

Yogi Andre Riehl

Federation of Traditional Yoga – France
Studio for Yoga Retreats PRANA BINDU (Ujjain, India)
and SOMAPA (Avignon, France)

BRAIN WAVES, SANSKRIT CHANTING AND SACRED SILENCE

Summary: *In this paper we research correlation between brain waves and states of consciousness in contemporary medicine and traditional yoga teachings. We can confirm similarities in consideration of the states of consciousness although traditional yoga approach derives from the distant past when there didn't exist contemporary medical apparatuses as electroencephalograph and scanner. Yoga praxis introduced intonation of mantras as an instrument for spiritual purification and improvement. In this paper we explain correlation between different states of conscious and use of mantras. Yoga praxis knew the influence of Sanskrit mantras chanting (vibrational syllables) and developmental impact of their practice. Sanskrit chanting (intonation) of mantras has been used with the purpose to introduce yogi to the refined (higher) states of consciousness.*

Key words: *brain waves, silence, states of consciousness, yoga, meditation.*

The brain waves

The brain is made of some twenty billion neurons which produce electrical signals/impulses. When there is a synchronicity among neurons, which means when they are working together in either activating, refraining or balancing any physical or psychological deed of a person, a very little and rhythmic electrical impulse appears within the synapses, those very tiny junctions in between the neurons chains.

The more neurons are working together in synchronicity, the larger is the amplitude of the electrical oscillation. This amplitude is measured in microvolts. The faster neurons are working together, the higher is the frequency of the electrical oscillation. This frequency is measured in hertz.

Amplitude and frequency are therefore the very basic characteristics which define the brain waves. Those very weak signals can be measured by placing electrodes on someone's scalp with the help of a conductive paste for helping conducting the information. By amplifying the electrical impulses/signals through a EEG-amplifier, they are then sent to a computer which analyses the characteristics, both amplitude and frequency. This is electroencephalography or EEG.

Researchers and scientists are developing the idea not yet identified or proved that the brain might generate some 10 watts of electrical power when it is fully functioning.

Those electrical activities called brain waves have been measured precisely since several decades and it appeared that four different categories could be well identified. Later on it was discovered and understood that the different brain waves corresponded to specific "states of awareness". The brain waves appeared to be common to any person regardless his/her gender, culture, beliefs and way of life. They are of four types:

- 1) DELTA: 0,5 to 4 cycles per second or Hertz (Hz)
- 2) THETA: 5 to 7 Hz
- 3) ALPHA: 8 to 13 Hz
- 4) BETA: 14 to 30 Hz

- 5) But in very uncommon cases, it was also discovered a fifth kind of brain waves, called GAMMA with a frequency of about 40 Hz, precisely between 31 to 42Hz.

Biophysiological observations

It is now common to hear saying that we only use about 10 percent of our mental capacities, and a big question since very long has been: "Is there a direct link between the biological and physiological activities of the material brain and the logical and imaginative activities of the non material thought processes?" In this regard, researchers have tried to observe which areas of the brain are effectively being activated when different mental activities are going on. Those researches are still on and up to now no final conclusion has been reached. We must therefore keep in mind that all explanations might be uncompleted and nothing should be taken as a clear and neat conclusion.

What is observed is that in a very large number of people, what we call the "average person" is mainly using in his/her daily life the parietal lobes of the brain, which are very active almost permanently during the waking state when BETA and ALPHA waves are operating. Those lobes are said to be stimulated by the "reptilian" brain which governs the very basic instinctive processes of each individual. Also the presence of GAMMA waves seems to be working with a stimulation of the frontal lobes, especially the left pre-frontal lobe. Once again we have to remember that those observations are still in progress and it would be very bold to conclude to any final assertion regarding the link between the material brain and the non material thought processes.

The states of awareness

Going on and deeper with the experimental studies and clinical observations, the researchers finally came to a conclusive point of view which was to be definitely considered as a truth. These four kind of brain waves were operating in a definite state of awareness linked to the relationship one has with the environment, either inner or outer. They are:

- DELTA: activated during the deep sleep and coma.
- THETA: activated during the dream sleep and states of trance.
- ALPHA: activated during the waking state when the body is very relaxed.
- BETA: activated during the waking state when the thought is attentive or concentrated.

