be electronically "created"—actually brought into the active state—and then electronically recorded, technologically reproduced and embedded into a final "product" with beneficial results for human wellness and ultimately all living organisms. Using a plasma generator, it is possible to create different subtle energy patterns, as explained by the inventor of Vital Force Technology, Dr. Yury Kronn, in the brochure, *Subtle Energy Essentials: Bridging Ancient Wisdom with Modern Technology*. Download at: www.vitalforcetechnology.com (Click "Get brochure").

different brain waves--alpha, beta, gamma, delta, etc.--responsible for various mental states and functional characteristics of the human brain.

Suggesting this accordance is not just a coincidence, and taking into account low-frequency electromagnetic waves cannot interact directly with the human brain, ionospheric effects are taken into consideration as a possible mechanism of this synchronization. The Earth-ionosphere is, in fact, a low-temperature plasma, a mixture of electrically charged ions and electrons. Electromagnetic waves of Schuman resonance force these particles to vibrate. A vibrating ionospheric plasma emits the subtle energy flow of a particular pattern that influences the Earth and everything on its surface. This flow interacts with the human brain, providing a basis for neurofeedback and a possibility for the human mind to evolve using Schumann resonance frequencies as referent points.

To check the hypotheses presented above, a low-temperature plasma generator was used to vibrate a gas discharge plasma with Schuman resonance frequencies. The resulting flow of subtle energy was recorded and then embedded and enhanced, with the help of the aforementioned proprietary Vital Force Technology, into dielectric samples. Several people who are hyper-sensitive to the electromagnetic field were chosen to test these samples. While they were using their phones, they were able to pursue normal activities, which would have otherwise been compromised by the electromagnetic pollution[3] coming from their cell phones, cell phone towers, home appliances and other electromagnetic devices.

Devices using a subtle energy pattern corresponding to the Schumann resonance frequencies could serve as a potential solution for counteracting polluting effects of electromagnetic pollution.

[3] Website of Joel M. Moscowitz, Ph.D., about the Electromagnetic Radiation Safety: http://www.saferemr.com/

Preface

It is not a new concept to suggest we live in a vibrational world, where everything exists in a state of continuous movement, where vibrations never stop. In the physical world, these kind of vibrations can be traced back down to the primary building block of our Universe, that which is used to "construct" the material world: the atom. And looking more deeply into the atom, science has found the atom's constituents, electrons and nuclei, are in a state of never-ending motion. As a rule, this motion has a repetitive pattern that can be presented as a particular frequency, which serves as a distinctive characteristic of a given atom or group of atoms, or molecule or group of molecules. That is, almost every process in our world can be characterized by a particular frequency or set of frequencies and, consequently, corresponding to these frequencies, wavelengths. The fact is, we can detect with our human senses some of these periodic processes or vibrations. For example, we can hear sound waves, see visible light, feel the radiance of heat, etc. However, the vast majority of possible frequencies are well beyond the capabilities of our human sensory system to detect. We cannot touch, hear or see X-Rays, we cannot sense most of the other electromagnetic waves. So, in order to detect and prove their existence, we have to rely only on various scientific devices. This does not mean, however, that these vibrating waves are not interacting with us humans. Actually, they *could* bring us potential benefits *or* harm us, depending on the degree of exposure to these waves (time spent when affected by them) and how they interact with our body and brain (i.e., some parts of the human body are much more sensitive than others).

Aside from different kinds of electromagnetic vibrations, there is also a broad spectrum of other forces (or manifestations of their presence) that have been known

and used by humans for centuries, although they are still not accepted by mainstream science as credible. The reason for this lack of acceptance is simple: there is no scientific device capable of reliably measuring their existence. Only humans can verify the existence of such forces and only after rigorous, specialized training. Specifically here, we are talking about a phenomenon that has been called life force, chi/ki or subtle energy, etc. These processes of identification and utilization of this particular force were the essence of various ancient practices and techniques, such as traditional Chinese medicine (TCM), ayurveda and other time-tested healing modalities.

In this paper, we attempt to introduce subtle energy as the force that binds together phenomena known and accepted by mainstream science, such as Schumann resonance, brainwaves, neurofeedback, the ionosphere and plasma.

To demonstrate the above-suggested position is not just a theory, and that subtle energy can be applied, de facto, we created a specific energy pattern based on the subtle energy flow generated in the plasma discharge and vibrating with Schumann resonance frequencies. We then processed an experimental sample with this subtle energy pattern and checked this sample with people who are hyper-sensitive to the electromagnetic field.

People who tested the experimental sample processed with this energy pattern were so sensitive to electromagnetic radiation, they were previously not able to keep cell phones next to them without having severe headaches, nausea, etc. However, with the experimental sample attached to their cell phone, they were able to use their phones without problems.

What is described above provides solid ground for concluding that the suggested approach and already-developed technology could be beneficial for further use in counteracting other polluting effects of the environment, in this case of an electromagnetic nature.

In order to proceed further, it would help to review the basics of Schumann resonance and brainwaves, along with the concept of neurofeedback.

Chapter 1. The Basics of Schumann Resonance[4]

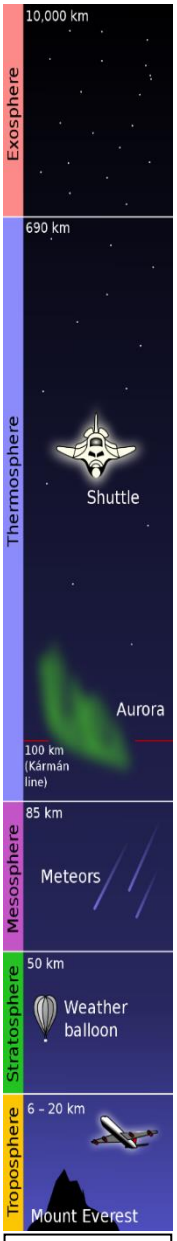

Fig. 1. Layers of the Earth's atmosphere.[6]

As we know, vibrations of any media in a closed volume create in this volume so-called standing waves, which exist in a state of resonance being reflected numerous times from the encompassing "walls." They are stable, in the sense that their frequency is determined only by the physical parameters of the media (air, liquid, matter, etc.), the volume's geometry, and the type of wave we're exploring (acoustic, electromagnetic, etc.). The waves amplitude diminishes with time, due to the dissipation of the energy of the waves as a result of friction. Well-known examples of standing waves are sounds coming from the resonators of various musical instruments (e.g., an acoustic guitar). Different kinds of standing waves are responsible for the particular sound timber that characterizes a specific musical instrument.

The standing waves of Schumann resonance are created by electromagnetic waves that propagate in the relatively narrow gap between the surface of the Earth and the ionosphere.[5] The ionosphere extends beyond the stratosphere up to the exosphere (see Fig. 1).[6] When electromagnetic waves reach the surface of the Earth, they dissipate and are absorbed by the Earth's surface. When they reach the ionosphere, they are reflected from it, like a mirror. The ionosphere's conductivity makes it a perfect reflective media for the electromagnetic waves "bumping" into it. The higher the frequency of an electromagnetic wave, the more elevated the layer of the ionosphere that reflects it back to the Earth's surface. Only a small percentage of the existing atmosphere electromagnetic waves makes its way through the gap to, ultimately, create a standing wave.

[4] All of the factual material in this chapter is taken from the following Wikipedia articles: https://en.wikipedia.org/wiki/Thunderstorm, https://en.wikipedia.org/wiki/Schumann_resonances and https://en.wikipedia.org/wiki/Ionosphere . Cross-references from the Wikipedia articles were removed to make the text more readable. Check the above links for the references.

[5] Layers of the ionosphere that reflect very low frequency electromagnetic waves responsible for Schumann resonance are located in two zones, at the heights of 40-50 km and 60-80 km above the Earth's surface. In comparison with the size of the Earth, this is a very narrow gap, about 1% of the Earth radius.

[6] https://ru.wikipedia.org/wiki/%D0%A4%D0%B0%D0%B9%D0%BB:Atmosphere_layers-ru.svg#/media/File:Atmosphere_layers-en.svg

This particular type of standing waves was detected experimentally between 1960-63 by Balser and Wagner. However, many years before that, back in 1893, George Francis Fitzgerald suggested the upper layers of the ionosphere have sufficient conductivity and would reflect electromagnetic waves, creating vibrations in the atmosphere. Then, he theoretically predicted their existence. Due to the theoretical studies of Winfred Otto Schumann, a German scientist working on the subject of electromagnetic waves propagating in a spherical waveguide in application to the Earth, these standing waves were later named the Schumann resonance.

