

International Conference on Yoga

SECTION 1: AN OVERVIEW OF THE CONFERENCE

VIVEKANANDA KENDRA-A MOVEMENT (HQ. KANYAKUMARI)

THE FIVE-FOLD APPROACH TO NATIONAL RECONSTRUCTION

The famous Vivekananda Rock Memorial on the mid-sea rock at Kanyakumari, the southern most tip of India has become a national movement of inspiration to nearly 5000 persons visiting the rock memorial everyday. Still more significant is the living memorial Vivekananda Kendra, a service mission with its head quarters at Kanyakumari spreading the message of man-making and nation building. Kendra is not an institution but a movement; with nearly 50 branch-centres throughout India and five major following fields of service:

YOGA AS AN INSTRUMENT FOR MAN-MAKING

1. Rural Development Programmes as means to invoke the dormant divinity and to channelise the energies of the rural areas towards national reconstruction
2. Education as a process for all-round Personality Development
3. Natural Resources Development Programme to transport appropriate and ecological technologies to rural areas
4. Yoga as a man-making tool
5. Publications for disseminating healthy literature

The Kendra is infusing the spirit of service to humanity as true workshop of divinity.

YOGA THE SCIENCE FOR THE NEW AGE

The endeavor of the Kendra has been

1. to make yoga a socially relevant science. Yoga not merely as a set of yogasanas or pranayama or meditation, but as a Science of Holistic Living.
2. To propagate a Holistic Value System consisting of Health and Wealth, Bliss and Poise, Harmony and Efficiency based on the laws of the life enshrined in the Upanisads to be actualised by the techniques of yoga lore.

WHAT IS YOGA

Vivekananda Kendra Yoga Anusandhana Samsthan (Research Foundation) or VK YOGAS in short has been set up to examine the efficacy of yoga practices and develop yoga courses to solve the basic problems of the modern hi-tech era.

Systematic scientific research is the basis in all the major fields of applications of yoga.

1. Yoga for modern society to propagate the science of Holistic Living for happiness, health harmony and higher efficiency.
2. Medical applications of yoga by integrated approach of yoga therapy to face the challenge of psychosomatic ailments and psychiatric problems.
3. Applications to the Executive World by using yoga techniques for Stress Management
4. Educational applications to fill the vacuum in the present system by introducing the technology of yoga for developing all-round personality, and
5. Yoga for Sadhakas to unravel the hidden dimensions of human consciousness by advanced practices of yoga.

CONTRIBUTIONS OF VK YOGAS

Research reports, papers, dissertations & books: Eighteen yoga therapy research reports, one doctoral-grade thesis submitted to the University of Heidelberg, forty one dissertations submitted in partial fulfillment of yoga therapy instructors courses and post graduate diploma for doctors, thirty research papers published in leading international (viz, BMJ, Journal of Asthma, British Journal of mental deficiency research etc.) and national medical and yoga journals, thirty five papers presented in national and international conferences and twelve books on yoga and its applications have been the major achievements of twelve years of long research. The book "Yoga for

common ailment" packaged by GAIA UK, and published simultaneously in UK, USA and Australia has now been translated to 8 European languages. The latest book is the "The Art and Science of Pranayama".

RESEARCH TEAM AND ONGOING PROJECTS

Research teams in Bangalore (India), UK, USA and Japan have been built up with research coordinators of repute. The team consists of medical researchers, yoga teachers and experts, scientists and technologists, vedic scholars, system analysis, and psychologists Research projects on Bronchial Asthma and Nasal Allergy, Diabetes and Obesity, Hypertension and IHD, Anxiety Neurosis, Mental Retardation and Cerebral Palsy, Ophthalmic Disorders, Cancer and Psychosis are in progress with long term follow-up studies.

YOGA COURSES AND TRAINING

Six yoga courses on Asanas, Pranayama, OM-Dhyana, Cyclic Meditation, Kriyas and Emotion culture for general public, integrated approach of yoga therapy courses for prevention treatment of ailments and rehabilitation and to deal with acute cases of modern ailments SMET, Voice culture, IQ and Creativity development courses for professionals and personality development courses for students have been developed and being run continuously.

INDIAN YOGA INSTITUTE

Under the aegis of VK YOGAS Indian Yoga Institute has been established. Yoga certificate and diploma courses, post graduate courses for doctors are run regularly. Ph.D. in yoga is being offered recently affiliated to Bangalore University.

YOGA RESEARCH LABORATORIES

The building for the Physiological, Psychological, Biochemical laboratories has been built. The first phase of equipping the laboratories with simple apparatus and instruments is complete. We are now heading for the further phases.

YOGA RESEARCH LIBRARY AND SEMINAR HALL

The new building for the library and seminar hall is just complete and the present library is being shifted. Also our library is being equipped with research journals, magazines, etc. Audio, visual section is also being developed.

AROGYA DHAMA

Facilities for treatment of patients and for promotion of Holistic Health are now available. Dormitory, single, double and deluxe rooms can house nearly 100 inmates. 'Mallika' and 'Anugraha' are the special blocks for housing affluent guests and inmates who need greater comforts and help us financially to build up the campus.

MONTHLY SYMPOSIA

In-depth and update symposia in various medical and other aspects of yoga are run in the Prashanti Kuteeram campus. So far 20 symposia have been completed. This conference is the emergence out of the experiences of conduction of the symposia.

FUTURE PLANS

1. Exhibition building
2. Swamiji's statue, meditation hall and music and light to depict the life and message of Swamiji
3. Completion of Library building

ANNADANA SCHEME

'Do not deny food, that is the vow*. Participate in this sacred scheme in the memory of your parents or dear ones on the occasion of their birth, marriage or obituary. Donate Rs. 30,000/- for one-day food (US \$ 750/-) for full time dedicated workers of Prashanti Kuteeram.

