

MOOD MODIFICATION WITH ELF MAGNETIC FIELDS: A PRELIMINARY EXPLORATION

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RECENT well-documented research suggests that between 25% and 75% of human and animal subjects exhibit psychophysiological sensitivity to magnetic and electrical fields in the extreme low frequency (ELF) ranges corresponding to brain-wave spectra.

Neuronal synchronization/desynchronization and brainwave entrainment can be demonstrated clinically in cats, monkeys, and human sensitives in the presence of ELF oscillations of both natural and man-made signals, including pulse-modulated radio frequency carriers.

There is additional evidence that the naturally occurring earth-ionosphere cavity oscillations (known since 1952 as the "Schumann resonance") can affect moods, states of consciousness, and health cycles of all life forms.

Prior to 1975 or 1976, the Soviets began transmitting pulsed electromagnetic signals over broad frequency ranges (from approximately 4 MHz to beyond 18 MHz) of sufficient power (measured at 40 MW peak) to disrupt lawful radio communications globally.

Fundamental frequencies of the higher harmonics as well as the pulse repetition rates (of 5 to 15 Hz) of the Soviet EM transmissions fall precisely within the "window" of neuronal psychoactivity, and have been observed to alter human EEC traces.

Speculation arises as to whether this potentially devastating problem is intentional or an unfortunate side effect of the Soviets' highly advanced global radar holographic imaging technology and undersea magnetic communications pulses.

This personal communication is an overview of my investigation and discoveries in this area since 1970, a discussion of my instrumentation approaches, and projections for possible future research.

An extensive bibliography of pertinent references in the open literature, prepared by the author and Eldon Byrd of the Office of Surface Weaponry, follows the article.

I welcome feedback and communication from other interested researchers.

—R.C.B.

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CLINICAL RESEARCH indicates that somewhere between 25% and 75% of human and animal subjects may exhibit marked psychophysiological sensitivity to extremely low frequency (ELF) magnetic and electric fields.

Brain-wave entrainment can be demonstrated electroencephalographically when subjects are in the vicinity of oscillations in the frequency range of approximately 3–20 Hz at intensities below 100 nT (nanoteslas). (1 T = 10^4 G.)

ELF fields of 6.67 Hz, 6.26 Hz and lower tend to produce symptoms of confusion, anxiety, depression, tension, fear, mild nausea and headaches, cholinergia, arthritis-like aches, insomnia, extended reaction times, hemispheric EEC desynchronization, and many other vegetative disturbances.

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H and B field (magnetic vector) oscillations of 7.8, 8.0, and 9.0 Hz produce anxiety-relieving and stress-reducing effects that mimic some meditative states. It has been speculated that frequencies in this range may be the universally permeating “clock frequencies” or carriers on which “mind” or “consciousness” states can be impressed and in which they may interact with other life-forms in the nebulous realms of ESP, psychotronics, distant healing, radiesthesia, and related paranormal but anecdotal phenomena.

Coherent ELF energies have the unique and interesting property of almost lossless propagation within the earth-ionosphere cavity waveguide, and attenuation of these signals due to distance from transmitter sites is negligible. Power losses are .8 dB per Mm (million meters). The magnetic vectors, unlike electrical (E-wave) components, permeate any substance and cannot be effectively shielded, even by iron, mu-metal, lead, copper, “Faraday cages,” etc.

The established physics of radio propagation therefore suggests that vast geographical areas can be readily mood-manipulated by transmissions of EM energy within the earth-ionosphere cavity waveguide. The “Luxemburg effect,” by which a transmitter of relatively low power, fed to an antenna array producing a circularly polarized signal, can “piggy-back” to any preexisting RF energy source and produce disturbances of the ionosphere at any frequency desired (which then “modulates” all other energies within that waveguide), was discovered accidentally in 1938. It is fully described in the literature of 40 years ago, but has probably been forgotten or is overlooked by today’s technologists.

History and Background

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Y PERSONAL INTEREST in EEC and consciousness dates back to 1969, when I became fascinated with the (re-)discoveries of Joe Kamiya and the conscious control of brain waves through biofeedback. I developed sensitive and reliable monopolar instrumentation for this purpose under the Alpha-Metrics trademark.