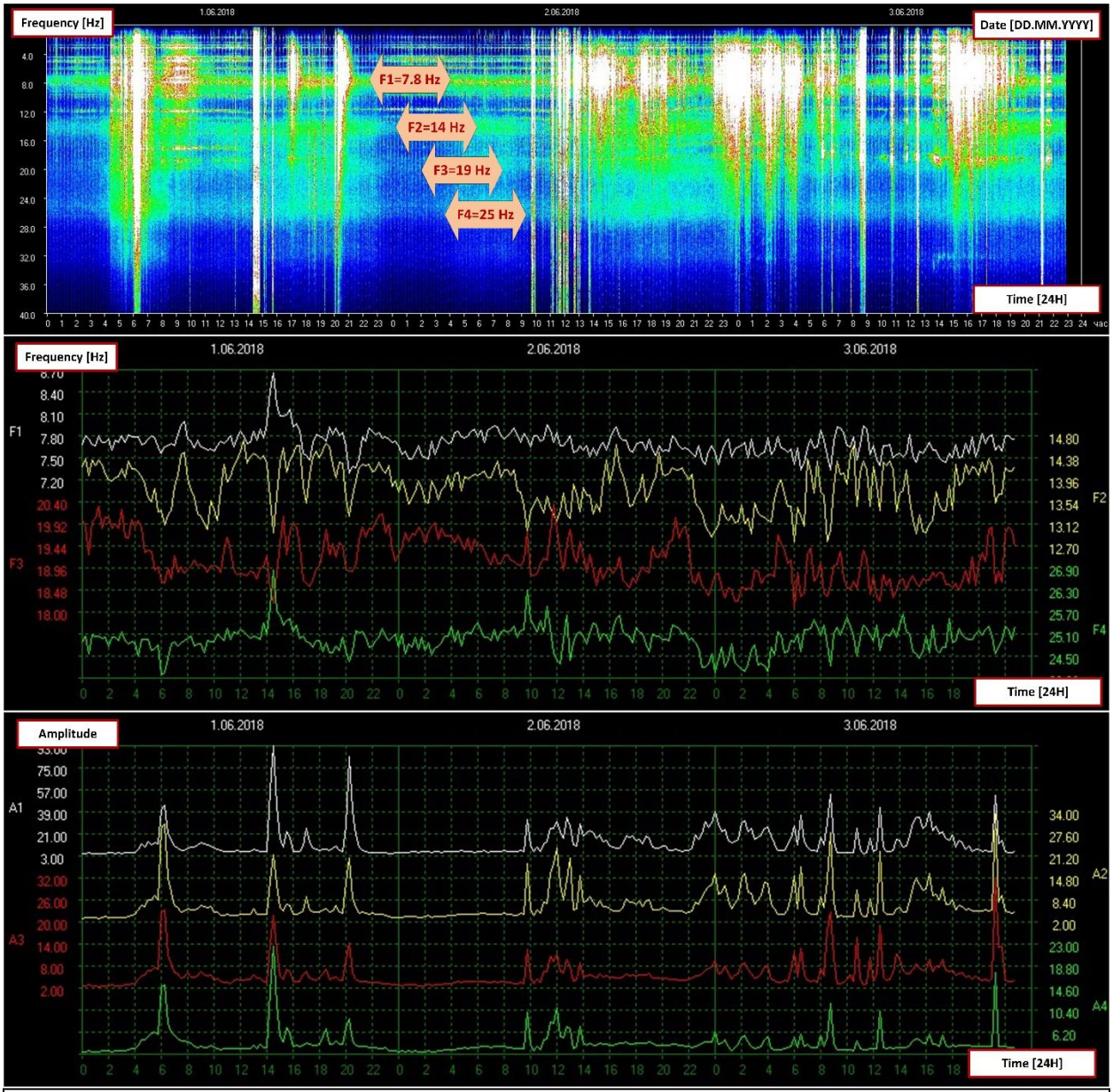

Fig. 2. Live monitoring of the Schumann resonance first four modes at the Tomsk Space Observing System station (http://sosrff.tsu.ru/?page_id=7) in Siberia, Russia. Vertical white lines in the upper graph show active thunderstorms in the Tomsk area in June 1-3, 2018, when these graphs were recorded. You can see a strong correlation between frequency/amplitude of the Schumann frequencies and a lightning activity in the area.

Now, let us go back to the detailed description of the factors that allow Schumann resonance to exist on our planet.

First of all, Schumann resonance is not possible without electromagnetic waves, which are at the core of this phenomenon. The primary source of electromagnetic waves in the atmosphere is the Earth's lightning activity. On average, with several billion thunderstorms globally per year, a lightning discharge is happening approximately 40-50 times every second, creating a brief, powerful, living "radio" antenna that emits a spectrum of electromagnetic waves into the atmosphere. This antenna transmits into the atmosphere a broad range of electromagnetic waves of different frequencies, from very low frequencies in the 10-1000 Hz region to the high-frequency oscillations of hundreds of MHz, with the maximum of these waves going into the KHz region of the spectrum. At the speed of light, these waves move around the globe, going through the Earth's waveguide, which is a gap between the Earth's surface and the ionosphere. Ultimately, they create a stable pattern of standing waves, which were discovered experimentally in the twentieth century and later named "Schumann resonance frequencies." Because lightning activity is not the same in all areas of the globe, with significant lightning activity zones above Africa, South America and Asia, the Schumann resonance pattern is slightly different in different regions of the planet. However, this pattern and the world's lightning activity are linked to each other so tightly, that it is possible to monitor global lightning activity across the globe by checking Schumann resonance parameters in stations located in different localities of the planet.

The second major constituent of Schumann resonance is the Earth's ionosphere. It consists of electrons and electrically charged atoms and molecules stretching from a height of about 50 km to more than 1,000 km. These electrically charged particles are created by the ultraviolet radiation coming from the Sun, cosmic rays and other factors.

As shown in Fig. 1 in the beginning of this chapter, the lowest part of the Earth's atmosphere, the troposphere, spreads from the surface of the planet to the height of about 10 km. Above it is located the stratosphere, followed by the mesosphere. In the stratosphere, incoming solar radiation creates the ozone layer. At heights above 80 km, the atmosphere is so thin, free electrons can exist for a short period of time before they are captured by nearby positive ions. The concentration of these free electrons is sufficient to affect electromagnetic waves propagation, including radio

waves and Schumann resonance waves. This part of the atmosphere could be considered to exist in a state of a rarefied plasma. In Chapter 3, the distinctive qualities of this plasma will be reviewed. Also, due to a difference in ionization in the lower ionosphere during the day and night, caused by the Sun's activity, a variability in Schumann resonance intensities, frequencies and quality factors can be detected.

So, both the world's lightning activity and the existence of the ionosphere make Schumann resonance happen on the Earth. We have to also mention the effects of solar flares and solar proton events, as well as the state of the ionospheric plasma, which causes variations of the Schumann resonance frequencies and amplitudes (please, refer to Fig. 2 for the real time monitoring of the Schumann resonance frequencies and amplitudes at the Tomsk Space Observing System station.)

Before continuing to the next chapter, it is advised to review the conclusions below and note that a base mode frequency of Schumann resonance is roughly equal to 8 Hz with the harmonics manifesting themselves at frequencies rounded to 14 Hz, 20 Hz, 26 Hz, 32 Hz, 38 Hz, etc. This is a simplified formula for the frequency of the harmonic number "N" (expressed in Hz) as $F_N = 2*(1 + 3*N)$, with N = 1 and F_N = 8 Hz for the base mode and N = 2,3,4, etc. for higher harmonics.

Conclusions:

1. Schumann resonance is a natural electromagnetic phenomenon which has existed on the Earth for millennia. The frequencies of Schumann resonance are very stable, as they are specified by the Earth's geometry and the electromagnetic properties of the Earth's surface and ionosphere.
2. Schumann resonance frequencies reflect a combined effect of the processes happening on the Earth, both "internally" (lightning activity, weather conditions, ocean currents and wind distribution, etc.) and "externally" (solar activity, ionosphere and magnetosphere effects, X-ray radiation and flows of particles coming from outer space, etc.). In this way, fluctuating Schumann resonance frequencies are a precise indicator of the Earth's "health" at any given moment, at any given place.

Chapter 2. Brainwaves and Neuro-feedback[7]

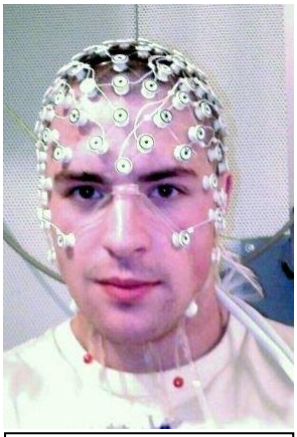

Fig. 3. An example of the placement of electrodes in the EEG recording setup.[8]

As part of this discussion, it will be beneficial, now, to focus on the human brain, specifically the brain's neural oscillations or brainwaves, which reflect the repetitive neural activity of the central nervous system, which produces electrical signals. While these signals can be detected using various methods, this paper will discuss results obtained with the help of electroencephalography (EEG). EEG is an electrophysiological monitoring method used to record the electrical activity of the brain. It is typically noninvasive, with the electrodes being placed along the scalp (Fig. 3), although invasive electrodes are sometimes used (e.g., in electrocorticography). EEG measures voltage fluctuations resulting from ionic current within the neurons of the brain.[8]

In the 1950s, almost simultaneously with the publishing of Otto Schumann's work[9] on standing electromagnetic waves in the spherical gap between the Earth's surface and the ionosphere, scientists researching the human brain discovered electromagnetic activity in it, which they named brainwaves. Following the order of how these periodic electromagnetic signals of a particular frequency were discovered, scientists named them with the letters of the Greek alphabet, though not necessarily following the corresponding frequency range. That is, alpha waves manifest themselves in the frequency range of 7.5-12.5 Hz, and beta waves are detected at 12.5-30 Hz, while delta waves are observed in 1-4 Hz range. With this discovery, scientists noticed that brain waves cover the same frequency spectrum as does Schuman resonance. No reasonable explanation of this correlation of frequencies was proposed at that time. However, after the first launches of space stations, when astronauts were spending months in the Earth's orbit, it was observed that, along with other potential dangers to human health, the lack of Schuman resonance frequencies also had to be taken into consideration. Due to the shielding effect of the upper layers of the ionosphere, which separate the space station from

[7] All of the factual material in this chapter is taken from the following Web-articles: https://en.wikipedia.org/wiki/Neural_oscillation and https://www.brainworksneurotherapy.com/what-are-brainwaves . Cross-references from the articles were removed to make the text more readable. Check the above links for the references.