SVASTHYA SEVA SCHEME

Yes, You can help rural poor patients by sponsoring a bed exclusively for them.

Annual Donation Scheme

Rs.50,000 -1bed for 12 months

Rs.30,000 -1bed for 6 months
Rs.10,000 -1bed for 2 months
Rs. 5,000 -1bed for 1 month

Lumpsum Donation Scheme

Rs. 1 Lakh -1bed for 2 months
Rs. 2 Lakhs -1bed for 5 months
Rs. 4 Lakhs -1bed for 10 months
Rs. 5 Lakhs -1bed every month

CONFERENCE STRUCTURE

The venue of the Conference is a spacious campus set amidst natural beauty and serene atmosphere. It is 32 Kms away from the Garden City of India, Bangalore. The city is recognised as the 'Science City' of India with many industrial, educational, spiritual and technical institutes of the highest repute. Bangalore is also endowed with a salubrious climate and has a population of around six million.

----- BEFORE THE CONFERENCE -----

HIMALAYA - A Yoga Olympiad final (13-14 Dec 1999)

This programme is essentially meant to bring together all the students of yoga from different institutions, especially the youth, under one roof and to propagate the holistic vision. Only teams are allowed to participate in this Olympiad. Yoga excellence team selection is conducted at district, state and zonal levels throughout India. The final round for National and International level will be held at the conference venue on 13 and 14 and concludes on December 15th.

PRE-CONFERENCE WORKSHOP (9-15 Dec 1999)

This week-long workshop features a unique combination of Science and Spirituality. Prof. Satyanarayana Shastry, a scientist turned philosopher and a sadhaka will give an in depth presentation of 'Message of Upanishads' in the morning sessions. The afternoon session comprises of presentations by Prof N V C Swamy, Ex-Director, ITI, Chennai on Quantum Physics and Consciousness, Dr H R Nagendra, Director, VK YOGAS on 'Consciousness based on Yoga and Scriptures' and Dr M Srinivasan on 'Measurement of Consciousness using a Random Event Generator'. Participants will also be acquainted with several subtler yogic techniques like Pranic Energization Technique (PET) and Mind Sound Resonance Technique (MSRT) invoking inner bliss and balancing the mind apart from Yoga Therapy Techniques by Dr R Nagarathna of VK YOGAS and Dr Lata Nityanand of Krishnamacharya Yoga Mandiram, Chennai. Several well-known Siddhas, Sadhakas and seekers will be presenting one-hour 'Satsang' everyday to give the participants an experience of tranquility and bliss.

INTERNATIONAL CONFERENCE ON BIOMECHANICS & YOGA (13-15 DEC 99)

A unique feature of this Conference is the first ever International Conference on Biomechanics and Yoga, to explain how Yogasanas increase the efficiency of joint functions; Yoga may prevent and remove coronary vessel blocks and Yoga practice may influence Brain functions.

YOGA NIGHTS

In the wonderful settings of yoga atmosphere charged with scientific fervour, the Yoga Nights will portray the cultural heritage of India through hypnotising programmes by the world renowned Prabhat Kalavidaru and the like. 'Investigating the paranormal' would astound the participants and add dimension of depth to yoga nights.

YOGA EXHIBITION

Holistic vision of Yoga, a perspective of published yoga research results, list of yoga institutions and courses etc will feature this unique exhibition.

YOGA INSTITUTIONAL STALLS

Apart from the sale of books, publications, audio, video cassettes, etc yoga institutions will display their research highlights, courses conducted by them and also set up a cell for guidance in Sadhana.

PARTICIPATING INSTITUTIONS

SCIENTIFIC

IISc, (Bangalore), NIMHANS (Bangalore), KMIO (Bangalore), IIM (Bangalore), CCMB (Hyderabad), AIIMS (Delhi), ICMR (Delhi), WHO, DIPAS (Delhi), IIT (Madras), IIM (Calcutta), Jaslok Hospital (Bombay), GON HOSP (BOM), MMC (Mysore), INYS (Bangalore), University of Oregon, UNESCO, etc. Moksha Foundation, USA.

SPIRITUAL/YOGA

Gayatri Pariwar, Krishnamacharya Yoga Mandiram (chennai), Bihar School of Yoga, Kaivalyadhama yoga Institute, Divine Life society, BKS Iyengar Yoga Institute, Yoga Institute, (Santacruz), Aurobindo Ashram (Pondicherry), Institute of Yoga and Consciousness (Vizag), Ramakrishna Mutt, Vyakti Vikas Kendra, Arsha Vidya Gurukula and Adhyatma Sadhana Kendra, Delhi.

SECTION 2: YOGA AND CONSCIOUSNESS

2.1 KEYNOTE ADDRESS

CONSCIOUSNESS AND YOGA

Dr H R Nagendra

ABSTRACT

Consciousness is the intelligence principle and yoga is a conscious process to accelerate our growth from grosser to subtler layers of mind. The goal of yoga is to manifest divinity of consciousness and to unfold the total personality in all of us.

Amidst infinite layers of consciousness, five main layers Panca Kosas have been distinctly presented in Taittiriya Upanisads. Pure consciousness is beyond the Panca Kosas and no words can qualify that ultimate reality. This consciousness-based ontology, the essence of the Vedas and Upanishads, presents the laws of creation-sustenance-destruction triplet with quantitative time dimensions. Among infinite techniques of yoga, four main streams - Jnana, Raja, Bhakti and Karma yoga provide the multidimensional approach.

Judicial applications of Yoga bring immense benefits to the individuals and the society. The wisdom of the consciousness-based ontology describing the structure and laws of Panca Kosas form the knowledge base for these applications of yoga to solve the problems of the modern society.