The fifth GAMMA is activated in cases of extreme focus and states of ecstasy.

DELTA was identified as the electrical activity of the state of unconscious, with the very basic instinctive activities to maintain the body surviving. THETA, as the activity of the subconscious where emotions, strong feelings and dreams are mainly operating. ALPHA, as the activity where the consciousness of the body and the integration of feelings are driving the person. BETA, as the activity where perceptions, light concentration and mental processes are at the first place.

Finally the fifth GAMMA brain waves were identified as a higher state of awareness not easy to define as the persons measured in such states show difficulties in finding proper words to explain what they are precisely living. But it is commonly accepted that this is a state of a very clear mind linked to a strong sensation of happiness.

Finally, comes the question of the observer itself. What is this function that we call observation? Is there a particular place or centre within the brain where we observe from and is this "observer" neutral enough to not interpret any of its observations? Or is observing a non material activity, a living process appearing in between the so called observer and the observed? And finally could the observing process be the inner dynamic of the GAMMA brain waves activity?

Upanishads and states of mind

In the classical culture of the Indian Upanishad, one of the basic traditional texts dating back around fifteen centuries, we can see that in spite of almost no clear knowledge regarding the material biological brain areas, very precise and detailed explanations were already given about the non material though processes which are quite well coping with the recent discoveries from our century !

The Mandukya Upanishad, consisting in only a few slokas - short sentences – describes four different awareness activities to which is added a fifth one. Those descriptions are done in term of identification with several though functioning ways.

JAGRAT: the waking state, into which the person is identified with his body, actions, ideas and verbal speech.

SVAPNA: the dreaming state into which the person is identified with his mental images and mental speech and emotions.

SUSHUPTI: the deep sleeping state into which the person seems not to be identified with something in particular. But it only seems as we have no recollection of this *Sushupti* state when we come back to the waking state. It is therefore describe as a state of no more awareness, but a “state of mind” where there is still a process of identification but with a certain *nothingness*.

TURYA: the very translation of this word is the “fourth state”. It is describe as a state of mind which includes the three others first, *jagrat* (waking state), *svapna* (dreaming state) and *sushupti* (deep sleeping state), but also as a state which is linking the passages between those three. In other words, when we pass from the waking to the sleeping or dreaming states, there is a very tiny continuity process that is going through this state of *turya* for a very quick moment. It is also describe as a state of extreme focus with a feeling of very vivid energy as well as deep happiness. This particular *turya* state is finally explained as a state which does not last very long compare to the three others as the waking state (several hours per day), dreaming state (about 100 minutes per night) and the deep sleeping state (several hours per night).

At last, there is this unusual fifth state called TURYATTITA which is simply described as a continuous state of *turya*, meaning that is a state where the person experiments a deep happiness and a full perception of reality. Thousands of yogis have tried to describe this state, always coming to the conclusion that it was not possible to explain clearly what it is and that the only clear understanding could only come from a personal experimentation. Going further into the Mandukhya Upanishad, we also find that this traditional text indicates the using of sounds as tools to experiment the different states of awareness. A deeper understanding to the Sanskrit root meanings of the words themselves is in fact showing that it is not the sounds that are involved, but most surely the vibrations related to those sounds. We then find that each state of awareness is associated with a specific vibration, itself represented by a sounding letter. *Jagrat* (waking state) is associated with the sound “A”, *Svapna* (dreaming state) with the sound “O”, *Sushupti* (deep sleeping state) with the sound “M”, *Turya* (the fourth or in-between state) with the sound “OM”, and finally *Turyattita* (the unusual state almost impossible to describe) with no sound at all, which means with a particular quality of silence.