[8] https://en.wikipedia.org/wiki/Electroencephalography

[9] https://www.degruyter.com/view/j/zna.1952.7.issue-3-4/zna-1952-3-404/zna-1952-3-404.xml

the surface of the Earth, electromagnetic signals "are not allowed" to leave the Earth atmosphere. NASA claimed that an artificial simulation of Schuman resonance frequencies in the space station using an electronic device (details were not revealed) improved the situation.[10]

In this discussion of brainwaves, it would be helpful to put emphasis on a discovery called "neuro-feedback" (or neuro-therapy or neuro-biofeedback, according to different researchers).[7] This phenomenon was observed during brain studies using EEG, when researchers noticed a person under examination could change his/her brainwaves pattern, if he/she is provided with the sensory reference (visual, sound or tactile) of their brain activity. This discovery allowed researchers to create a highly efficient brain training procedure that enabled people become more successful in their mental, emotional and/or physical activities. Experimentation on this training procedure, showed people could successfully train and possibly change their brain and its functions, if provided with appropriate feedback on their brain activity.

It would be useful now to take a closer look at the different brainwaves and behavioral patterns associated with them, in order to better understand better the phenomenon of neuro-feedback. It will be good to discuss brainwaves in the order of the frequency spectrum they belong to, starting from the low frequencies. Brainwaves differ from each other, not only in frequency, but also in the amplitude of the EEG signal for different brainwaves.

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Delta brainwaves, 1-4 Hz (0.5-2 Hz, according to recent studies**).**[7] These brainwaves are the slowest *and* highest in amplitude. Delta brainwaves begin to appear in stage 3 of sleep, and they dominate nearly all spectral activity by stage 4 of sleep. Stage 3 of sleep is defined as having less than 50% of delta brainwave activity, while stage 4 of sleep has more than 50% of delta brainwave activity. Delta brainwaves occur in all mammals, and potentially all animals, as well.

As people move from lighter to deeper stages of sleep (before REM stage of sleep), the occurrence of alpha brainwaves (see below) diminishes, and they are gradually being replaced by the lower frequency theta and then delta brainwaves.

[10] https://www.amazon.de/Informative-Medizin-Muss-krank-Krankheits-Ursachen/dp/3886990508

Although delta and theta brainwaves are generally prominent during sleep, there are cases when delta and theta brainwaves are recorded from individuals who are awake. For example, theta brainwaves will occur for brief intervals during emotional responses to frustrating events or situations. Delta brainwaves may increase during intense mental activities requiring concentration. In general, the occurrence and amplitudes of delta and theta brainwaves are highly variable within and between individuals. Interestingly, delta is the dominant frequency in infants up to one year old.

Theta brainwaves, 4-7 Hz. These brainwaves come into view as EEG signals in the 4–7 Hz frequency range, regardless of their functional significance or the area in the brain they are observed.

Human scalp EEG is generated mainly by the cerebral cortex. Cortical theta brainwaves have been observed during the transition from sleep to waking and during quiet wakefulness. There is an association during hypnosis with stronger theta brainwaves activity, as well as with changes to the gamma brainwaves activity (see below).

Theta brainwave activity associated with the hippocampus appears during some short-term memory tasks. These brainwaves reflect an active state of the hippocampus when it is ready to process incoming signals. Conversely, theta brainwaves in rats correlate with various voluntary behaviors (exploration, spatial navigation, etc.) and alert states (goosebumps, etc.). This may reflect the integration of sensory information with motor output, suggesting that theta brainwaves are likely involved in spatial learning and navigation. Theta brainwaves are believed to be vital to the induction of long-term potentiation, a potential cellular mechanism of learning and memory.

It is known that theta brainwaves occur most often in sleep, but are also dominant in deep meditation. It has been said that theta brainwaves are our gateway to learning, memory and intuition. In the theta brainwave state, our senses are withdrawn from the external world and focused on signals coming from within. These kinds of sensations are usually experienced upon waking or drifting off to sleep. In the theta brainwave state, the mind is often “in a dream” sometimes inclusive of vivid imagery, intuition and information beyond our ordinary conscious awareness. There, too, can be found one’s fears, troubled history and nightmares.[7]

Alpha brainwaves, 7.5-12.5 Hz (alpha1 – 7.5-10 Hz; alpha2 – 10-12.5 Hz)**.** This type of brainwave was first reported in the early 1920s, along with beta brainwaves, by Hans Berger, the inventor of the EEG. He was interested in so-called "alpha blockage," which happens when a person opens his/her eyes. At that moment, alpha brainwaves decrease while beta brainwaves increase.

Alpha brainwaves drew the attention of researchers again in the early 1960s and 1970s with the creation of biofeedback, a kind of neuro-feedback. In research with humans, it was found that some people can distinguish a state when they are creating alpha brainwaves, and they can consciously increase their alpha brainwave activity.

Scientists distinguish at least two forms of alpha brainwaves, which may have different functions in the wake-sleep cycle. One is detected during the relaxed mental state, when a person is at rest with eyes closed, but is not tired or asleep. This brainwave activity is centered in the occipital lobe and is presumed to originate there, although it might have a thalamic origin, as well. These brainwaves begin appearing at around four months of age and initially at a frequency of 4 Hz. The “mature” alpha brainwaves, at 10 Hz, are firmly established by the age of three.

Other alpha brainwaves manifest themselves during REM (rapid eye movement) sleep. As opposed to the ‘awake’ form of brainwave activity, this form is associated with a frontal-central location in the brain. Currently, it is considered that alpha patterns are a regular part of REM sleep, indicating a semi-arousal period.

Alpha brainwaves are present when the brain sets itself to rest or reflect. Alpha brainwave frequencies increase with one’s closing of the eyes and relaxing, yet are offset by the opening of one's eyes or with any concentrated effort. Alpha brainwave activity is usually best detected in the frontal regions of the head, on each side of the brain. Alpha brainwaves are the dominant rhythm seen in normal relaxed adults and are typically regarded as the common relaxation mode beyond the age of 13.

Alpha brainwaves move a person toward deep relaxation, imagination and intuitive thinking, as they accompany a relaxed mind after complex thinking, and bring one into a mode of relaxation and recovery from stressful thoughts or emotional despair.

Each region of the human brain has been shown to have a particular alpha brainwaves rhythm, but alpha brainwaves of the highest amplitude are recorded coming from the occipital and parietal zones of the cerebral cortex. Usually, amplitudes of the alpha brainwaves diminish when a person opens his/her eyes and

is attentive to external stimuli, although some people trained in relaxation techniques can maintain alpha brainwave amplitudes even with their eyes open.

Beta brainwaves, 12-38 Hz (beta1 – 12-15Hz; beta2 – 15-22Hz; beta3 – 22-38Hz). These brainwaves appear on the EEG diagram when people are alert and attentive to external stimuli, or when they exert specific mental effort. Beta brainwaves also occur during deep sleep, i.e., REM sleep with eyes moving back and forth. These brainwaves indicate arousal of the cortex to a higher state of alertness or tension. They have also been associated with "remembering" or retrieving memories.

Beta brainwaves are a characteristic of the engaged mind, one which is highly alert and well focused. Typically detected in the frontal lobes (managing decisions), these brainwaves exist in both sides of the brain. They tend to be the dominant brainwaves in those persons who are alert, anxious or have their eyes open. Beta brainwaves are engaged when the brain is aroused or processing activities, such as involved conversations with others that command one's full attention, complex problem-solving and assessment of situations, public speaking, lectures or teaching information. Beta brainwaves dominate in normal waking state of consciousness, when attention is directed towards cognitive tasks and the outside world.

Low amplitude beta brainwaves with multiple and varying frequencies are often associated with active, busy or anxious thinking and intense concentration. Over the motor cortex, beta brainwaves are associated with the muscle contractions that happen in isotonic movements and are suppressed before and during movement changes. Bursts of beta brainwave activity are associated with a strengthening of sensory feedback in static motor control. This activity is increased when the movement has to be resisted or voluntarily suppressed.

We can describe Beta1 (Low-Beta) as a 'fast idle,' or when one is musing. Beta2 is present during high engagement or when actively figuring something out is involved. Beta3 (Hi-Beta) occurs during highly complex thought, excitement, high anxiety or the integrating of new experiences.

Gamma brainwaves, 38-100 Hz. This type of brainwaves is the fastest of all brainwaves and deals with the simultaneous processing of information from different brain areas. Gamma brainwaves are also the most subtle in amplitude; the mind has to be quiet to access them. Some researchers suggest that gamma brainwaves modulate perception and consciousness, and that a more significant presence of gamma brainwaves relates to expanded awareness and spiritual growth. These

brainwaves are associated with the "feeling of blessings" often reported by experienced meditators.

It is possible that gamma brainwaves can link information from all parts of the brain. They originate in the thalamus and move from the back of the brain to the front and back again with a frequency of about 40 Hz. This "full sweep" action makes the gamma state typically present during peak mental and physical performance.

People with higher levels of gamma brainwave activity will often experience improvements in memory and the ability to vividly recall past experiences. Gamma brainwaves are also known to intensely enhance the vibrancy of reality. A sensory perception, when attuned with gamma brainwaves, will make smells more powerful, sights and sounds much brighter, and flavors more intense.

Gamma brainwaves are attributed to people with high IQ and are associated with advanced learning abilities. Those who experience more gamma brainwave activity naturally tend to feel more compassionate towards others, while also experiencing a heightened sense of joy. Also, gamma brainwaves are believed to be our gateway to insight and blissful awareness. Compassion comes from a feeling of oneness with all creation, and a sense of natural euphoria has been known to accompany high levels of gamma brainwave activity.