In the course of traveling, lecturing, teaching classes, and demonstrating this EEC equipment, and because one of my personal interests was in parapsychology and consciousness research, I had the unique opportunity (and reliable instrumentation at hand) to make electroencephalographic recordings of the brain-wave patterns of a number of truly exceptional subjects in the United States and Hawaii, who were famous or had established reputations as psychics, healers, shamans, dowzers, etc. Since I had a wealth of personal contacts in both the scientific establishment and the “psychic underground,” I was fortunate to be allowed to meet and to wire up and instrument a cross section of “sensitives” from vastly different disciplines, ranging from charismatic Christian faith healers to an authentic Hawaiian kahuna, to practitioners of wicca, Santeria, radiesthesia and radionics, to seers, ESP “readers,” and psychics.

A striking number of these authentic “sensitives” exhibited a nearly identical EEC signature when reporting that they were in their “working” state of consciousness, a state persisting from one to several seconds intermittently during the “altered state of consciousness” phase of the paranormal activity. The signal appeared to be an almost pure sine wave of up to 25 μ V (read monopolar, frontal to occipital, midline) and 7.8–8.0 Hz in frequency (on the “alpha-theta” borderline).

This serendipitous discovery was unexpected, in that—although the subjects were practising opposing disciplines, and came from totally disparate teachings and held opposing viewpoints, and would barely acknowledge the existence or authenticity of practitioners outside their belief systems—they all appeared to be marching to the sound of the same “cosmic drummer” when in an altered state of consciousness.

After replicating this observation a number of times at sites thousands of miles apart, the obvious question arose that if these exceptional people, unknown to one another, were falling into the same “cosmic consciousness” mode, what or where was the signal to which their brain waves became entrained? What was the “drummer”? Was there a “clock” or “synchronizing” signal present?

In 1952, physicist W.O. Schumann postulated mathematically that our earth and ionosphere constituted a cavity waveguide whose physical constants and magnetic field would oscillate at a resonant frequency identical to the range of human brain waves. In 1962, the National Bureau of Standards division of Radio Propagation reported the actual physical detection and instrumental recordings of these signals; and, as predicted, tracings were indistinguishable from encephalographic recordings from human brain waves. This newly discovered phenomenon was dubbed the “earth brain wave.”

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INCE THERE IS a pronounced node in these “Schumann resonances” at 7.8–8.0 Hz, the question of possible EEC and ELF interconnectedness appeared to be an irresistible area for investigation.

In 1973, a professional coil fabricator duplicated the “Schumann pickup” (described on p. 313 of the *Journal of Research of the National Bureau of Standards, Division of Radio Propagation*, 66, 3 [May–June 1962]), and I perfected an extremely low-noise, highly filtered amplifier capable of recording and displaying the naturally occurring magnetic oscillations surrounding our biosphere.

My intention was to recontact as many of the “sensitive” subjects from my first study as was feasible and this time to make simultaneous EEC and ELF records and compare the signals for frequency and phase coherency. This was done on a more limited scale than in the original investigation. In a few instances, careful analysis revealed episodes of absolute brain-wave entrainment during the brief seconds when sensitives reported being in their altered states of consciousness. Unexpected variables emerged, such as reliability factors dependent on lunar phases and time of day.

This study was extended to test the theory that if a very small percentage of subjects, by virtue of hereditary factors, religious or metaphysical disciplines, or meditative practices, had sensitized some portion of their minds or brains to act as extremely sensitive “dual-conversion superheterodyne receivers,” it might be possible to sense remotely, amplify, and display this real-time “drummer,” the Schumann magnetic oscillation, to less sensitive subjects (whose brains were as unresponsive and unselective as a crystal set) so that they too could mimic the highly organized “psychic” abilities of the trained “seer.”

Late in 1973, apparatus was built for pulsing a miniature lamp held in an empty eyeglass frame to be a real-time photic stimulus that would cause an evoked potential in step with the ELF “cosmic drummer.” This was moderately promising, but only marginally successful because of the individually variable delay-line (of about 100 ms) between the onset of the stimulus and its response.