Stable state of mind

The Indian tradition is very precise regarding the different levels and functions of the human psyche, and we have great difficulties when we are confronted to the question of translation. We must first try to be as clear as possible with the words which are used. The states of awareness are four in number as it has been explained before. Out of these four, three are quite well accepted by the western scientific psychology, the states of wakening (or conscious), of dreaming (subconscious) and of deep sleep (unconscious). The “fourth state” is not so easy to accept as it cannot be measured objectively, but

only felt subjectively. It brings the person to a kind of perception which can be called a state of "intuition". This kind of intuition needs to be confirmed by the daily experimentation in our life. For example when we have some kind of premonition and that we can effectively watch and practically verify later on that it was a right perception. We then could ask, what is this particular state of awareness which knows without having any object to stand on. Yoga has given an answer to such a question: it says that this state comes from not any object, but from the subject itself, i.e. the Identity, also called sometimes the "I-ness", this very root of the fact of being oneself alive. This I-ness is said to be precisely this Turyattita, the fifth state, or in other words the function of watching, the higher Self, the Seer, the non personal Energy... and so on, as many different words have been used trying to give intellectual sense to this "thing". This activity of non personal I-ness is described as being at the origin of each and every sentient being, human, animal, vegetal and mineral (as mineral evolve too, from ordinary stone to precious jewel) and in its nature equal within all reigns of life, but more or less "hidden" by the context (or culture) of each reign.

This non personal state of mind is defined with three qualities: silence, vastness and joy. Regarding the study of the impact of sounds on the being, we have to go deeper into the concept of the meaning of words like sound, vibration, information and silence. The Indian Shaivaite tradition for example says that there are some fourteen different levels -or qualities- of silence and the tiny differences between them are very difficult to grasp only with the cognitive faculties, but need to be perceived as physical experience through the body sensitivity.

We then have a question about the criteria of a scientific research which needs to be proved and should be reiterate at will to be validated as real. This means that any experience must be objective, i.e. there must be a distance, a separation between the observer (the scientist) and the observed (the object that is being studied). When we come to personal experience where the observer and the observed are part of the same person, it is almost impossible to have this scientific approach according to its own definition. We then have to deal with another way of relationship that should include a new creativity from which could arise absolutely new paradigms and totally unknown possibilities. In other words, including the unknown as a part of knowledge. This requires a total openness linked to the passion for discovering, both being dynamic processes which do not stop whenever something is recognized as a real.

Going back to this question of Sanskrit vibrating chanting and its effects on the brain and the mind, we have to take in consideration what the Indian tradition give us a kind of a scale helping us to understand tiny details, some of them playing as key-roles. Inside the using of vocal Sanskrit, there are once again five levels to be defined:

NAMA: the word itself and its signification. We all have noticed that using words to communicate with other is never so easy because of the different interpretations that each of us give to any particular word, but also because the meaning differs according to the cultural context and personal background. The understanding of words is therefore totally dependent of the intellect, personal conditionings and cognitive functions.

SABDA: the sound. The sound does not have any particular intellectual meaning, but it can be measured in terms of frequency, low or high, volume or power, speed and movement. But if the intellect cannot grasp to a sound, the body can, experiencing sensations, through not only audition, but also kinesthetic perception like inner rhythm, pulsation, movement...

SPANDA: the vibration. The vibration can be defined according its very specific behavior that helps: it is dynamic but does not really move, it is vibrating and stay at the same place. The subjective personal perception of the vibration is made of either soft or strong inner movement that comes and goes but does not really change its location.

Riehl, Y.A. (2011): Brain Waves, Sanskrit Chanting and Sacred Silence. In: P.Nikic, ed. *Proceedings "Yoga – the Light of Microuniverse" of the International Interdisciplinary Scientific Conference "Yoga in Science – Future and Perspectives"*, September 23-24, 2010, Belgrade, Serbia. Belgrade: Yoga Federation of Serbia, p. 104-111

VRITTI: the information. The information is explained as a very subtle movement going from one place to another and hence organizing the process of vibrations.

SUNYA: the void. This unusual fifth level, is defined as void which is a quality of silence. Silence is then considered as the very basis of any heard activity, the tantric tradition saying that there are several qualities of silence, from 14 to 18 according to the different schools...

Mantra and sankrit chanting

Trying to find links or correlations between the old traditions and the modern science, we can interpret the Mandukya Upanishad as follow. The vibrating sound "A" stimulates the faculties of perception and the mental concentration inside the awakening state where BETA and ALPHA brain waves are operating. The vibrating sound "O" stimulates the emotions, strong feelings and dreams inside the subconscious state where THETA brain waves are operating. The vibrating sound "M" stimulates the faculties of no objectivity occurring inside the unconscious state where DELTA brain waves are operating. The vibrating sound of "OM" stimulates the extreme focus and ecstasy inside the "fourth state" or turya where GAMMA brain waves are operating. Above all that or deep within, there is an indescribable state of silence where the observer and the observed are one and united.

