Current Comments on "Magnetic Energy of the Brain"

During the past decades, a series of fascinating scientific and philosophical investigations were published in the popular magazine, the Rosicrucian Digest, in a series called "Mindquest." Since many of the readers of the Rose+Croix Journal do not have access to these, and since this was not a peer-reviewed publication, the Journal has invited members of the Rosicrucian Research Branch, and other interested investigators and commentators, to begin reading these archival articles and to comment on them in the light of modern scientific, philosophical, and mystical thought, always with an eye toward transdisciplinarity, and to raise new questions, which we hope readers will write to us about for discussion during the year.

For this issue's "Mindquest" article with commentary, please find below "Magnetic Energy of the Brain" by Michael Bukay, M.S. and George F. Buletza, Ph.D., first published in the Rosicrucian Digest in April 1978. Following the article are comments on related issues. We welcome continuing commentary throughout the year on this article and its subject matter, which can be sent to editorinchief@rosicrucian.org.



MINDQUEST

REPORTS FROM THE RESEARCH
DEPARTMENT OF ROSE-CROIX UNIVERSITY

Magnetic Energy of the Brain

by Michael Bukay, M.S. Staff Research Scientist & George F. Buletza, Ph.D., F.R.C. Research Director

In the past ten years, significant advances made in techniques for studying biomagnetism have shed new light on our understanding of age-old Rosicrucian principles. As Rosicrucians we know that electric and magnetic fields direct and maintain the functioning of cells, tissues, organs, and even the brain. We know that an understanding of the principles of polarity and electromagnetism can greatly contribute to an appreciation of cell and mind activity.

While we know that each cell of the body produces electromagnetic fields, cellular magnetic fields are so small in relation to the Earth's field and other background "noise" that cellular magnetism has been difficult to study. But fortunately, some groups of cells work together in synchrony and produce a com-

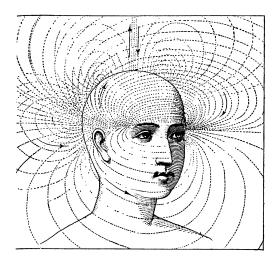
bined magnetic field. It is by studying these cell groups that major advances in biomagnetic research are being made.

These rhythmical fields are found around the heart, brain, and other organs, but even as a combined field their strength is still extremely small. The instruments used to measure their activity must be capable of detecting magnetic field intensities only one millionth to one ten-billionth as strong as the Earth's own field. Therefore, scientific inquiry into biomagnetism had to await the development of supersensitive magnetometers, magnetic shielding, and filtering devices for reducing background noise.

The heart was the first human organ whose magnetic field was effectively studied. With an instrument called a magnetocardiograph (MCG), scientists were able to record rhythmical changes of the heart's magnetic field.² They discovered that the heart's magnetic field varies in parallel with its electrical field, and that both arise from the same source,³ originating from the rhythmical flow of positive and negative charges in the nerve and muscle fibers of the heart. After these discoveries were made, attention turned to the brain.⁴

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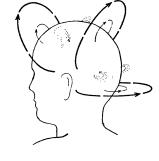


Figure 1: Long before the development of instrumentation capable of measuring brain magnetism, Edwin Babbitt described magnetic currents passing around and through the brain. In the above diagram he depicted these currents as connecting both hemispheres in some places, and as rising and falling within each hemisphere. What is now emerging from modern research looks very much like what was imaginatively described by Babbitt a century ago.

Figure 2: General features of the brain's magnetic field as measured by a modern supersensitive magnetometer capable of detecting magnetic fields one ten-billionth the intensity of the Earth's own magnetic field. Modern descriptions of brain magnetism closely parallel those described by mystics over a century ago.

Over a century ago Rosicrucians and other mystics⁵ described what appeared to be magnetic currents looping over the surface of the skull (see Fig. 1). What is now emerging from current research looks very much like what was imaginatively described by psychic attunement in previous centuries. Figure 2 illustrates some general features of the magnetic field surrounding the head as measured by modern instrumentation.

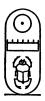
As in the heart, the brain's magnetic field was found to vary in parallel with its electrical activity. Bursts of alpha waves that appear when the eyes are closed are accompanied by bursts of magnetic activity.⁶

Information obtained from brain-wave studies with the electroencephalograph (EEG) is far from optimum. At present there is no simple and effective model that explains brain-wave phenomena.⁷ With the EEG, electrodes must be at-

tached to the scalp, but because the skull is a poor conductor of electricity the pattern of electrical signals from the brain is distorted, making EEG recordings difficult to interpret. Distortion of the brain's magnetic field is not a problem, however, with the magnetoencephalograph—MEG (see Figure 3, page 20).