The next effort at inducing psychic awareness was to place a coil 9 ft in diameter of about 100 turns of #28 magnet wire on the floor of the laboratory and expose subjects to the real-time magnetic replica of the highly amplified “Schumann” signal sensed at a remote location to avoid feedback. Results with individuals and groups experiencing this “magic circle” were dramatically successful. The third-generation investigations were extended to determine if subject’s brain waves could be influenced by artificially generated magnetic oscillations of sine waves of low intensity and at specific frequencies within the ranges occurring naturally.

Some subjects exhibited absolute brain-wave entrainment over the range of approximately 6–14 Hz and at signal strengths of approximately 100 nT. Onset of phase/frequency lock-on averaged from 1–4s from the time of switching on the artificial ELF generator and would sometimes last for the duration of the stimulus, usually a 10s episode.

One subject (Mr. A.P., 54) displayed absolute entrainment when he was placed inside a triple-shielded magnetic (iron) and triple electrostatic (copper) Faraday cage. The artificial ELF stimulus was originating from a pocket-size battery-powered device positioned outside the shielded room and 12 ft removed from the subject. Tuning the device over a wide frequency range caused subject’s EEC to follow the stimulus exactly.

After demonstrating the neurological responses of sensitive individuals, and doing preliminary mapping of subjective states as reported for various specific frequencies (defined to .01 Hz on a digital frequency counter attached

to the ELF generator), experiments were undertaken on a broader scale with totally unaware subjects, such as customers at local coffee shops during rush hours. This obviated the variables of “suggestion,” “expectancy,” or “hypnosis.”

Anecdotal data was amassed suggesting that a pocket-size transmitter at power levels of under 100 mW could drastically alter the moods of unsuspecting persons, and that vast geographical areas could be surreptitiously mood-manipulated by invisible and remote transmissions of EM energy. Tests were rapidly abandoned after dramatic proof because of ethical considerations.

IT IS WELL KNOWN that naturally occurring earth-ionosphere magnetic oscillations will vary slightly in frequency diurnally, monthly (full vs. new moon), and in definite cycles related to sunspot activity. This may well explain observable “full moon craziness.”

We are aware that tides in the ocean are affected by lunar vectors. Resonant frequencies are also affected by Earth/Venus/Mercury/Moon/Jupiter/Sun gravity vectors. And there is well-documented correlation between these geophysical phenomena and episodes of political unrest, mood alteration, and health cycles, as supported by a vast technical and medical literature. Our “drummer” seems to affect all life-forms. An excellent reference source of widely unrelated phenomena that are dramatically tied to our earth’s geomagnetic cycles is Petersen’s *Man, Weather, Sun*, cited in the bibliography.

By artificially amplifying or altering these geomagnetic fields or by transmitting specific and coherent frequencies, vast segments of earth’s population could be affected. This now becomes an attractive modality for psychological or psionic warfare or for intentional modification of moods, which could reflect in areas ranging from time-specific insomnia to stock market fluctuations. (There have been recent epidemics of “worry insomnia” between 4:00 and 5:30 A.M., coinciding with the “Schumann resonance” signal drop-out, as observed in journals of geomagnetic research.)

On several occasions within the last few years, our laboratory began to detect wave trains in the ELF ranges that could not have been of natural origin. These may or may not be related to recent Soviet transmissions of radio energy spread over broad segments of the frequency spectrum ranging up to 28 MW. Danish monitoring stations report that peak powers of these signals are on the order of 40 MW. Transmitters are presumably located near Riga or Gomel. Transmissions have disrupted lawful radio communications throughout the world and have been protested by several nations. The Soviets have not given an adequate explanation of the purpose of these tests. An early theory assumed Soviet experiments with over-the-horizon radar; perhaps the psychoactive EM components are unexpected side effects of these tests.

Canadian Department of Transport monitoring sources have established that spectrum analysis of these strange signals indicate that they may be higher harmonics of a fundamental frequency of 6.67 Hz (the Tesla frequency). The signals are modulated with pulses with repetition rates of 5-15 prf, usually 10 Hz. Besides modifying the electrical, ionic, and stratospheric jet-stream equilibrium weather-motion factors, the signals fall precisely within the “windows” known to be psychoactive. The Canadians also report alarming mood alterations in certain areas of eastern Canada, such as near Timmins and Kirkland Lake, Ontario, which observers believe are linked to Soviet transmissions.