Going further in this research, when each isolated sound is studied separately, the Indian tradition gives the depths of its intuitive ingenuity. For example, the vibrating sound "A" is declared to be a sound that brings about something out of nothingness. Several letters of the Sanskrit alphabet are said to be contained into the vibration of "A". The same affirmation is made with the vibrating sound "O" which is said to sustain any activity as a regular dynamic without changes, and the vibrating sound "M" to organize any process of deconstruction. At last the vibrating sound "OM" contains the three activities of life, apparition, maintenance and decay. At the very end, Silence is declared to be the very unfathomable basis impossible to grasp or understand onto all these four activities are operating.

Among the 50 letters composing the Sanskrit alphabet, some of the sounds are building up together the faculties of creation resumed in the vibrating sound "A", some others are building up the faculties of maintenance resumed in the vibrating sound "O" and some others building up the faculties of decaying in the vibrating sound "M". It is often considered that the whole alphabet is all together resumed in the vibrating sound "OM", and that the basis of all life lies into an unuttered quality of Silence that cannot be understood.

Linked to the vibrating sound "A" are six *bija mantras* or root-sounds which are chanted loudly and inwardly so to stimulate the whole process of expanding the awareness in all and each of its levels. Linked to the vibrating sound "O" are other *mantras* chanted to stimulate the maintenance of this awareness. And linked to the vibrating sound "M" are again other *mantras* chanted to stimulate the vanishing of this awareness. Linked to the vibrating sound "OM" is the total awareness, then called "Consciousness" which is a state of wholeness where all levels are included. And beyond all these levels of material and non material existence is a perfect and unattainable quality of Silence.

The way of the yogi is not to define all the technical and intellectual particularities of the different *tattwa* – aggregates- which are combining matter and energy at the basis of the every physical existence. The goal of yoga has been given in Patanjali's *Yoga sutras* as reaching this state of mind made of a deep quality of silence by slowing down the thought process until it becomes absolutely quiet. It is said that when the mind becomes silent, then yoga start. In other words, the state of separation comes to an end and the state of non separation appears, the literally meaning of the word *yoga* being a state of union or unity. The way of the yogi is to look for this potentiality to become his very life. But also to testify the reality of life by his life and through his insights. It is far from any beliefs, superstitions and second hand ideas or ideals. The affirmation of this reality is the manifestation of the very creativity of life which has nothing to prove and no body to convince. The final position of the yogi could be either to become totally anonymous in the world or to be an instructor for students having strong motivation for discovering the

Riehl, Y.A. (2011): Brain Waves, Sanskrit Chanting and Sacred Silence. In: P.Nikic, ed. *Proceedings "Yoga – the Light of Microuniverse" of the International Interdisciplinary Scientific Conference "Yoga in Science – Future and Perspectives"*, September 23-24, 2010, Belgrade, Serbia. Belgrade: Yoga Federation of Serbia, p. 104-111

sense of the whole life. The teachings themselves are said to belong to ancestral oral tradition where the very meaning is transmitted by the way of speaking. It is poetically said that this speech is in fact the outcome of the silence of the Universe.

References:

1. Sastri, Mahadeva (1920). *The Yoga Upanishads*, text with commentary of Sri Upaniṣad-Brahma-Yogin, Madras.
2. Bahadur, R., Vasu, S.C. (1914-15): *The Gheranda Samhita*
3. Griffith, Ralph T. H. (1893): *The Sāmaveda Saṃhitā*.
4. Patanjali (1977): *The Yoga Sutras*
5. Sivananda, Swami (1995), *The Bhagavad Gita*, The Divine Life Society.
6. Bihar School of Yoga (1998): *Hatha Yoga Pradipika*.
7. Van Nooten, B., Holland, G. (1994): *Rig Veda, a metrically restored text*, Department of Sanskrit and Indian Studies, Harvard University, Harvard University Press, Cambridge, Massachusetts and London, England.