Gamma brainwaves are usually present in deep dream states and can be activated through the visualization meditation. With gamma brainwave activity present, advanced levels of information processing can also be available to people during wakefulness. Meditation and brainwave entrainment are perhaps the best ways to access these cutting-edge levels of conscious awareness and intense bursts of insight.

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Now, given this wide spectrum of information about different brainwaves, it can be a perfect time to return to the phenomenon of neuro-feedback. As has already been mentioned, neuro-feedback is a type of biofeedback that monitors brainwaves and, depending on their activity, modulates a signal that is used as a feedback to teach a person how to self-regulate her/his brain functions. Neuro-feedback is commonly organized using video or sound support, with positive feedback for the desired brain activity and negative feedback for undesirable brain activity. Related technologies include hemo-encephalography biofeedback (HEG) and functional magnetic resonance imaging (fMRI) biofeedback.

Within the last 5–10 years, neuro-feedback has taken a new approach to look into deeper states of consciousness. Alpha-Theta training has been tested with patients with alcoholism and other addictions, as well as anxiety. This low-frequency training differs significantly from the high-frequency Beta and SMR[11] training that has been practiced for over 30 years. Beta and SMR training can be considered a more directly physiological approach, strengthening sensorimotor inhibition in the cortex and inhibiting alpha patterns, which slow metabolism. Alpha-Theta training, however, derives from the psychotherapeutic model and involves accessing of painful or repressed memories through the Alpha-Theta state.[7]

Brainwaves entrainment. Our brain can naturally synchronize its brainwave frequencies with the rhythm of periodic external stimuli, most commonly auditory, visual or tactile. For example, listening to periodic beats of specific frequencies, a person can experience the desired state of consciousness corresponding to the particular neural activity. When this synchronization is taking place, so-called brainwave entrainment is happening.

As was just indicated in detail above, brainwaves correspond with states of alertness, such as focused attention, deep sleep, etc. Brainwaves correlate with emotional responses, motor control and some cognitive functions, including information transfer, perception and memory. Brainwaves, in particular, theta brainwaves, are extensively linked to memory function, and a coupling between theta and gamma brainwaves is considered to be vital for memory functions, including episodic memory.

Brainwaves share the fundamental similarity with any waves, including acoustic and optical waves; they could be described in terms of their frequency, amplitude and periodicity. The question is: whether or not the synchronous electrical activity of cortical neural ensembles might not only alter in response to external acoustic or optical stimuli, but also entrain or synchronize their frequency to that of a specific stimulus.

Brainwave entrainment is a term used for 'neural entrainment,' denoting the way in which the aggregate frequency of oscillations produced by the synchronous electrical activity in ensembles of cortical neurons can adjust to synchronize with the periodic vibration of external stimuli. They might be a sustained acoustic

[11] Sensorimotor Rhythm. For most individuals, the frequency of the SMR is in the range of 13 to 15 Hz. https://en.wikipedia.org/wiki/Sensorimotor_rhythm

frequency perceived as pitch, a regularly repeating pattern of intermittent sounds, comprehended as rhythm, or of a regularly rhythmically intermittent flashing light.[7]

Exogenous rhythmic entrainment, which occurs outside the body, has been identified and documented for a variety of human activities, which include the way people adjust the rhythm of their speech patterns to those of the subject with whom they communicate, and the rhythmic unison of an audience clapping. Even among groups of strangers, the rate of breathing, locomotive and subtle expressive motor movements, and rhythmic speech patterns have been observed to synchronize and entrain in response to auditory stimuli, such as a piece of music with a consistent rhythm. Furthermore, motor synchronization to repetitive tactile stimuli occurs in animals, including cats and monkeys, as well as humans, with accompanying shifts in EEG readings. Examples of endogenous entrainment, which occurs within the body, include the synchronizing of human circadian sleep-wake cycles to the 24-hour rhythm of light and dark, and the synchronization of a heartbeat to a cardiac pacemaker. [7]

Everything conveyed above has been essential to suggest the following: Schuman resonance frequencies can create brainwave entrainment, and they are the vital

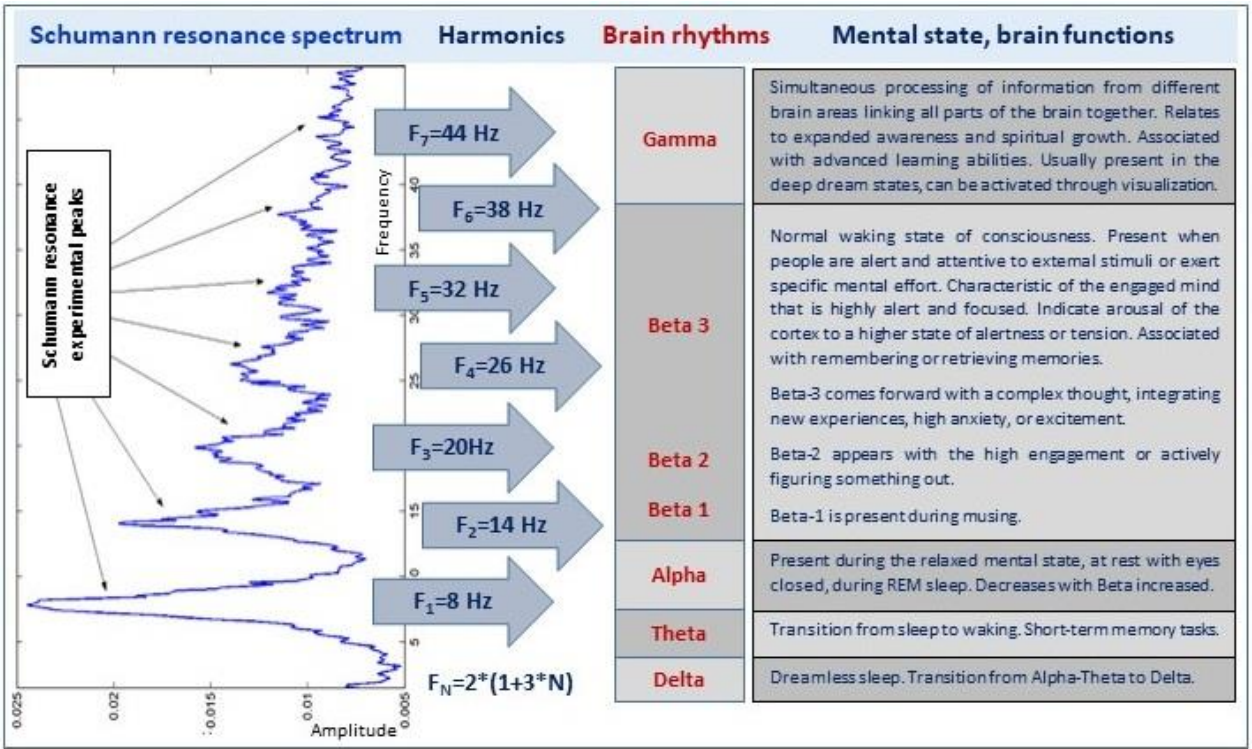

Fig. 4. A real time Schumann resonance spectrum recorded in 2004 at the Ukrainian Antarctic station "Academician Vernadsky" (-65.245556, -64.257778) is shown against different brainwaves' functions responsible for different modes of the human brain operation.

reference points for the human brain, even though they are neither optical, acoustic nor tactile stimuli. If this is the case, then a correspondence between Schuman resonance frequencies and different brainwave rhythms are not just a coincidence, but rather an indication of the existence of a powerful and longlasting mechanism that helps humanity to evolve physiologically, psychologically and spiritually through the synchronization with the Earth's natural beats. In Fig. 4, it can clearly be seen that Schumann resonance peaks[12] create a natural ladder that serves our brainwaves, just as steps to climb to a summit, heightening our creative potential from the dreaming state of alpha-theta rhythms through thinking and complex thoughts associated with beta rhythms to the expanded awareness of gamma rhythms.

In the next chapters, this suggestion will be verified by modeling the mechanism of synchronization in the lab. It is helpful to understand that straightforward generation of electromagnetic waves with Schuman resonance frequencies (mimicking the effect electromagnetically) would not produce any benefits, because electromagnetic waves of that length (comparable to the Earth's circumference) would not interact with the human brain. The same way ocean waves leave properties of the cork floating on the water surface intact, even though the cork is moving as a whole following the movement of the water surface. However, as was mentioned before, referring to NASA experiments with astronauts in space stations, it is clear that Schumann resonance effects are essential for human health. In order to link these two phenomena together (Schumann resonance frequencies and brainwaves), it must be determined whether or not there is something else (not of an electromagnetic nature) that might bind them together.

As a hypothesis, it is herein suggested that the connecting media between the huge, tEarth-caliber Schumann resonance effects and a relatively small human brain is subtle energy (see the next chapter for details). This type of energy is generated in the upper layers of the atmosphere, when the low-temperature plasma of the low Earth's ionosphere is vibrated by the electromagnetic waves of Schumann

[12] The experimental results of Schumann resonance frequencies measured in 2004 in Antarctica were generously provided by Dr. Alexander Koloskov, Institute of Radio Astronomy National Academy of Sciences of Ukraine, http://geospace.com.ua/en/index.html

resonance. It will be valuable here to take a closer look at the ionosphere and its characteristics.

Conclusions:

1. Brainwaves reflect a repetitive neural activity of the central nervous system that produces electrical signals associated with different types of brain functioning.
2. Neuro-feedback is a type of biofeedback that monitors brainwaves and, depending on their activity, modulates a signal that is used as feedback. A person could change his/her brainwave pattern if he/she is provided with the sensory reference (visual, sound or tactile) of their brain activity.
3. Brainwave entrainment happens when our brain synchronizes its brainwave frequencies with the rhythm of periodic external stimuli. Listening to periodic beats of specific frequencies, for example, a person can experience the desired state of consciousness corresponding to the particular neural activity.
4. Schuman resonance frequencies can create brainwave entrainment, and they might work as vital reference points for the human brain, even though they are neither optical, acoustic nor tactile stimuli.