Since both theory and laboratory tests prove that magnetic (H-wave) shielding is impossible at these psychoactive frequencies, even with highly sophisticated multiple iron or mu-metal shielding, it can be speculated that ELF signals can be a powerful potential weapon with global capabilities in psychophysiological warfare. (The wavelength of an 8 Hz signal is 22,159 mi.)

I feel that tests should be undertaken with a number of remote ELF sensors that can be made directional in order to establish by triangulation the sources of these recently detected man-made disturbances, whether originating from offshore or on land. ELF data should be correlated with data monitored from Soviet transmissions detected on shortwave receivers. These can then be correlated with human or animal EEC recordings. (This was done May 25, 1978, with positive correlations.)

ELF as a modality for mood manipulation is a demonstrated reality. And there is a strong possibility that it has been implemented since 1976 by the Soviets, intentionally or accidentally, as an unpredicted side effect of local standing waves or re-radiation of power lines. This speculation is currently being explored by a network of independent scientists working in the disciplines of psychophysiology, geophysics, radio propagation, pharmacology, physics, electronics, and psycho-therapy. A bibliography of pertinent medical and technical articles and books follows this report.

Possible countermeasure proposals embrace psychopharmacology, adaptive desensitization, and the utilization of personal low-powered (milliwatt) magnetic oscillators, which—by the law of inverse square—will override hostile signals, man-made or natural, with beneficial frequencies.

An interesting device of this nature with possible “countermeasure” capabilities is the “Vitasette” instrument, designed by W. Ludwig for limited distribution and testing in West Germany. One model of this device is the size of a cigarette lighter and has a claimed battery life of 2 yr. Frequencies are user-programmable over the range of 1.25–19 Hz by activating specific combinations of switches. This “transmitter” generates spike-wave pulses when a mu-metal core of extremely high permeability is driven to beyond saturation with a single transistor and coil. Effective range is claimed to be about 1 m. This is sufficient to ensure proper synchronization of the wearer’s “biological clocks,” circadian rhythms, and possible coherence of left and right hemisphere neuronal firings. Ludwig claims cures for a broad spectrum of vegetative disturbances. The brain cells appear to “latch on” to the highest amplitude pulses in their proximity in a manner similar to the characteristics of a frequency-modulation discriminator (Foster-Seeley). Unlike audio modulation detectors, however, they will reject background noise and pulses of lower intensity. The analogy is that a small transistor radio held up to a listener’s ear will drown out a nearby rock band with thousands of watts of audio amplification. Similarly, a milliwatt device worn on the body can override a hostile transmission of megawatt power at a distance.

While almost everyone is familiar with electronic heart pacemakers capable of ensuring proper heart rhythms, few are aware of recent research establishing that brain waves and other biological functions can be influenced at great distances by magnetic pulses of critical frequencies.

There is promise that such devices, when tuned to highly specific “beneficial” rates, could be of value in stress modification, tension and anxiety relief, dyslexia, insomnia, “confusion” states if caused by right and left hemisphere desynchronization, headaches, sexual dysfunction, and many other conditions. However, as was the case with the initial application of atomic energy, the first large-scale implementations of ELF discoveries appear to be destructive.

I invite other interested investigators to replicate and verify my observations. A brief disclosure of my procedures follows.



HUMAN SUBJECT, selected for sensitivity, is wired to a battery-powered, totally isolated EEG amplifier. The output is recorded on one or more channels of chart or (preferably) fed as an FM/VCO to channel(s) of magnetic tape. Monopolar electrodes were frontal to occipital, midline. Simultaneously, but with electrical or optical isolation sufficient to eliminate cross talk, the output of a magnetic signal detector (Schumann coil) is chart-recorded or fed to its separate magnetic tape channel.

The Schumann coils typically consist of 50,000–250,000 turns of #38 magnet wire wound on a ferrite, soft iron, or mu-metal core. Coil axis is oriented to magnetic N-S and connected to a separate amplifier having a band pass of 2–40 Hz, a noise figure capable of seeing .1 V rms at 10 k and 100-dB-or-better rejection of frequencies of 60 Hz and higher.