Advantages of MEG

The skull and surrounding tissues have little effect on the brain's magnetic field. The MEG does not require physical contact to make brain recordings and can therefore measure magnetic flux from a variety of positions around the head. Such measurements in the brain's three-dimensional magnetic field enable researchers to precisely chart areas of the brain that receive and integrate sensory information from specific body parts. States of consciousness may eventually



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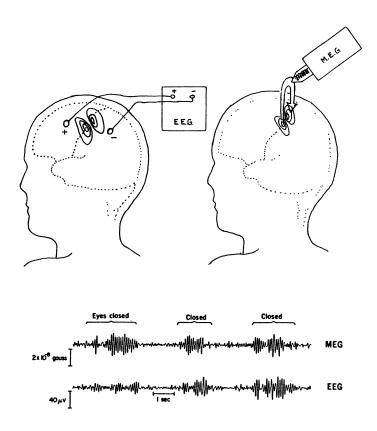


Figure 3: Magnetic fields are produced around the head in synchrony with alpha brain-wave rhythms. In this particular study, electrical and magnetic fields of the brain were simultaneously recorded while subjects opened and closed their eyes. Closing the eyes produced bursts of alpha brain waves. Opening the eyes blocked alpha. These changes in brain-wave activity (EEG) were accompanied by corresponding changes in the magnetic field (MEG) surrounding the head.

The Rosicrucian Digest April 1978 be found to have characteristic magnetic patterns around specific brain areas. Such measurements with the MEG will shed new light on our understanding of EEG brain-wave phenomena.

Since the magnetic field of the brain is about one ten-billionth the intensity of the Earth's own field, initial experiments with MEG instruments had to be performed in rooms with elaborate magnetic

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shielding to reduce background magnetic interference. Recently, a more sophisticated MEG instrument has been developed which can measure the brain's magnetic field in a room without elaborate shielding. The instrument is called a SQUID (Superconducting Quantum Interference Device). The design of the SQUID and its experimental setup is illustrated in Figure 4.

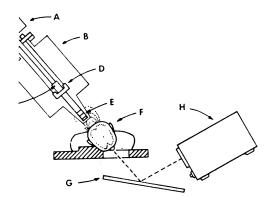
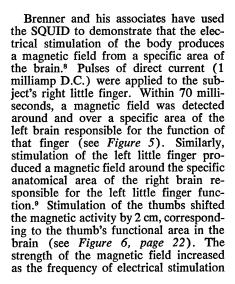


Figure 4: The advent of the Superconducting Quantum Interference Device (SQUID) provides a field monitor of sufficient sensitivity to detect brain magnetic waves (10⁻⁸ to 10⁻⁹ gauss) without special magnetic shielding of the subject. The SQUID is maintained at liquid helium temperature in a special glass container called a Dewar and is coupled to external fields by a loop of superconducting wire (a flux transformer) wound in the configuration of a second-order gradiometer. Arrangement shown is for monitoring visually evoked MEG responses:

(A) SQUID electronics, (B) Dewar, (C) SQUID, (D) Trim Colls, (E) Gradiometer and pick-up coll, (F) Subject, (G) Mirror, and (H) Variable light stimulus for evoking brain response. After Brenner and Kaufman (1975). 10



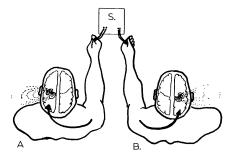


Figure 5: Pulses of direct current applied by a DC stimulator (\$) to a finger of the right hand produced a magnetic field over a specific area in the left brain (A). Stimulation of a left finger produced a localized magnetic field in the right brain (B). The point source for these magnetic fields corresponds to the specific functional areas along the brain's Fissure of Rolando (see Fig. 6).

increased from 3 to 30 pulses per second (see *Figure 7*, page 22). Visual stimulation also produced localized magnetic activity in the brain. Pulses of light directed into the eyes produced magnetic fields in the brain region specialized for processing visual information.¹⁰

These studies show that sensory stimulation affects the magnetic fields that surround the body. Even the thoughts we hold affect the body and its magnetic envelope. The magnetic aura changes with such moods as anger, depression, happiness, and Cosmic Attunement.¹¹ Preliminary experiments in the Rosicrucian Research Laboratories suggest that concentration on specific body parts (the Rosicrucian over-all exercise) may reverse the polarity of the magnetic inductive field surrounding each body part. These preliminary studies await verification by more vigorous studies made in magnetically shielded chambers or by means of such sophisticated magnetometers as the SQUID.