2.2 INVITED TALKS

PERILS OF THE PATH

Andrew Cohen

Moksha Foundation, P.O.Box. 5265, Larkspur, CA 94977, USA, © : (415) 256-9063

ABSTRACT

If one wants to know what enlightenment is one should leave infinite room inside oneself. If the profound depth of the self is to be directly experienced one should liberate oneself from so many odds and thus help oneself to create the required infinite room inside. Just knowing is not synonymous with the enlightened consciousness. Humility is the human face of enlightened

consciousness. The tremendous challenge for all true seekers of enlightened perception lies in finding that perfect middle place between knowing and not knowing. Once you know as to what you know there is no going back. The goal for the seeker is always leave room inside themselves for what they do not know, to manifest and attainment that casts no shadow to rest always in that perfect middle place between all pairs of opposites.

The greatest peril of the path for those who seek enlightenment is not leaving enough room inside themselves for what they do not know. And the greatest peril of the path for those who already are enlightened is neglecting to leave enough room inside themselves for what they do not know.

If we want to know what enlightenment is then we have to leave infinite room inside ourselves for what we do not already know. That simply means no matter what we think we understand, if we want to directly experience that profound depth of self, the discovery of which always liberates, then we have to create infinite room inside ourselves for what we do not know.

The reason of have so much difficulty experiencing enlightened perception, which is seeing beyond the mind and knowing beyond memory, is simply because we don't leave enough room inside ourselves for what we do not know. And the reason we don't leave enough room inside ourselves for what we do not know is that without being aware of it, we believe we already know. Already know what? Already know everything - including what it is that we don't know! Already knowing is how the ego protects itself from the unknown. From the perspective of enlightenment, already knowing is what the ego is. Ego is the veneer of invulnerability and overconfidence that creates a life - numbing wall of separation. A wall of separation that always divides the domain of experience into two: inner and outer, self and other, individual and world. From the perspective of enlightenment, the very definition of ego is arrogance. The arrogance of already knowing the invulnerable over-confidence of already knowing is that fortress of limitation that always keeps the unknown at bay. From the perspective of enlightenment, the unknown is a metaphor for no limitation, and no limitation is a description of the experience of consciousness liberated from the inherently limiting arrogance of already knowing.

Not knowing is synonymous with enlightened consciousness because not knowing automatically creates infinite room for the unknown, which is experienced as consciousness liberated from any sense of limitation. Humility is the human face of enlightened consciousness precisely because that face has been freed from the arrogance of already knowing. Humility is the direct consequence of always first not knowing in relationship to all experience. Arrogance or ego is the human face of unenlightened consciousness because it is the direct consequence of always first already knowing in relationship to all experience. In not knowing there is always infinite room for the unknown but in already knowing there never could be.

But the nature of enlightenment is paradoxical. Its perfect continuity rests upon a delicate balance of opposites. On one hand, enlightened consciousness is a direct consciousness of abiding in a state where there is always infinite room for the unknown. And on the other hand, the very stability of that consciousness equality rests upon a doubtless conviction, a knowing of the ultimate nature of reality that is unshakable.

So therefore, the tremendous challenge for all true seekers of enlightened perception lies in finding that perfect middle place between knowing and not knowing, and once having found it staying there.

Once again, the greatest peril for those who seek enlightenment is not leaving room inside themselves for what they do not know. And the greatest peril for those who already are enlightened is making the very same mistake. Indeed, the often confusing results of deep spiritual

experience lies in their potential to bestow a powerful knowing strong conviction that is unsupported by a deep and continuous surrender to the unknown. This is the most precarious aspects of enlightenment and spiritual experience in general - arrogance or already knowing tainting the potentially immaculate expansion of powerfully awakened consciousness, this is why enlightenment is such a delicate business. Because unless we hit the bull's eye, which means that perfect middle place between knowing and not knowing, the inevitable result of profound spiritual experiences including over enlightenment itself will be imperfect. That simply means in the one who is enlightened a shadow of ego will remain, because in their attainment knowing will be more powerful than not knowing. That is why the pursuit of enlightenment is such a delicate matter for the seeker and finder - because it's so easy to err on one side or the other.

If the seeker is unwilling to surrender all prior knowing, then the liberating power of enlightened perception will remain over beyond their grasp because without that inconceivable leap into the unknown the confidence of knowing that mystery that abides beyond the mind will always be unstable. And for the one who has found, the one who has taken that leap, now that he or she is a finder, will there still be room inside them for what they don't know? once confidence in enlightenment has finally been won, will the all - important humility still be there? or will they now paradoxically have become only the one who knows?

Once you know, and once you know that you know, there is no going back. So the greatest danger for the finder is doubtlessness - even though doubtlessness is an essential ingredient to liberation! you see, in the end, the goal for the seeker and the finder is the same: to always leave room inside themselves for what they do not know, to manifest an attainment that casts no shadow, to rest always in that perfect middle place between all pairs of opposites.

CONSCIOUSNESS AND UPANISADS

Dr Shubhada Joshi

Prof and Head, Department of Philosophy, University of Mumbai Vidyanagari, Santacruz (west)
Mumbai-400 098, © 6526091 Ext.428

ABSTRACT

The visionaries of Upanisads are fascinated by phenomena of the consciousness. They have found the phenomena as enigmatic and have persistently attempted to understand it. The approach of Upanisadic seers is metaphysical and mystical. They mainly speak of 'consciousness' as the essential character of 'self (atman) or they call it ultimate reality. The modern western approach portrays how the logic of predicates ascribing consciousness differs from that of physicalistic and mentalistic predicates. An attempt is made here by presenting the distinctive features of the Upanisadic approach from the point of view of philosophy of consciousness.