Chapter 3. The Ionosphere as a Plasma Generator.[13] Vital Force Technology.[14]

In Chapter I, we briefly described the Earth's ionosphere as a conductive media that prevents low-frequency electromagnetic waves of the Schuman resonance from going out to interstellar space, reflecting them back instead to the Earth's surface. From the physics perspective, the Earth's ionosphere is a mixture of ionized gases existing in the upper layers of the atmosphere. Mainly, these gases are nitrogen, oxygen, argon and their ions, plus free electrons. In other words, the ionosphere is a fourth fundamental state of matter—plasma—which does not exist "freely" under normal conditions on the surface of the Earth, *unlike* the other three states of matter we live with and consist of: solid, liquid and gas.

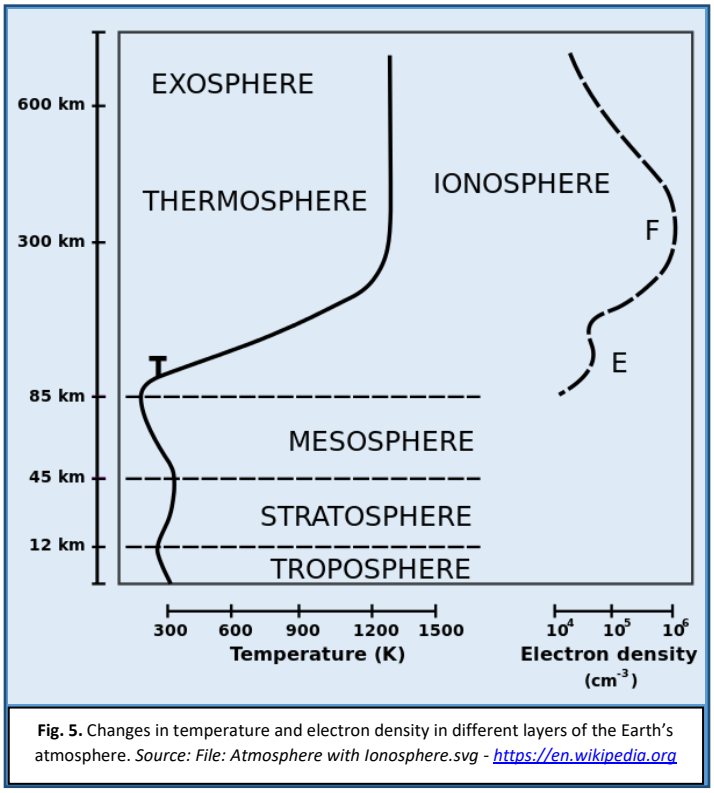

Fig. 5. Changes in temperature and electron density in different layers of the Earth's atmosphere. *Source: File: Atmosphere with Ionosphere.svg - https://en.wikipedia.org*

However, as we know, this plasma we call Earth's ionosphere has existed for millennia in the upper layers of our atmosphere. The ionosphere in its current state is formed due to the cosmic rays, proton bombardment, solar winds and other processes having their origin both in outer space and the magnetic field surrounding the Earth.

The ionosphere occupies a relatively vast region of the upper atmosphere, with its lower layer lying in the mesosphere at altitudes of 50-60 kilometers (see Fig. 5), while the upper layer exists at altitudes higher than 1000 kilometers (about 600 miles), above the exosphere, where it is considered to be a plasma-sphere.

[13] Information in this chapter is taken mostly from http://vvkuz.ru/books/lectures_1/11.pdf (in Russian) and the Wikipedia article: https://en.wikipedia.org/wiki/Ionosphere . Cross-references from the article were removed to make the text more readable. Check the links for the references, in order to verify the original source publications.

[14] http://vitalforcetechnology.com/how-it-works/the-science

To describe the parameters of the ionosphere, scientists usually use the following physical characteristics: the ionosphere's temperature, its ionic composition and the concentration of its electrons. These parameters vary with the distance from the Earth's surface, and are configured in a somewhat complicated manner, as shown in Fig. 5. However, it is possible to define three zones of the ionosphere having the maximum concentration of electrons, which are responsible for the reflective qualities of that particular stratum: D-layer (begins above altitudes of 80 km), E-layer (110 km), and F-layer. The latter one consists of two layers: F1 (170 km) and F2 (300 km). Variations in the plasma parameters in the D- and E-layers are caused mainly by the daily and seasonal changes in the Earth's illumination. For the F-layer, magnetosphere effects are the most significant.

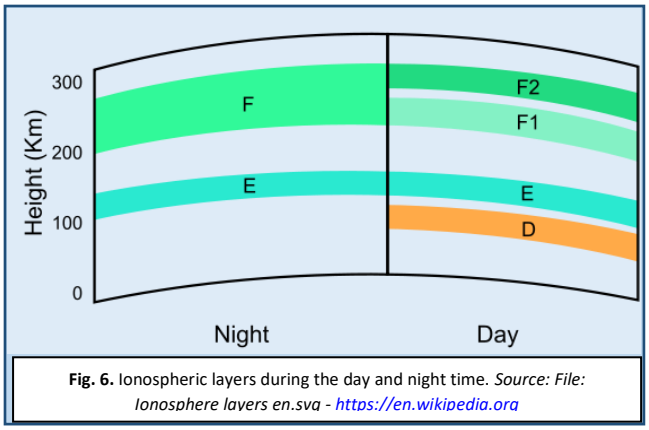

Fig. 6. Ionospheric layers during the day and night time. *Source: File: Ionosphere layers en.svg - https://en.wikipedia.org*

Because of the conductive nature of these layers (due to the high concentration of electrons present), they work as a reflective surface for the electromagnetic waves coming from the Earth's surface, regardless of the origin of these waves. The higher the frequency of the electromagnetic wave, the higher the layer of the ionosphere reflecting it, due to the higher density of the electrons at higher altitudes (Fig. 5). That is, the lowest layer of the ionosphere, D-layer, reflects low-frequency electromagnetic waves of the Schumann resonance. At night, when D-layer is not active (Fig. 6), E-layer is working as a reflective mirror for these waves. As a result, frequencies of the Schumann resonance are slightly smaller at night.

It's important to note D-layer is the layer of the ionosphere located at altitudes of 60 km to 90 km above sea level, Because this is where ionization is happening; and this is due to the Lyman series-alpha hydrogen radiation occurring at a wavelength of 121.6 nm. The result is the ionizing of nitric oxide (NO). It is also significant that high solar activity can generate hard X-rays (wavelength < 1 nm), which ionize nitrogen (N_2) and oxygen (O_2). Recombination rates are high in the D-layer, so the percentage of the ionized molecules is small.[11]

Medium frequency and lower high-frequency radio waves are significantly attenuated within the D-layer, as the passing radio waves cause electrons to move, which then collide with the neutral molecules, giving up their energy. This effect peaks around noon each day and is reduced at night, due to a decrease in the D-layer's thickness; only a small part of this layer remains, due to cosmic rays. A typical example of the D-layer in action is the disappearance on your radio of distant AM broadcast band stations during the daytime.

During solar proton events, ionization can reach into the D-layer at unusually high levels, over high and polar latitudes. Such infrequent events are known as Polar Cap Absorption (or PCA) events, because the increased ionization significantly enhances the absorption of radio signals passing through the region.

The E-layer is the middle layer of the ionosphere, spreading from 90 km to 150 km above sea level. Ionization there happens due to the soft X-rays (1–10 nm) and far ultraviolet solar radiation ionization of molecular oxygen (O_2). Typically, this layer can only reflect radio waves having frequencies lower than about 10 MHz and may contribute to absorption of frequencies above that. However, during intense sporadic E-events, the E-layer can reflect frequencies up to 50 MHz and higher. At night, the E-layer weakens, because the primary source of ionization is no longer present. After sunset, an increase in the height of the E-layer maximum increases the range to which radio waves can travel by reflection from the layer.[11]

Summing up, the Earth's surface is covered by a relatively thick layer of a low-temperature plasma that reflects electromagnetic waves and creates—with the Earth's surface—a resonant cavity, a waveguide, where Schumann resonance events take place. The parameters of the D- and E-layers of the ionosphere—their conductivity, in particular—are dependent on the Sun's activity, as well as interstellar events. Along with the activity of lightning, the following parameters influence the amplitude and frequency of Schumann resonance frequencies: functions of the time (day-night), seasons (summer-winter), the geographical location (closeness to the most active thunderstorm areas), solar activity (for example, magnetic thunderstorms intensify them), the Moon's phases, etc. In other words, the frequency and the amplitude of Schumann resonance electromagnetic waves vary significantly, both during any given day, as well as during longer periods of time, such as can be found in seasonal changes and the much longer peak solar activity periodical variations. All these factors cause variations in the average values

for Schumann resonance frequencies, up to plus-minus 1.5 Hz over the average, along with the significant changes in their amplitude.

That is, Schumann resonance frequencies are natural Earth rhythms—in a way, one could view them as the Earth's pulse— which reflect both surface and interstellar characteristics of the Earth at any given moment in time. Further, it has been proposed that this rhythm is transmitted from the ionosphere to the ground in order to synchronize every living organism, including humans, with these Earth-Cosmos rhythmic beats.

It seems worthy to ask: Is there a mechanism of communication between any given remote ionospheric event and objects (both living and inanimate) on the Earth's surface? And if so, what is that mechanism? As discussed earlier, very low-frequency electromagnetic waves must be ruled out as a direct medium for the interaction between ionospheric events and the human brain, due to their vast wavelengths and the lack of appropriate "wiring" in the human body that might work as a possible antenna. Continuing on, what else may be capable of connecting macro and micro scales of the Earth's atmosphere and the human brain?