Magnetic fields are always accompanied by electric fields. Taken together they



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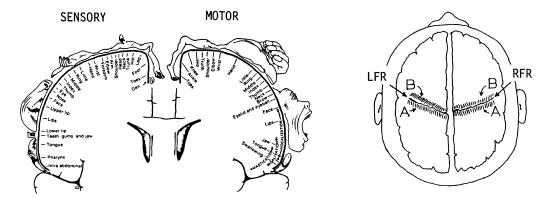


Figure 6: The homunculus shown above is a cartoon of the body showing the order of representation and the relative amount of space along the Fissure of Rolando that is devoted to each part of the body. Imagine the two sides of the brain sliced through the cerebral cortex along this central fissure. The sensory homunculus is arranged along the cortex to the back of this fissure (A). The motor homunculus depicting the body muscles is arranged along the cortex to the front of the fissure (B). The functional correlates arranged along the left Fissure of Rolando (LFR) directs the corresponding features on the left side of the body.

are called electromagnetism. Our body cells constantly emit and receive electromagnetic energy. Our brain generates an ever-changing electromagnetic aura that extends into the environment. Theoretically, these electromagnetic fields have no boundaries as they travel outward into an electromagnetic universe. We are electromagnetic beings living in a sea of electromagnetism.

Thus, all life on Earth is joined together by electromagnetic fields. We are in continuous contact with the electromagnetic auras of everyone around us. It may be that psychic attunement with another person or place involves a blend-

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Figure 7: The frequency of sensory stimulation affects the magnetic fields that surround the head. A 30-Hertz (cycles per second) stimulus produced a large magnetic arc (A). A 3-Hz stimulus produced a small magnetic arc (B). This demonstrates that the strength of the localized magnetic field of the brain resulting from electrical stimulation of a finger increases in proportion to the frequency of stimulation.

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Figure 8: Recent studies suggest that the subtle electric and magnetic fields in the environment affect our own electromagnetic field, our health, and our behavior. ¹² In one experiment, activity rhythms of humans living in shielded chambers were shortened by exposure to electromagnetic fields. Rats exposed to a 60-Hz electromagnetic field for one month exhibited hormonal and biochemical changes similar to those caused by stress. As a result of these and other studies, the artifically induced EM fields from high-tension wires are being studied for possible adverse effects on human beings.

ing of electromagnetic auras that triggers the appearance of symbolic impressions in the imagination. These psychic impressions are highly subjective. The symbolic details of form and color vary from individual to individual, but the meaning and interpretation of their subjective impressions are often quite similar. Subjective or inner impressions received through psychic attunement need to be verified by observation of the external world. Thus, future developments in magnetometer instrumentation may soon provide a new objective means of shedding light on the powers of our mind and imagination.

Footnotes:

¹Buletza, G. (1977) Your personal healing power, *Rosicrucian Digest*, *LV*(9):17; (1977) Secrets of the brain, *Rosicrucian Digest*, *LV* (10):18.

²Baule, G. & McFee, R. (1963) Ameri. Heart J. 66:95; Baule G. (1965) J. Appl. Phys. 36:2066; (1965) Trans. New York Acad. Sci. 27:689.

³Cohen, D. (1967) Magnetic fields around the torso: production by electrical activity of the human heart, *Science 156* (3775):652.

⁴Cohen, D. (1968) Magnetoencephalography: evidence of magnetic fields produced by alpha-rhythm currents, *Science* 161 (3843):784.

(Footnotes continued overleaf)

[23]



(Footnotes continued from page 23)

5Babbitt, E. (1878) The Principles of Light and Color, Babbitt & Co., New York, p. 217-220; Von Reichenback, K., (1968) The Odic Force, University Books, New Jersey; (1974) Books, New Jersey; Mesmer, F. (1779) Mesmerism, MacDonald, London.

⁶Cohen, D. (1972) Magnetoencephalography: detection of the brain's electrical activity with a superconducting magnetometer, Science 175 (4022):664.

⁷Bukay, M. & Buletza, G. (1978) Electrical energy of the brain: a mind-mirror?, Rosicrucian Digest LVI(3):21.