MACHINES AND THE ELUSIVE WISDOM

V J Modi

Professor Emeritus, Department of Mechanical Engineering, The University of British Columbia,
Vancouver, B C, Canada V6T 1ZA

ABSTRACT

Faith, intellect, experience, memory and intuition are cornerstones of our life-stream. Thought cannot stir without faith and to that extent the machine is a creation of our faith. But it will never be able to search outermost bounds of nature and the innermost depths of man, and can never comprehend the force that unites them. No machine, no computer, no robot will ever be able to enjoy the sunset, nor will it be able to describe its total beauty spontaneously in a haic, a three-line, seventeen-syllable, poem.

Life imposes on us the obligation to be compassionate, considerate and true. We cannot pass these obligations to the machine. To paraphrase Bernard Shaw : No creation of man manages its affairs as well as a tree does.

UNRAVELLING CONSCIOUSNESS

N V Raghuram

Suhruda Poly Clinic, No. 50, 4th Main Road, Near Post Office, Chamarajpet Bangalore-560 018

ABSTRACT

The Upanisadic period of Vedic age is considered as the age of research. The sages and seers of that period have looked into the entire creation both at the individual as well as the universal level through their visual window. Their eagerness and curiosity to look at the whole world has made them possible to analyse the process of creation and evolution. This is what they called 'Jijnasa'. The intellectual personality is the beginning and there can be nothing beyond this and more powerful than this which is our nature. 'Pancakosa Viveka', the knowledge of five subtleties of existence is also discussed in Upanisads. So it becomes essential for a person who is interested in Yoga to know what Upanisads have preached us.

EVOLUTION OF CONSCIOUSNESS

P Parameshwaran

Director, VK YOGAS, Kanyakumari

ABSTRACT

The innate urge for evolution is divinity that is inherent. It is not because there is an interaction between the doing and the surrounding that evolution takes place. Evolution is the manifestation of what is already there within. Manusya (man) is essentially of the mind. The characteristic feature of man is mind. Man is so called because he has a mind. This mind evolves and in the process of evolution passes through different layers and levels. As a result the rough becomes smooth, hard becomes flexible and grosser becomes subtle. Our philosophy looks at the entire process of the evolution in whole and not in part.

This is the sixth millennium, the 21st century AD and the 51st century of the Kali era. When we speak of entering a new millennium they are accepting a complete and total concept, which is at variance with the concept, which we have evolved in our country. According to this, history began

at a particular time 6000 years back. That is not the Indian concept of time.

So even when we speak of creation we mean that unlike the western theory of creation, God created something out of nothing. Our concept is only another projection of the entire universe as it is visible today. Both the west and the east accept the concept of evolution.

According to our Yoga Darsini also there is a concept of evolution, Ja-tyantara Parinama; i.e., one species changing and evolving into another species. This is accepted. Darwin also speaks of one species evolving; transforming basic question is what is the driving force of this evolution? What makes evolution necessary? Even there is a difference of perception between the western and the Hindu concept of evolution.

In the western concept, a being interacting with the surrounding and due to constraints and compulsions or situations, environment, mutation takes place and not able to explain in technical terms, but evolution is the result of being interacting with the environment and a mutation taking place. According to the Hindu way of looking at things, Swami Vivekananda explains the process of evolution by saying that prior to evolution there is what is called an involution.

Without an involution there cannot be an evolution. Evolution is a process of what is already involved manifesting itself. If something is not already involved there can be no evolution. So involution is half the process and evolution is the rest of the half. Involution and evolution are the two halves of the stream of evolution.

What is involution and what is evolution? Evolution we are more or less familiar with. Right through our life the process of evolution goes on. That is more or less evident, but the process of involution is beyond our understanding, beyond our observation. According to the Indian view of life the ultimate truth is one. There is only one Reality. Ekameva Advitya, there is only one_. There are no twos. That one, the ultimate Reality is called Brahman or Satchit Ananda. Whatever it is, the ultimate divinity, that is the only thing that exists. It is that Satchit Ananda which Indians think is the cause of this evolution and out of that, this evolution is second. So these two together have to be understood.

Now as I said, the process of evolution is visible. Mahayogi Aurobindo, one of the greatest thinkers, seers of modern era who is equally conversant in the western and eastern philosophy of life, Darsanas, has given a complete picture of this concept of evolution. He says the involution or descent of the divine into the dead, inert, dull, lifeless matter. That is the first of the descent, and from the descent the ascent begins. The ascent is called evolution. We see the inert dead matter. There is no visible sign of life. It is absolutely lifeless for the external eye. But it is from that dead, inert, lifeless matter that signs of life become visible and life emerges out of that matter and out of life, gradually mind evolves. So matter, life, mind - this is the process of evolution.

There was a time when people doubted whether matter is not dead, there is life. As Aurobindo said life is dormant, it is sleeping, but it is there. Great scientists like J.C. Bose also proved that even matter, metals has shown testimony. They become sad, they become happy, they have got various sensibilities that even though for our external eyes they are dead it can be proved that there is life. So life evolves out of dead matter because it is already involved there. Unless it was involved there it cannot come out of it. It is there. Satchit Ananda or Brahman has descended, involved in the dead matter which is gradually evolving, unfolding itself. So the driving force of all evolution is the divine spirit that is already involved in the dead matter. Evolution is only a process of the manifestation of the divine which is already involved there.

We all remember Swami Vivekananda's magnificent definition of the word religion - 'Religion is the manifestation of the divinity already inherent in man.' The divinity is already inherent in everyone of us. What religion does or what religion helps us to do is to manifest that unmanifest divinity. So the Divinity is there not only in man, in the animals also, in the vegetable kingdom also, in the dead inert matter also the divinity is there. It is the urge of the dormant divine to manifest

gives expression to what we call the process of evolution. So it is the innate urge for evolution is divinity that is inherent.