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One could easily spend a great deal of time wandering in darkness, attempting to answer the above question, if it were not for the long-standing research done by Dr. Yury Kronn,[15] the inventor of Vital Force Technology (VFT). During his many years of research, he experimented with low-temperature plasma, which was vibrated by a low-frequency alternating current. In these studies, he found that this vibrating plasma emits, along with visible light, a flow of "subtle energy" (referencing the term mentioned in the first sentence of this paper's Abstract) that he succeeded to record with a system he invented and afterward reproduced and enhanced as a distinctive pattern carrying a particular energy signature. As a result of his research, Dr. Kronn demonstrated that different frequencies and combinations of frequencies create different subtle energy patterns, which ultimately have a different and unique influence on humans, animals, plants, cells and all living organisms.[16]

More specifically, Dr. Kronn vibrated plasma of the electrical discharge in a mixture of inert gases at low-pressure, along with the electrical signals coming from a

[15] http://vitalforcetechnology.com/dr-yury
[16] http://vitalforcetechnology.com/research-library

function generator. He found that a range of frequencies below 1,000 Hertz is the most ideal, especially when sweeping these frequencies up and down inside a particular region. Experimenting this way, he succeeded in creating, among others, an energy pattern that proved to be an excellent stress-relieving substance when "infused" (for example, into diluted trace minerals) and then taken orally (the recommended dosage was eventually determined to be in the amount of 10-20 drops with water). By infusion, Dr. Kronn means the processing of any substance in the VFT system that reproduces amplified subtle energy patterns that were created with the help of the plasma generator and recorded in his system.

A group of scientists at Riga Stradins University, Latvia, checked this stress-relieving phenomenon on mice, in order to exclude a potential placebo effect that might be present in human reactions. Their experiments showed statistically significant results indicating this formula works on mice even better than on humans, with the overwhelming efficacy of some behavioral parameters up to 350%.[17]

That is, based on Dr. Kronn' research and experimental results, it is hereby proposed that ionospheric plasma vibrating with electromagnetic waves of the Schumann resonance sends a flow of subtle energy onto the Earth, which influences everything that exists on its surface, including us humans. It is further suggested that this flow of subtle energy is beneficial for human beings, In that it synchronizes our brainwaves with the Earth's natural rhythms, and in this way presents our minds with the possibility of evolving more rapidly, given this provision of natural brainwave entrainment.

As was shown in Figure 4, particular frequencies of the Schuman resonance work as reference points for different brainwaves, providing our brain with a "road" going forward from the dreaming state of consciousness to the waking state, with a potential for transition into "full awakening" (described throughout history as "enlightenment").

It will be useful to check this hypothesis in lab experiments with subtle energy patterns created using Schumann resonance frequencies in a gas discharge plasma.

[17] Simons Svirskis et al. *Evaluation of "Stress Relief" dietary supplement on the animal stress level and locomotion.* Proceedings of the Latvian Academy of Sciences, June 2018, DOI: 10.2478/prolas-2018-0027. https://www.researchgate.net/profile/Simons_Svirskis

Conclusions:

1. The Earth's ionosphere can be viewed as being in a plasma state. Due to its conductivity, the ionosphere reflects low-frequency waves of Schumann resonance. The conductivity varies, due to natural causes reflecting conditions on the Earth, the Sun, and interstellar space.
2. When any plasma, including the ionosphere, is vibrated by electromagnetic waves, it emits (along with other types of radiation) a flow of subtle energy.
3. The Schumann resonance waves cause the ionosphere to emit a specific flow of subtle energy.
4. Dr. Yury Kronn's Vital Force Technology (VFT) makes it possible to record, store, enhance and reproduce different patterns of subtle energy, including a pattern corresponding to Schumann resonance waves.

Chapter 4. Electromagnetic pollution vs. Schumann resonance effects

Having reviewed more about the ionosphere, it will be good to return to the plasma generator experiments of Dr. Yury Kronn. In his lab, he modulated the electrical discharge of the mixture of inert gases (i.e., a low-temperature plasma), sending electrical signals from the function generator through the plasma. Using proprietary technology, he was able to record a flow of subtle energy coming from the discharge tube, keeping these records in an electronic format for further use. Afterward, using a subtle magnetic field, he was able to "infuse" (with significant amplification) a particular previously recorded energy pattern into practically any media: liquids, solids, crystals, plastics, etc. Processed this way, these compounds were experimentally found to have positive effects on living organisms in a predetermined fashion.

Indeed, as was shown by Dr. Kronn' numerous experiments conducted on humans, animals, plants, living cells and even on genetic expression,[18] different subtle energy patterns are responsible for different effects in living objects. For example, different subtle energy patterns have been demonstrated as beneficial for humans (animals, plants, etc.) when taken internally, via ingestion of the trace minerals or electrolytes processed in the Vital Force Technology "infusion" system.[19] During the last 15-20 years of testing and retesting, using these energetically-processed minerals and working with a network of alternative medicine professionals, Dr. Kronn succeeded in the creation of a wide range of functional energetic patterns, which have been shown both experimentally and anecdotally to help people who suffer from pain, fatigue, stress, lack of concentration, etc.

At this point, it seems appropriate to concentrate on one of the products created in the Dr. Kronn' lab, one that deals with electromagnetic pollution, which is defined here as a disorganized, disruptive flow of different electrical and magnetic signals, what has been referred to as "so-called electromagnetic smog." This particular product, which utilizes the previously discussed Schumann resonance effects, is called the EMF Transformer.

[18] Dr. Yury Kronn. *Subtle Energy Essentials: Bridging Ancient Wisdom with Modern Technology*. Download from www.vitalformtechnology.com Click: "Get brochure"
[19] http://vitalforcetechnology.com/how-it-works/infusion-benefits

Clearly, we live in an era characterized by the exponential growth of electromagnetic pollution of various kinds. Our homes are enmeshed with wiring circuits, emitting nonstop, day and night, electromagnetic radiation that "vibrates" the environment with the frequency of 60 Hz—most developed countries' home circuitry uses electricity moving at 50 Hz. (This is not to mention the high-voltage industrial power lines sometimes noticed buzzing overhead.) All electrical appliances and power supplies connected to one's home outlets add to the cacophony of non-organized frequencies surrounding us, affecting us with all kinds of vibrations, starting with the low "household" frequency of 60 Hz and ending with the very high frequency of 2.45 GHz, which "greets" us from our microwaves, Bluetooth devices and smartphones. Our cordless phones, our refrigerators, our TVs and computers, they all pollute our household with invisible, soundless—but *not* harmless—radiation. New generations of smartphones will bring us 5G technology, which is the frequency of 5GHz . . . with a view to very soon have in our houses 20G and even *100G* devices and antennas! To ensure that all these high-frequency devices remain working successfully, cell phone towers are being built ever closer to densely populated areas. Very soon, however, all these towers and antennas are going to be invisible, masked by the surrounding landscape, following advances in new technology that allows for the production of very small, yet very powerful transmitters and antennas, as well as the ingenuity of disguising them as something entirely "innocent" – a tree, a stone, furniture, etc.

One highly important question to ask is: *Is electromagnetic radiation harmful?* The leading manufacturers of electronic equipment in use worldwide will assure you it is not harmful, if it is within the limits established by current safety regulations. However, clearly these regulations consider electromagnetic hazards differently in different countries, and a review of such regulations shows they differ from country to country, sometimes with up to a difference of 60 times! Ironically, a higher level of exposure to electromagnetic radiation is considered safe and legal in industrially developed countries like the USA and Canada, while lower limits are imposed in both China and Russia. Still, it's important to note that even *low* exposure to electromagnetic radiation *might be* very harmful. There have been studies conducted on the hazards of electromagnetic pollution, some of which are collected on the website of Prof. Joel Moskovitch[20], which point to such findings. Additionally, it would be good to review an open letter written by Prof. Beatrice Golomb, Ph.D.,

[20] http://www.saferemr.com/

from the University of California, San Diego, about problems that a future installment of 5G antennas might cause to the public,[21] primarily to a category of the population who became "hyper-electromagnetic sensitive." That is, these people became so sensitive it created an illness preventing them from having a healthy life. There are clinics now that treat people damaged by environmental factors, including electromagnetic radiation.[22]

In his efforts to help people suffering from electromagnetic radiation, Dr. Kronn has dedicated many years of research to the creation of what he calls the EMF Transformer. For an ordinary end user, this unusual, yet sophisticated device looks just like a piece of plastic that could be attached as a "sticker" to any device that radiates electromagnetic waves. Initially, it was designed to be used on cell and smartphones, but proved to also be effective with all kinds of electromagnetic devices, including computers, routers, microwave ovens, refrigerators and even fuse boxes. This plastic device is "infused' via Vital Force Technology with a particular set of subtle energy patterns that help the human brain to counteract harmful effects of electromagnetic radiation by providing it with a kind of a neuro-feedback or bio-feedback.