*Brenner, D., Lipton, L., Kaufman, L. & Williamson, S. (1978) Somatically evoked magnetic fields of the human brain, Science 119(4324):81.

⁹Bukay, M., & Buletza, G. (1978) Split-brain research, Rosicrucian Digest LVI(1):14.

¹⁰Brenner, D., & Kaufman, L. (1975) Visually evoked magnetic fields of the human brain, Science 190 (4213):480.

¹¹Bigu, J. (1976) On the biophysical basis of the human "aura", J. of Res. in Psi. Phenomena 1(2):8.

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ROSICRUCIAN DIRECTORY

A complete directory of all chartered Rosicrucian Lodges, Chapters, and Pronaoi throughout the world appears in this publication semiannually-in February and in August.

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Cover

Our cover this month features one of the many Mayan edifices located on Mexico's Yucatán Peninsula.

Rosicrucian This edifice is commonly referred to as the Temple of the Jaguar, because at its entrance is a recumbent stone statue of a jaguar. The jaguar was worshiped by the Maya.

(Photo by AMORC)



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Current Commentary on the Mindquest Article:

From José Moya:

In "Magnetic Energy of the Brain," I infer a possible connection between magnetic fields and dreaming. My own experiences suggest that during sleep, we are actually aware in some way, but this awareness is a condition without sensory input. The impressions associated with dreaming might be the effect of, or at least influenced by, a magnetic field from a close source or a source at a distance. In some cases, the source might be a magnetic field emanating from another person. There is also the possibility that the mechanisms associated with dreaming are something other than electromagnetic in origin.

From Antonietta Francini, M.D.:

Brief historical review and recent updates on "Magnetic Energy of the Brain."

1. Historical Context

The modern concept that everything is "Energy" is actually very old. Ancient Egyptians understood that everything in the universe is lively with Life- Forces. Consequently, the entire cosmos is animated and vibrant. The animating principles were called *neteru* (gods/goddesses) and were designated by numbers considered either "male" or "female."

We have learned about this ancient concept of living interactions (equivalent to what we would call "electromagnetic vibrations" in modern language) from the study of ancient Egyptian Papyrus that have been preserved until our days, such as the Leiden Papyrus 1350 (Old Kingdom 2686-2134 BCE) and the Rhind Mathematical Papyrus (ca. 1650 BCE). The Leiden Papyrus consists of an extended composition describing the principal aspects of the ancient creation narratives and matches each principle with a symbolic number. The Rhind Mathematical Papyrus states that there are "Rules for enquiring into nature and for all that exists, every mystery, every secret." This affirmation appears to express knowledge of cosmic aspects related to a universal "essence" permeating the knowable universe.

Similarly, in the very ancient Vedic (ca. 3000 BCE) traditions of India we find expressions suggestive of a wisdom that identifies "Fire" with the living manifestation of Eternal Life. The archaic expression of "Fire" to indicate powerful-all-pervasive-energy, is just a different way of showing the intrinsic power of the Manifested Source.

For example, quoting from the *Mundaka Upanishad*:

This is the Truth,
As from a blazing Fire,
Sparks fly up,
A thousand-fold,
So are different beings
Created by the Eternal Source,

And return there to.

The Creative Source is bodiless,
Without and within, unborn,
Without the need of breath,
Mind pure,
Higher then the high, Imperishable.....

Manifest, near,
Moving in the heart-cave,
Closer that your breathing,
Is the Supreme Being,
In THAT all is centred,
Which you know
As moving,
Breathing,
Bringing,
Blinking,
Being and not-being,
As Beloved,
The Best,
Beyond all creatures understanding.....

In modern times, a large amount of scientific research was needed to develop the concepts that we have today about "Energy." Some of the most relevant studies were carried on by scientists such as:

Benjamin Franklin (1706-1790)
James Watt (1736-1819)
Michael Faraday (1791-1867)
James Maxwell (1831-1879)
Thomas Alva Edison (1847-1931)
Nicolas Tesla (1856-1943)
George Westinghouse (1846-1914)
Heinrich Hertz (1857-1894), and many others.

But, the final recognition that "ALL is ENERGY" had to wait for the famous formula of Einstein: E=mc² (Energy equal to mass, or matter, multiplied by the speed of light squared). The formula proved that one gram of mass can be converted into a torrential amount of energy.

The development of Quantum Physics in later years contributed to the understanding of the behaviour of physical particles/waves. As a consequence, the projects related to electromagnetic resonance were fully developed by the scientific establishment.