It is not because there is an interaction between the doing and the surrounding that evolution takes place. Evolution is inherent in the matter and the urge to express the divinity that is contained within, that is the grading force of evolution. So evolution starts from dead matter to various levels and layers. It is not that matter suddenly becomes living. There are intermediary processes, levels and layers. Life manifests from life. At various levels mind manifests. There is mind in the vegetable kingdom, but not visible, not as manifest as it is in the animal. In the animal we find mind becoming more manifest, more and more developed, there is more unfoldment and in the man the mind is fully developed.

Man, Manushya is essentially of mind. The characteristic feature of man is mind. Man is so called because he has a mind. Manushya means one who has got a mind. A developed, evolved and unfolded mind. No one is a man unless he has got a mind. So this mind evolves and even then you find that there are various levels and layers of this evolution. So man is in the process of evolutionary mind. Mind or you can call it consciousness.

Consciousness is visible in man in the form of mind. But does evolution stop there? Is man the aim of all evolutionary process? Is he the ultimate outcome of the evolutionary process logistically not. If from the atom the inert matter life can evolve, vegetable kingdom can evolve and from vegetable kingdom animals can evolve and from animals man can evolve, there is no reason why man cannot evolve further and especially because man is involved divinity. The urge of the divinity to manifest itself will continue more powerfully in man. Evolution at the lower stages was the result of nature's working. It was not any conscious effort on the part of the vegetable kingdom that animal evolved out of it and there is no conscious effort on the part of the animal to evolve into man. But once you reach manhood we all know that there is an urge within each one of us and we are all conscious. No animal is self-conscious. Man is probably the first animal, which is self-conscious who can introspect and try to understand and analyze the process that is going on. We can divide ourselves into two, the objective and the subjective and we can look upon ourselves or observe, become conscious of what is going on and we can also decide our destination. Therefore unlike in the earlier stages of evolution, so this goes on and what used to be evolved out of man - Sri Aurobindo says that man is an interim phenomenon. In this long unbroken chain of evolution, man is only an interim being. Man is not the ultimate end of evolution. All the faculties and potentialities have not been manifested. The divinity has not been totally expressed in man. There is an attempt, there is a struggle going on within each and every man. All the struggle that is going on today is in fact a struggle to express the divinity that is within us. itself that Sri Aurobindo says the mind has evolved and in mind we find not only the animal mind, not the feeling mind, not the groping mind, there is the rational mind, the intellectual level is very high in man with the result that what the animal cannot do, the man can do. All the scientific and technological advancement all that we call the modern civilization with all its enviable conveyances and comforts at our disposal with all the high speed and high tech and all that, all these are the result of the rational mind. The fact that the man has evolved from the mind is the highest peak we have reached is also the greatest challenge for all of us.

The high tech, high speed and all that, they are so great, we are so proud of it. But each one of them is a great challenge to us also. Fifty years back we did not have this speed we did not have the high tech but we lived even more comfortably. There was no threat of a nuclear explosion. There was no threat of missiles flying across continents. The threat has come along with the advancement. Every step in our advancement has thrown a new challenge to the human being. So this evolution that we have undergone and the present stage that we have reached is throwing a challenge to us and how are we going to solve it? Every evolutionary ascent is the result of a

challenge. Life evolved itself into mind because there was a challenge and today the human mind is facing challenge and it is that challenge that will give rise to another and higher evolution. As it is we are in the threshold of the millennium. We have great hopes and expectations but are they well founded? They are not. The threat is there, the challenge is there and how are we going to face the challenge is there. And how are we going to face the challenge? Sri Aurobindo says by another leap in evolution, from a mind you have to evolve into a super mind, from man into superman then only transcend the mind and go into a realm where the present perception of the world and the present structure based upon that perception will be overcome and you will reach a stage where you will be able to have what is called as a holistic vision, a realization of the unified existence. So this is supposed to be the next stage in the evolution of consciousness and Sri Aurobindo says that he draws his conclusions from the Vedic Rishis. This is not something that has come like a bolt from the blue. He has trust in the vedas. I shall conclude by saying that all this great and universally visible quest and thirst for yoga study in consciousness a subjective turn of mind after exhausting all objective world. That is the reason why there is a yearning for yoga an interest in yoga, in all its various aspects. This is an indication of the coming change, the consciousness evolving into a higher state. Sri Aurobindo says an integral yoga and that also in a collective way will give rise to a new species which will be as different from the present human beings as human beings are different from the animals. Qualitatively so different, so superior their kind of a race is in the womb of the future. That is the destination of the evolutionary process. That is the ultimate is another matter. But then the history of the entire creation and the world has been the history of a continuous chain of evolution of the divinity that was already involved. So this is the way how our philosophy looks at the entire process of the evolution of consciousness.

THE PANCAKOSA AND CONSCIOUSNESS

Dr Madhusudan Penna

C/oA ViplavReddy, H No: 1-1-336/54, Viveknagar, Chikkadpally, Hyderabad-500 '020, (AP)

ABSTRACT

The objective of the paper is to study the five Kosas and the consciousness and explain the misidentity between the two which leads to the circle of births and deaths. With-drawing the awareness from the Kosas one after another, the practitioner of yoga ultimately remains as 'PURE-SELF'.

The concept of Pancakosa is of great importance in the study of Vedanta and in the process of Self-realisation. The Yogasutras and commentaries on the text are silent regarding the nature and application of realization of Pancakosas.

Consciousness in yoga terminology is a changeless reality. (Here Bhokta is called the experience, what he experiences is called Bhogya and mind is called the Bhoga karma)

The concept of Pancakosa is of great importance in the study of Vedanta and in the process of self-realization. The Upanisads and various other sacred texts deal with the concept of Pancakosa in detail. This Pancakosa concept does not merely have significance as a Sastric topic but it has great use in the practice of Yoga too. Unfortunately, almost all the ancient commentaries on the Yogasutras don't seem to reconcile this concept with the Yoga theory explaining the nature and functions of the five Kosas. Though this concept appears to be closely connected with the Vedanta

system, its application and realization in the practice of Yoga cannot be denied. The Yogasutras and commentaries on that text are silent regarding the nature and application of realization of Pancakosas.