To prove that a piece of plastic processed in his VFT system could work with the human brain as a bio-feedback device, Dr. Kronn sent the EMF Transformer to The Center for Cognitive Enhancement in Arizona for testing. At this Center, Dr. Jeffrey Fannin, a known specialist in electroencephalography (refer to Chapter 2), tested the device using the QEEG (Quantitative EEG) procedure, in which brainwaves are analyzed for different types of correlations, with the help of a sophisticated computer program. Experimenting with a group of 10 adults, a mix of males and females, Dr. Fannin demonstrated that with the EMF Transformer attached to a working cell phone, the brain goes to a normal, undisturbed, functioning state, typical of one's "everyday life." Without the EMF Transformer, with the cell phone placed close to the head, it was found the brain is overagitated in important brain regions, deemed to be due to the phone's electromagnetic emissions. Excessive activity in these regions of the brain may cause problems with working memory: visual and auditory functions, divided and selective attention filtering, and semantic short-term memory buffer, dealing with word retrieval. It also may negatively influence verbal expression, speech fluency and cognitive mood regulation. The elevation of neuronal

[21] https://drive.google.com/file/d/0B14R6QNkmaXuZURHNFVEVnNBMjQ/view
[22] https://www.ehcd.com/

activity in the left frontal lobe and frontal cortex when using the cell phone suggests that an individual may have a lack of flexibility of logical attention and verbal expression.

It is not intended that this paper should go deeper into the mechanism of interaction between subtle energy patterns embedded in the EMF Transformer and electromagnetic waves coming from the cell phone, nor how this device creates neuro-feedback, allowing our brain to counteract harmful effects of EMR. The ultimate result is what is important here – and that is, the "healthy" response of the human brain when the EMF Transformer is attached to a working cell phone or smartphone. The EEG mapping (QEEG) conducted by Dr. Jeffrey Fannin demonstrated the benefits of the VFT device. Additionally, further evidence has been gathered, that being the reaction to this device by people with electromagnetic field (EMF) sensitivity.[23] Now, this kind of sensitivity is being treated as an illness, and The Environmental Health Center-Dallas, mentioned above[22] is one of the few clinics in the world that recognizes and examines the electromagnetic field sensitivity as a disease. Several people known by this paper's author who are afflicted with this disease have tried the EMF Transformer and claimed they now cannot even think of living without it.

Although the device was not able to completely cure them of their heightened sensitivity to electromagnetic field radiation, it nonetheless has helped these people improve their quality of life, allowing them to use their cell phones at least for some time each day before feeling discomfort (e.g., various symptoms include severe headaches, pain or even bleeding from the ears). Also, just having the EMF Transformer close to them, these people were now able to attend public events that were previously not accessible to them, due to the discomfort brought on by the effects of EMR.

Interstingly enough, though the EMF Transformer worked just as it was designed to, Dr. Kronn sensed something was missing to make it more efficient. As was discovered later, the prior calculations didn't take into accounts the effects of Schumann resonance and its importance for human well-being. Also, the extent of the electromagnetic pollution currently so prevalent had been underestimated. To stress the importance of the last statement, it will help to check the data received by a Ukranian microsatellite, named Chibis-M, which has been monitoring Schumann

[23] https://www.ehcd.com/emf-sensitivity/

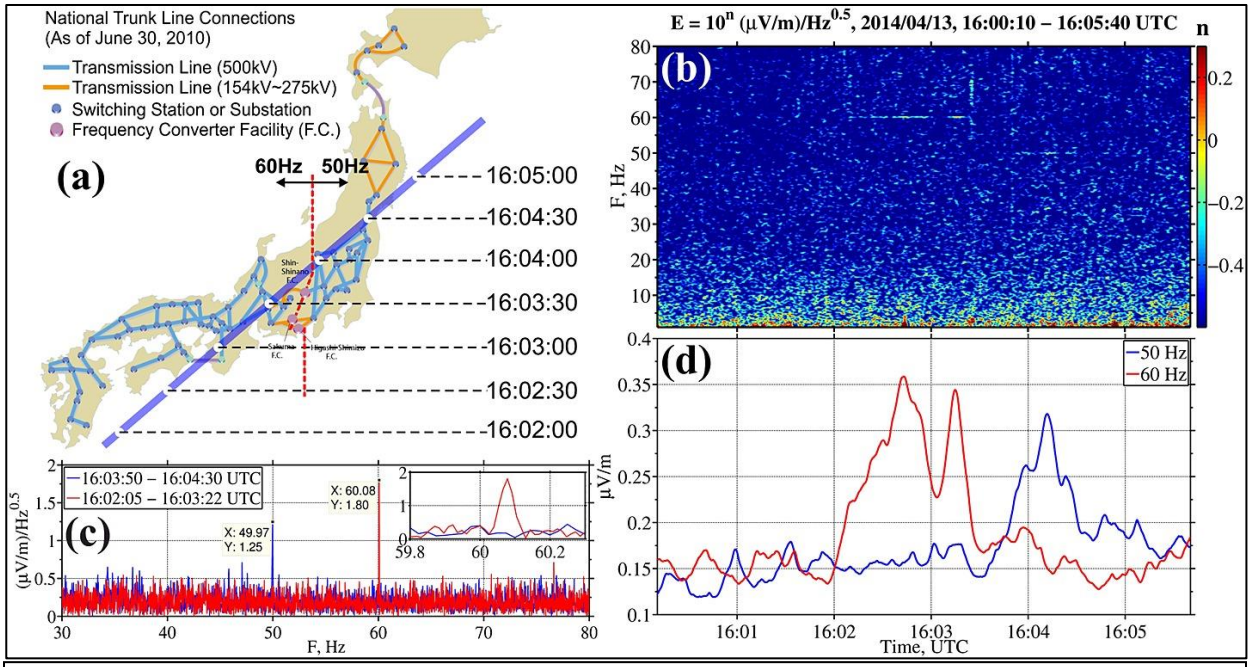

Fig. 7. The Schumann resonance monitoring over Japan in June 2010. Horizontal lines in the upper right corner graph indicate 50/60 Hz power line signals.

resonance frequencies and power line signals over Japan and other countries.[24] As can be seen in Fig. 7, the electromagnetic signals coming from the 50/60 Hz power lines over Japan are much stronger than the Schumann resonance signals. The same situation was observed over other regions of the globe, where the same microsatellite Chibis-M was monitoring the Schumann frequencies.[22] These data clearly indicate that, currently. Schumann resonance signals are being masked and replaced by much stronger industrial signals. Certainly, the natural state of Schumann resonance signals have to be restored for humanity to receive all of the potential benefits they bring for us.

For that purpose, Dr. Kronn and the VFT team "infused" a working EMF Transformer with the subtle energy pattern carrying Schumann resonance frequencies. Like many others in Dr. Yury Kronn's "subtle energy pattern" library, this particular pattern was created using a gas discharge of the specific inert gases working as the plasma generator mimicking the Earth's ionosphere. This low-temperature gas discharge was modulated with the electrical signals from the function generator, which emulate the first three harmonics of the Schumann resonance, fluctuating over the average values for several hertz. The subtle energy

[24] Fedir Dudkin et al. *Electric field of the power terrestrial sources observed by microsatellite Chibis-M in the Earth's ionosphere in frequency range 1–60Hz.* Geophysical Research Letters, July 2015. DOI: 10.1002/2015GL064595

pattern coming from the plasma generator was recorded, amplified and embedded, applying Vital Force Technology to the existing EMF Transformer.

The efficacy of the device that was updated this way had surprisingly good results. Several electromagnetic sensitive people who agreed to "self-test" the device reported they feel even better after using their smartphone with the EMF Transformer attached to it. They didn't experience any of the painful symptoms they had to deal with before. The Schumann resonance delivered to them through this device changed their life of pain and discomfort into a normal existence. When funding is made available, full-scale research of the device with more subjects involved is planned.

However, based on the testimonials of these people, it's clear these experiments may serve as evidence indicating Schumann resonance frequencies delivered as a subtle energy flow to the human body, especially the human brain, provides essential support for human well-being and might help people survive or even thrive in an electromagnetically polluted environment.

Further, it is hereby suggested that the subtle energy flow coming from the ionosphere, vibrating with Schuman resonance frequencies, is an important natural neuro-feedback setup, which for millennia has been helping and guiding the human brain to evolve in harmony with our planet. Electromagnetic pollution surely makes it more and more difficult to "hear" this subtle "voice" coming from the ionosphere above, given it's covered by a cacophony of signals disorienting our brains and programming them, seemingly in whatever way the technology is directed to go.

The good news is that advanced technology (like Vital Force Technology and others of its kind) might be used in the way described above to help in the restoration of our disrupted communication with Earth, the planet we all call "home."

Conclusions:

1. Electromagnetic pollution created by exponentially growing technological sources of the sorts that do *not* have coordinated electromagnetic waves affects our planet and all living organisms.
2. Besides being harmful by itself—when people are overdosed or overexposed to it—electromagnetic pollution shields signals of Schumann resonance frequencies.

3. The subtle energy pattern associated with Schumann resonance frequencies is beneficial for human well-being. Electro-smog prevents humans from being in resonance with these signals.
4. Recreating in the lab the subtle energy flow corresponding to Schumann resonance vibrations helps our brain to restore our connection to these natural rhythms, which was previously disrupted by electro-smog pollution.

Discussion

As was just mentioned, subtle energy might be responsible for the beneficial effects Schumann resonance phenomenon has on the human brain. In the context of considering subtle energy as a "connecting bridge" between the Earth's rhythms and the human brain, it will be useful to review Fig. 4, which was mentioned briefly in Chapter 2. For convenience, it has been reproduced below.