Also, with respect to the personal, individual, areas of development the revolutionary concept

that "All is Energy" promoted a more conscious awareness of our own latent, potential, skills. The energy of the human brain can be studied from an objective, external, point of view and from an internal personal, introspective point of view.

In this review we will deal first with the external study of the human brain, mostly for medical purposes. Next we provide opinions about personal investigation of the brain energy. As a consequence of these considerations, the present exposition will be divided in two sections. The first section highlights some practical applications obtained by academic and scientific institutions. The second section considers the personal aspects related to the development of individual consciousness.

2. Scientific Studies of the Electromagnetic Characteristics of the Brain—Ways Forward

The article discusses the relationships between electric encephalograms (EEG), which have been used to measure brainwave activity, and magnetic encephalograms (MEG). The correlation between the EEG and MEG data need not be surprising, as time-varying electric fields produce time-varying magnetic fields, and conversely.

However, there are additional promising tools for brain research such as nuclear magnetic resonance (NMR) imaging, which is a diagnostic medical procedure. It examines the behavior of atomic nuclei in the presence of applied, time-varying electromagnetic fields. MRI provides great contrast between the different soft tissues of the body that can be useful for diagnosing cancer as well as other disorders. The contrast is due to differences at which protons in different tissues (diseased vs. healthy) return to their equilibrium states when the applied electromagnetic field is relaxed. MRI has additional applications including chemistry and non-destructive testing (or non-destructive evaluation, NDE).

The article discusses the correlation between electrical stimulation of the body and the magnetic fields that are measured in specific (presumably corresponding) areas of the brain. In doing this, it suggests the possibility that other stimuli, for example, tactile and visual (specific imagery) will generate magnetic fields in the brain. Another area worthy of further investigation is the correlation between various states of consciousness, including those associated with meditation and balancing exercises, and the characteristic magnetic patterns around specific brain areas.

The article hints at additional areas for further investigation as well, for example, electromagnetic characterization of the field known as the "aura" (a field that surrounds humans and other living things) and a study of the impact of external fields on biofields. Such external fields include not only those due to human activity but also those that occur in nature, for example, the (now weakening) magnetic field of Earth.

3. Subjective Studies of the "Law of Thought" and the Skill of "Visualization"

According to Rosicrucian Tradition, humans are "spiritual beings traveling on a purposeful human journey." This has been corroborated by writings that are of more recent origin. For example, as Richard Gerber, M.D., tells us:

"We are multi-dimensional beings of energy and light whose physical body is a single

component of a large dynamic system.... The tissues which compose our physical form are fed not only by oxygen, glucose, and chemical nutrients, but also by higher vibrational energies which endow the physical frame with the properties of life and creative expression."³

Ancient Eastern tradition and modern research show that the Chakras/nadi system and the physical-etheric interface regulate the flow of energies into the physical form.

The well known acupuncture/meridian system connects the molecular forms with the energies of the etheric body.

"Correction of an energy dysfunctions occurring at emotional, mental or spiritual level...will result in an improved functioning of the Chakras."

This is the goal of modern vibrational and holistic medicine focusing on the natural development of the human potential without use of technical procedures.

Similarly, the fundamental AMORC teachings are also based on the knowledge of brain energy and consist of practices aiming at fostering the faculties of intuition, visualization, insight, ecstasy, and creativity. The fundamental goal is to develop and enhance individual levels of awareness and to attain Cosmic Consciousness.

4. "The Law of Thought," as It Relates to Magnetic Energy of the Brain

An excellent modern reflection on the principles posed in "Magnetic Energy of the Brain" may be found in this interesting chapter, which relates to the subject matter investigated by the earlier "Mindquest" article.⁵

Lonnie Edwards, M.D., states, at the outset: "The path to wisdom has been announced and lighted by all the great avatars, teachers, masters, philosophers, and saints throughout human history."

This introductory sentence opens up the heart and blesses with joy every sincere student of mysticism: there are no dogmas, no restrictions, no exclusions. The Rosicrucian Tradition includes all sincere seekers, all true devoted researchers of eternal reality.

He goes on to explore the core interest of his discourse: "The great Law of Thought governs the spiritual universe....This Law functions through universal mind, which flows in, through and about everyone. It is a creative intelligent power. Whenever we use our mind, we are setting into motion the creative power and energy of universal mind."