Present paper aims at a proper understanding of the Pancakosas not for scholarly discussions but for self-realization. Since, Yoga system has been honoured as a practical science directly dealing with the human existence and with making the existence a happy and beneficial one, a clear understanding of the Pancakosas and its application in Yogic life are incumbent.

Consciousness or citih in Yoga terminology is a Changeless reality. That is the Bhokta (experiencer) while the external world is Bhogya (enjoyed). Mind is called the Bhogakarma (means of experience). The Yoga texts explain that the consciousness and the mind exist in same locus and hence have their characteristics reflected in the opposite. Thus, mind which is inert appears to be conscious on account of its proximity with the consciousness. This proximity is not special but purely characteristic. Similarly, the consciousness appears to be inert also. This is called Avidya also. There are different layers on the consciousness that the light of consciousness does not fully flow out and the person does not shine externally and internally. The layers are not to be seen physically but they are the outcome of 'misidentity' of the consciousness with various other parts of the personality. These layers entangle the consciousness depending on the Samskaras of the mind (Impressions on the mind) and therefore called 'Kosa'. The subtle level of consciousness unmixed with any other impurities is realized in the 'Anandamayakosa'. The awareness confined to other levels gets other names like Annamayakosa, Manomayakosa, Pranamayakosa and Vijnanamayakosa.

The sacred texts exhort us to go beyond the level of these kosas and realize the Self as unattached, pure consciousness. The Yoga propounds that the various methods of Yoga practice enable an aspirant release himself from the clutches of the Kosas and realize himself. In all these methods, meditation is the most efficient method practiced even today by thousands of people all over the World.

The objective of the present paper is to study the five Kosas and the consciousness and explain the misidentity between the two which leads to the circle of births and deaths (Samsara). Withdrawing the awareness from these Kosas one after another, the practitioner of Yoga ultimately remains as the PURE-SELF.

LIFE OF THE UNIVERSE

Prof Vinod J Modi

Professor Eminentus, Department of Mechanical Engineering The University of British Columbia,
Vancouver, BC Canada V6T1Z4

ABSTRACT

For several thousands of years mankind has posed questions of fundamental importance; 'How old is the universe? How long will it last?' The prevailing scientific view of creation vests in the so called 'big bang' theory. Gradually, the energy 'condensed' into matter according to Einstein's theory of relativity which links energy with matter through the speed of life.

NEURO CHEMISTRY AND ANANDA

David Prestie

Professor of Neuro Science, University of California, Berkeley

ABSTRACT

What we know about human brain seems to be related to different aspects of how we behave. We perceive and construct a picture of the world. As a result of that we hear, see, feel, smell, taste. Underlying all the stuff of consciousness, perception and behaviour according to the tenets again conventional neuroscience is the chemistry of the brain in particular how the neurocells interact. Such_ a chemistry of our brain effects the way we think, act, feel perceive. Ananda the supreme bliss can be attained through some of the activities of the_brain. We have to understand what 'chemistry' helps our brain attain Ananda.

I bring the point of view of western reductionistic science and its perspective on the brain, the mind and consciousness to this issue as one that is complimentary. Really in some ways to the identic perspective I look forward to being able to contribute to coming together of those two different ways of conceptualising consciousness. We believe that underlying a lot of our behaviour is our brain in some way. The evidence for that is if you damage the brain in some way with traumatic injury, brain is really complex, that is the bottom line here develops complications. We know about all these Neuro transmitters and connections and circuitry so on and so forth. We have an urge to scratching the surface of really understanding the what's going on in the human brain.

What we do know about the human brain is that it seems to be related to a lot of different aspects of how we behave. We can talk about things like perception. Perception is our gathering of information about the world and constructing a picture of the world. As a result of that we do hearing, seeing, feeling touching, smelling, tasting - these are all aspects of perception. Our behaviour is composed of 3 components. Our actions are observable behaviours. Internal behaviours like our thoughts and our feelings though cannot be observed they are turly aspects of our behaviour. Those 3 components perform an interact between one another. So the way we think effects the act and feel, the way we feel effects the way we think and act and so on and so forth. Then there is also this consciousness thing that of course is one of the key themes in this conference and it is very vaguely defined in scientific terms. We don't have an accurate reliable sceintific definition for consciousness. The way I like to think about is that we do all the stuff we see, we hear, we taste, we smell, we touch, we remember, we act, we think, we feel, we sleep and we dream - the kind of essence of how we were aware of all this stuff is our consciousness. It is not possible to give a precise mechanistic definition of the consciousness within the domain of science as we know it today. We just don't know how to define mental states like consciousness or even feelings and thoughts in terms of actions of neuro circuits itself and so forth. That does not mean that we will never be able to do that but at this point the knowledge of brain is too primitive to be able to make those kinds of definitions.

Underlying all the stuff of consciousness, perception and behaviour according to the tenets again conventional neuro science is the brain and the chemistry of the brain in particular how the neuro cells interact. The chemistry of our the brain effects the way we think, act, feel, perceive our consciousness in some way and conversely those things effect the chemistry of our brain. You can make some easy illustrations about this. For example you can give somebody a chemical that effects the brain chemistry e.g. is alcohol. Alcohol is a chemical, it effects someones physiology and in particular effects the brain chemistry. If you give somebody alcohol it changes the way they act, the

way they feel, the way they think, the way they perceive and in some sensory consciousness, and if they do not get alcohol they become unconscious and even more they will die, so they crudely effect on the chemistry of the brain. The other direction that there are effects of those things on brain chemistry is also reasonable to believe, however, it has not been possible to study again with scientific tools. It is now possible to start doing experiments like sophisticated brain imaging technologies and see the differences in brain chemistry between when someone is thinking a certain thought and when they are not or however this is only a beginning to be done.