When looking at the sequence of Schumann resonance harmonics and matching such to corresponding brainwave functions, one may notice that peaks of the harmonics might work as "guiding lighthouse beams" for a particular feature of the brain to acquire another quality on its way from a dreaming state of mind to a complete awakening. That is, the first base harmonic of Schumann resonance of 8 Hz is a pivotal point from a transition from sleep to waking, occurring with the theta rhythm moving to a relaxed waking state with the eyes closed with the alpha rhythm present. The next sequence of events happens with the second peak of the Schumann resonance appearing at 14 Hz, where the alpha rhythm gives way to beta-1 with the transition from the dreaming state to the musing wakeful state. Harmonics three, four and five work with higher octaves of beta brainwaves, and our mind then goes from

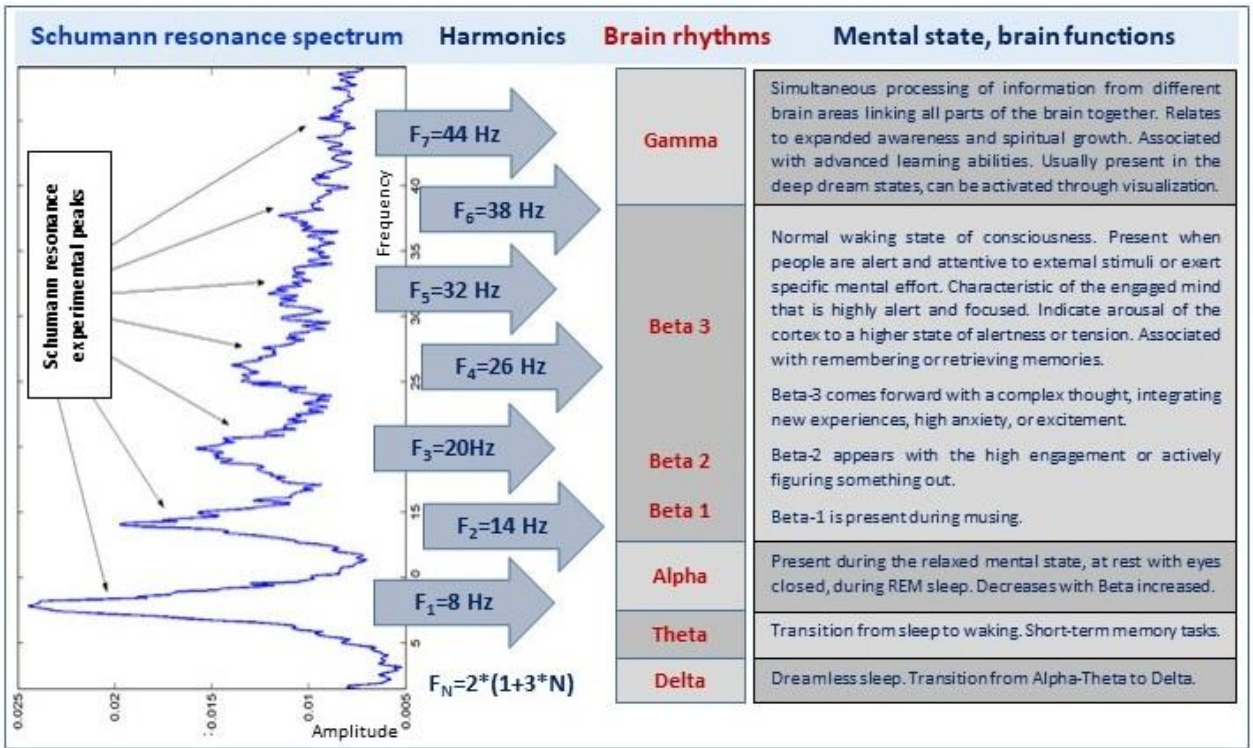

Fig. 4. A real time Schumann resonance spectrum recorded in 2004 at the Ukrainian Antarctic station "Academician Vernadsky" (-65.245556, -64.257778) is shown against different brainwaves' functions responsible for different modes of the human brain operation.

the state of full engagement in solving a particular problem at beta-2 to the complex thoughts necessary for integrating and evaluating new experiences at beta-3. With harmonic six at 38-40 Hz, our brain switches to gamma mode, which is the highest state of our minds, with the simultaneous processing of information coming from different parts of our brain. Traditionally, this state is associated with spiritual growth.

Due to widespread electromagnetic distortions and pollution, even in Antarctica, it is difficult to experimentally observe the higher harmonics of Schumann resonance, those that are close to the industrial 50 and 60 Hz (harmonics eight and ten, respectively) in the gamma brainwaves region. As was discussed in Chapter 4, the amplitude of the signals coming from industrial power lines is much higher than those of the Schumann resonance. In this way, the industrial signals that have no live connection to the processes on the planet artificially obstruct a natural base "tone" of the Earth. There is a known fact in music: our brain is attuned to the overtone series, in such a way that, if we encounter a sound that has all of the components *except* the base tone, the brain fills it in for us in a phenomenon called "restoration of the missing fundamental."[25] To transpose this example to the discussion at hand, with the false overtones of the industrial power lines, our brain is losing its ability to attune itself to the natural Schumann resonance series.

However, given this paper's proposed suggestion, that subtle energy helps humans to be in more permanent contact with the Earth's natural rhythms (Schumann resonance), then a salient question: Is it possible to capture subtle energy experimentally and explore it directly?

The answer, fortunately, is a satisfying "yes." Along with other researchers mentioned in a book written by MIT and Princeton-trained physicist, Dr. Claude Swanson,[26] the capturing of subtle energy has been successfully accomplished by Dr. Kronn. Having conducted a number of rigorous tests of a dozen energetically sensitive people, he was able to compare different subtle energy patterns, choose from them the most beneficial for various applications, and embed them in different materials, selecting those that provided the best delivery system for a particular energy pattern. For the EMF Transformer, the focus of this paper's discussion, an

[25] Levitin, Daniel J. *This is your brain on music*. Published by Plume, a member of Penguin Group (USA) Inc. 2007.
[26] Claude Swanson. *Life Force, The Scientific Basis: Breakthrough Physics of Energy Medicine, Healing, Chi and Quantum Consciousness.* Poseidia Press. 2010.

ordinary plastic was chosen as the ideal carrier for the subtle energy pattern, since it doesn't interfere with the electrical properties of any devices.

However, those dealing with the subject of subtle energy and with products processed with technology using subtle energy or its effects, have been asking the very same question: Is it possible to prove—using any electromagnetic device—that all claims accompanying the subtle energy effects are not just inventor's imagination ornot just the result of a placebo effect (i.e., in the case that some benefits are, indeed, observed)?

There have been and currently are many published reports about different methods of capturing subtle energy. Some evidence goes back in time for centuries, for example, dowsers looking for water and other objects hidden deep in the ground who were able to capture subtle signals coming from "below the ground" using dowsing rods or pendulums.

Nowadays, the market is full of different kinds of contemporary devices, as well. Besides the book by Claude Swanson that mentions them, there are a number of credible surveys that present a variety of methods used in this field.[27] Some of the discussed devices may, indeed, do the job as claimed. Nevertheless, none of the ways has been or is accepted by mainstream science as proof of the effects of subtle energy. This seems to be for one simple reason: in the eyes of mainstream science, there is no such thing as subtle energy (life force, etc.). Scientists today consider any and every manifestation of subtle energy as merely "unexplainable phenomena" (poltergeist, crop circles, telekinesis, kinesiology, homeopathy, etc.) and completely ignore the existence of subtle energy. Period. This is most likely due to their being unable to explain such. And so, they give no credibility to any such mention of subtle energy or any of the alternative terms for subtle energy, known for millennia as ki, chi, prana, life force, etc.

Some researchers who analyze the current market of devices allegedly capable of detecting subtle energy consider Kirlian photography as the most reliable method of registering subtle energy effects.[28] Unfortunately, this method is still under development and allows one to capture only an integral result of all possible

[27] Zhigalov, V.A. http://www.chronos.msu.ru/old/RREPORTS/zhigalov-harakternie_effecti_izlucheniya.pdf (in Russian) and Koltovoy, N. https://koltovoi.nethouse.ru/ (in Russian, some articles in English).
[28] Koltovoy, Nikolay https://koltovoi.nethouse.ru/page/941247

energetic impacts caused by subtle energy, leaving the “infrastructure” of the particular pattern undeciphered.

So far, there is no tool on Earth capable of “reading’ subtle energy patterns, other than the trained human mind. However, we are closer to the day when some sensitive devices will be created that will allow us to see subtle energy patterns as clearly as we see images on a movie screen.

Afterword

At a closing note, it would be helpful to emphasize the most significant conclusions made during the preceding discussion of Schumann resonance and the mechanism behind the beneficial effects now accessible (through VFT) for our brains, health and well-being, as well as factors that might prevent the development of such.

1. The Schumann resonance frequencies reflect the combined effect of processes naturally occurring on the Earth, both "internally" (lightning activity, weather conditions, ocean currents and wind distribution, etc.) and "externally" (solar activity, ionosphere and magnetosphere effects, X-ray radiation and the flow of particles coming from the outer space, etc.). These frequencies are a precise "thermometer" monitoring the Earth's "health" at any given point and at any given time.
2. Standing electromagnetic waves of Schumann resonance cause the ionosphere to emit a specific flow of subtle energy. This flow of subtle energy creates the potential for brainwave entrainment, which can work as a vital reference point for the human brain, which can ultimately be seen as a neuro-feedback system between the planet and all living beings.
3. Electromagnetic pollution, so-called electro-smog, shields signals of Schumann resonance frequencies, thereby preventing its beneficial effects. It also is harmful to humans, given too large a dose or in cases of overexposure.
4. Vital Force Technology (or any other technology based on the same principle) provides for the ability to record, store, enhance and reproduce different patterns of subtle energy, including a pattern corresponding to the Schumann resonance. This pattern, when re-established technologically with the EMF Transformer (for example), helps the human brain to counteract the harmful effects of electro-smog and reconnects the brain back to the Earth's "heartbeats."

P.S.: Any feedback concerning the subjects discussed in this paper will be appreciated, and should be sent to the following email address: schumann.resonance.and.beyond@gmail.com