This statement is fundamental in our materialistic environment. One school of modern science would have us believe that "You are your brain." Our tradition argues otherwise. We are not our brain in the same sense that we are not our body.

Dr. Edwards impresses on us the notion that when we use our mind/brain, we are setting into motion the power of universal mind. Our physical brain is only an interface—the real "creative

power" is the universal mind that flows in and about everyone.

This is the key on which is based our responsibility as evolved individuals. What we *think* sets into motion the energy and creative power of the universal mind.

He reinforces this concept: "Every thought we think struggles to become a reality and is destined to manifest." This is in agreement with the most sacred and ancient teachings of the human race: We are responsible. The Law of Cause and Effect is the logic consequence of our personal responsibility.

In a more explicit form, Dr. Edwards explains: "...when the conscious mind produces a thought, it is delivered to the subjective and subconscious mind where universal law takes over and creation begins." 9

This is the most clear and convincing statement linking the physiology of the functional human brain to the sub-consciousness and to the transcendent cosmic powers. In this sense humans have the potential to be co-creators.

Nevertheless, we must be cautious: "...the proper use of thought is a learning process. It takes time, patience and devotion.... Students of mysticism must learn to think proactively..." 10

More precisely, Dr. Edwards confirms that: "Creators of thoughts vibrations, regardless of whether these thoughts remain in the aura or radiate outward, become involved in the Law of Karma." "The masters have taught that strong negative thought vibrations act as boomerang, returning their energy to the sender with increased velocity...." "12"

Finally serious advice is needed: "Become aware of all your thoughts in terms of polarity and vibratory qualities....Carefully supervise and cultivate your thought life.... Create thoughts that heal and bless you and others." ¹³

The clarity and wisdom of these twenty-first century reflections on both ancient tradition and modern science are quite useful in updating our consideration of the Magnetic Energy of the Brain.

5. Practical Mysticism Puts Brain Energy to Use

In his book titled *Practical Mysticism*, well-known lecturer and Rosicrucian educator Edward Lee analyzes and explains the technique used in AMORC's curriculum to develop concentration, problem solving, visualization and other practices. These are aimed at increasing intuition as a balance for better living and at developing higher vibrational consciousness for personal growth.¹⁴

The author defines the ability to concentrate as: "...the collecting of our mental energy into a single pinpoint of undiluted, intense force...." He then gives the example of a skilled artist in the most intense moment of creativity: "Entering even deeper into concentration upon his or her work, the artist passes into a state of mind whereby subconscious mental input is possible. The

subconscious, being the most profound level of consciousness, is in contact with the Great Cosmic Mind and inspirational ideas and impressions may flash across the threshold of the inner mind."¹⁵

In these expressions we find an echo of Dr. Edwards' commentary, stating that the functioning of the brain must be applied for the higher purpose of entering in contact with the Cosmic Mind and deriving inspiration, intuition, and knowledge from our superior being.

Lee continues: "The final stage of mystical concentration is where concentration ends and inner attunement becomes truly dominant....when the student stops objective thinking, releases the thoughts while in that borderline state, he or she begins to meditate." ¹⁶

This is the exact description of the ancient sacred state of Samadhi, which is the state where the brain has stopped its selfish functioning to surrender in total attunement with the Cosmic. Thus ancient wisdom and modern science can be found in harmony, which is one of the profound goals of the Rosicrucian Path.

¹ Alan Jacobs, *The Principal Upanishads* (Alresford, Hampshire, UK: O-Books, 2004), 102, 105.

² Lonnie Edwards, M.D., *Spiritual Laws that Govern Humanity and the Universe* (San Jose: Rosicrucian Order, AMORC, 2005), 63, paraphrasing Pierre Teilhard de Chardin, S.J. "We are not human beings having a spiritual experience. We are spiritual beings having a human experience."

³ Richard Gerber M.D., *Vibrational Medicine*, 3rd ed., (Rochester, VT: Bear and Co., 2001), 419.

⁴ Ibid., 421.

⁵ Edwards, Spiritual Laws, 105-119.

⁶ Ibid., 105.

⁷ Ibid., 106.

⁸ Ibid., 107

⁹ Ibid., 108

¹⁰ Ibid., 108-109.

¹¹ Ibid., 111.

¹² Ibid., 113.

¹³ Ibid., 117.

¹⁴ Edward Lee, *Practical Mysticism* (San Jose: Rosicrucian Order, AMORC, 2005).

¹⁵ Ibid., 19-20.

¹⁶ Ibid., 25.