There are the some of the tools we use in conventional neuro science to study the brain, basic anatomy looking at how cells are wired up together. You can do this now in living humans with the technology that has been developed in the last two years that looks at what is called functional imaging, PET scan and functional magnetic resonance imaging and also the older methods like EEG, MEG - these things give a picture in some case very detailed microscopic activity of the human brain inside a person who is alive in different states of consciousness, exhibiting different kinds of behaviour. And then looking at neuro chemistry looking at the local and long range chemistry, chemical interaction between the cells, these involve things like studying neuro transmitters, the receptors for these neuro transmitters, the effects of external chemicals like alcohol or any other chemical drugs you can think out that effected brain function and also finally looking at actually regulatin of the DNA and the genetic material by different kinds of chemicals and different kinds of neuro activity and so forth. So by applying these tools in the human brain we can start to address the questions of what is mind, what is consciousness, what are the mechanistic aspects of these things and see how far we guess. We may find that some of these things may automatically be unknowable by these tools but what is perspective does is just push the arm loop of this methodology and see how far it takes us to see, we can see what point we hit the wall and say we just cannot possibly explain this using the conventional concepts in biology, chemistry and physics. You have this complex somewhat of the branching system of what is called dendroids which like antenna that pick up information from other nerve cells. What nerve cells do is specialise to communicate signals from one cell to the next. In that sense any brain is kind of like useless terminal very qualified way it is a little bit like a computer that has a lot of circuits that are computing different kinds of things, but it is a real mistake to think that brain is just a kind of complicated computer in someway because it is so much more sophisticated, has so much more stuff of different kinds going on than anything that we know of a computer in the technological sense that had really limits our understanding brain to think about it in that way. But it is a kind of doing this complex signalling between different parts of the circuitory. And those signals are generated and propogated by nerve cells. They collect information with these Dendroids on the left and they send the signal down the stream which is called as an axon. It gets to the end of the axon and the signal jumps to the next nerve cell. Connection between the nerve cells is the cynapse. When a nerve signal propogates down to the end of the wire axon, and causes the release of the bunch of chemicals which are called neuro transmitters, these chemicals flow across and stick to the next neuro cells that are called receptors and when those receptors get neuro transmitters molecules struck to them they activate the next neuro cell and they do something to the next neuro cell they inhibit it, they activate it, they turn on a piece of DNA and they turn of an enzymes sometimes all kinds of complicated stuff that goes on. This is such a simplest picture of complexity of what is happening at the cynapse. Then the neuro transmitters fall after those receptors and they get vacuumed back up into the nerve cell that release them in the whole thing re-cycles and the whole process takes place in a fraction of a second, thousandth of a second, millisecond just goes on over the time we are having a hundred billion of neurons in our brain that are disappearing away hundreds of times per second.

The neuro transmitters are chemicals. The chemicals in the way they work in the brain is infact is

the chemistry, the process of what is going on here is the synapse. If you take common drugs that can produce addiction in people like Alcohol, like Nicotine, Tobacco, like microcaine, the ingredients in morphine, from Opium or Heroin which is ingested with that - all these things do their thing by acting at the synapse. And then also you have various medications like anti-depressant medications or anti-psychotic medications for the treatment of psychosis and schizophrenia, these things do act at the synapses.

I want to give few examples of the connections that we can have, that we can make between the behavior and brain chemistry that's going to a subtler stage than looking at some of the more profound interactions between brain chemistry and behaviour. An experiment was done about 50 years ago which had really a profound discovery, that was made on a rat. It showed, that it was possible for the rat to learn more easily and remember things more easily in some way from that part of the brain that was stimulated. But more importantly the rat seemed to really like it in some way. Now we don't know rather what rats are really feeling then but this was a very clever experiment where a stimulated electrode was implanted in the brain and the rat pressed the button basically with its paw to activate the electrical stimulation activated it according to the brain. The hypothalamic electrode in most areas of the brain of the rat does not go out of its way to press this button give itself any stimulation. Most of the time it does not even find itself repulsive. But in this particular area all the rats do is press the button whenever they get in this point. So it sits there all day and presses this button at one time per second, just you know it's phenomenal and will do that for hours and hours until it essentially exhausts itself, wears out and then little while have a nap or little food or water normally a lot of food and water and will have a choice between food and water or pressing this button. It will take to press the button. And it has been found that people would report things some people are very pleasureable, some people reported things and feel somewhat orgasmic and other people have said it's not really pleasureable, it is a kind like that feeling that you have when you try to remember somebody's name when it is in the tip of your tongue and you can almost remember it but not quite and it is just like I will try little harder, I will get it, so it is something compulsive or driven. Can you keep on doing? Will it really give pleasure? So what that exactly is that the circuits which are buried in the deep, in the interior in our brains in a couple limbic system may be partly related to reward and at the experience of pleasure and satisfaction the Sanskrit 'Sukha.' We now know more about the circuits, 50 years later we know that the neurotransmitters that is used is oftenly that are called reward circuits. And we know that all the different drugs that have been looked at they can produce addiction in people as the one just I mentioned above. These things will all activate those circuits. So in fact to make a kind of abnormality active and as a result of that the circuit should reset the whole balance so that they become how would they activate in future. And this is actually there is some insight in the understanding in the treatment of drug addiction. And there is an example how I came by mechanistically studying the brain we can get some information exactly useful for addressing an important problem in human behaviour. Depression the congestion which we clinically call depression where the people have moods and they bumped out whenever they feel not like doing anything. Clearly depression of a people's actions, thoughts and of the components of their behaviour they have depressed mood which is a feeling thing. They also don't feel like doing anything that is an action thing. And their thoughts were negative, they tend to think negative is like 'I don't want to live anymore'. These things are all related to brain chemistry because we know you can give people a pill common at present medication and they will become less depressed.