With proper subjects, phase, and frequency, EEG “lock-ons” can easily be observed by inspecting the chart recordings or, if measurements are made in the field, by later observation of the magnetic tape

records after signal recovery on paper charts or dual-trace storage scopes (Tektronix 214).

My initial transmitter of magnetic ELF signals consisted of a phase-shift, modified sine wave oscillator whose output was fed to a 10 Hz soft iron core inductance of 1200 Ω DC resistance. Power level was 9 V at .7 mA, or 6.3 mW. This device could cause EEC modification and mood alteration in subjects at up to 10 ft. A higher power device constructed in 1973 provided greater effective range, as was to be expected. Highly specific modulating and carrier frequencies were obviously withheld for fear of potential misuse, as are “keyhole” and waveform data, as well as details of the multiple-source devices producing “soliton” ELF magnetic standing waves.

My investigations began in 1970. Early research in consciousness modification by external nonchemical stimulus was undertaken in the following areas:

- (1) Photic stimulation of the subjects by miniature lamps, both cold cathode (phosphors) and filament and “strobe.” These light sources were either driven by oscillators or by the subjects’ amplified brain waves in real time and (later) with delayed and phase-modified pulses to “pump” EEGs.
- (2) Exposure of subjects to voltage-gradient oscillating fields and electrostatic (modulated) fields.
- (3) Exposure of subjects to pulse-modulated negative ion generators, typically (-)20 kV DC sources of corona discharge modulated by mechanically rotating screen shields or by carefully adjusted spark gaps that would arc over and short the output at frequencies centering on the 8 Hz range.
- (4) Exposure of subjects to actinic stimulus of nearly monochromatic red-green-blue pulses of light through a fiberoptic display device held close to the left or right eye. Phase and frequency of each channel was selectively varied in efforts to excite red-green-blue rod and cone receptors independently and to evoke “standing wave” potentials in specific sites of the occipital cortex. By selective excitation of both eyes with delayed pulses, evoked “standing waves” occurred.
- (5) Exploration of audible “click” stimulus, as well as infrasonics, ultrasonics (28 kHz), and phase-shifted sound fed to left and right ears. Audio-modulated 100 kHz electrostatic fields were tested.
- (6) In two series of tests, the amplified, filtered, and clipped (about 200 mV) real-time Schumann signals were fed directly to the head via surface electrodes. This approach was dramatically psychoactive, and was abandoned in 1974 as dangerous after subjects experienced LSD-type visions.

At this time, we prefer *sinusoidal* waveforms (not pulsed, triangular, square, sawtooth, or other wave-forms). Fundamental frequencies are psychoactive, but can be enhanced by audio-modulating them onto compound carrier frequencies, heterodyning multiple sources, or generating “soliton” waves. We feel that much data has been overlooked by other re-searchers, not specifying the precise frequencies under investigation to accuracies of .01–.001 Hz. There is evidence that long-chain molecules near liquid crystal boundaries may simulate coherent dipole arrays with very high Qs. Biological signals are, after all, at the opposite end of the electromagnetic spectrum, where communications frequencies in the VHF and UHF bands are specified to .005% and better.

These investigations have been undertaken privately as a personal interest by the author. They have been totally funded by myself, and are in no way connected with any outside interests, either governmental or commercial.

Results have been reported on an informal basis via limited personal communications with other interested parties. Highly specific frequency and advanced waveform data are proprietary.

Precise technical details on low-noise biological and geomagnetic amplifiers, filters, Schumann detector coils (now into our fourth generation devices), practical and inexpensive voltage-controlled os-

cillator and FM discriminator circuits for cassette tape recording of ELF and EEC signals and data, practical and inexpensive modifications to digital frequency counters with extended ranges and accuracies of .005 Hz, suggestions for recording, displaying, and analyzing these signals, etc., can be made available to other serious and informed research workers who have a responsible interest in this subject. We feel it wise to withhold only the data on hemispheric desynchronous frequencies.

The instruments and hardware used in this study may be made available for inspection and evaluation.