So there is clearly a chemical component of depression and you can by its simply addressing the chemical component you can help someone feel better. However we also know the things that don't involve chemistry directly also will be healing for depression like certain things that are probably psycho therapists and also although I haven't seen any published studies yoga based

therapies would have efficacy in helping to treat depression. So again this is an example of a kind of connection between brain chemistry and the behaviour that has social implications as well as other implications that might be going on in the brain.

Another example is that the congestion of ego psychosis in chronic terms of schizophrenia, people are chronically unable to distinguish between what we might call reality and what is going on inside their head. And in severe cases this causes major problems for them in their life. We know something about the Chemistry what is going on in the brain and there are number of medications that are used to help treat the symptoms of psychosis, but all of them are pretty crude and actually have toxic side effects. And there is a big kind of discussion with some cases of schizophrenia or psychosis about, Is this really a problem or Is this an expanded consciousness in some ways this person having a spiritual opening they just looks psychotic if you don't like to look at it in right context. I believe that is definitely the case with some people who get diagnosed psychotic and I think for something like that looking at it how these things are looked at.

BRAIN CHEMISTRY AND ANANDA

A molecule which is called Nandemide was discovered only a few years ago. The publication of this Nandemide was in 1992 in highly respected journals in science. It is a new neural transmitter in the brain and the receptors that respond to that are also unknown.

The receptor called Cannaboid receptors that respond to the active ingredient in Ganja the one at Cannabis which is the ancient medicinal plant that also have psycho lactive properties also have potential subjection and has an unique psycho lactive compound called tetra hedron Cannaboid (THC) until ten years ago was not known how it worked in the brain. Our brain has lots of lots of Cannaboid receptors. We have idea what they do except responding to Ganja. A Nandemide which is internally manufactured chemical that was 'brain made' that activate the circuits we have no idea what it does but the people who discovered it because of the psycho lactive properties of cannabis Ganja that may involve components of euphoria or feeling good or bliss they named it a Anandamayi.

I feel it a more important probe to understand what might be happening in the brain during certain kinds of transcendent spiritual states will we use them. And they have a long history of ritualistic and spiritual throughout the world, where there are plants in the environment they contain in these things.

The Vedas talk about something called Soma. These chemicals are very important probes to brain function especially and what we might call expanded states of awareness and may be similar things that are induced in the brain under the action of some of these chemicals compared to some of the things induced to meditative state and other kinds of yoga practices. However it is also very important to appreciate that these states of Ananda or Moksha whatever are not to be found in a chemical or a pill and nor they would be found in other kind of simplistic practice. But these things may also be probed to what is going on in the brain and they may help us understand the underlying brain chemistry.

The key had a distinction between the western and Indian approaches to looking at consciousness, or that is the western scientific approaches says that consciousness is generated by the brain and it is a product of brain chemistry in some way, where as the Vedantic approach i.e., that consciousness is somehow our mind and some of it may be gone on and some of it may be received in some way by some kind of greater source that is outside our own body in some way. And these two things are complementary to one another and two different approaches to really trying to address the problems of consciousness.

Panel Discussion with a prelude
Theme Yoga and Consciousness

Chair-person

Dr H R Nagendra, Director, VK YOGAS, Bangalore

Panelists

Dr C R Mukundan Dr Shubhada Joshi Dr Tulsi Saral, Prof N V C Swamy, Prof A S N Shastry, Sri O P Tiwari, Dr E C G Sudarshan

PRELUDE BY DR H R NAGENDRA

In this conference a plan of action was chalked out to lay emphasis on the spiritual dimension of health. So we circulated a right up giving the context in which this conference should give a concrete recommendation to the WHO to further the concept of this dimension of health. Definition of health according to WHO is not merely absence of infirmity or a disease, it is a state of well-being at a physical, mental and social levels.

In 1978 Dr Bist proposed a new dimension which is very necessary for human beings. He said even a flock of wolves also can have the physical health, the mental health. And they can work together for a social health. But there should something very unique for human beings and he called that as factors X. It was an extensive survey conducted on large group of experts, thinkers and researchers in this field. They said that we should have something new. The people in health area and all in the scientific circle also came to an understanding that there should be something very extra to human beings and they were not prepared to call it with any specific name. Bist called it factor X and later on in 1982 and 1983 there have been further seminars and conferences of the WHO and everywhere they have been trying to bring about the spiritual dimension into the health scenario. We would like to contemplate on the spiritual dimension health as to how the spirituality the consciousness can be brought into the field of health and what are the concrete steps that we can suggest to bring about the spiritual dimension into the health scenario.

With regard to the consciousness referred to by Prof Swamy in the earlier session it was the absolute, and unchanging. As Dr Shubhada Joshi explained it the mystical, dimensional, metaphysical dimension which modern science has not accepted. But there is a manifested consciousness, caitanya which goes on changing the intelligence principle within us. The creative dimension within us featured by freedom, featured by the choice of elements within us. The super computer, the Robot can have the tremendous capacity to beat even a chess master but it has no intelligence because intelligence is something very unique. To human beings it is caitanya. Therefore how do we bring about this dimension of consciousness or the caitanya, consciousness which is the intelligence principle into the scenario of our health. This is the point on which we have to contemplate.

Dr E C G SUDARSHAN added

Very often people are told 'you should be unselfish, you should be kind, you should be gentle, you should not be attached to things and so on'. And many people find it quite difficult to follow or to understand. I am a gardener, I like plants. It is very tempting for me to remove the aged leaves because anyway they have to fall down, one day. Why should I wait until the aged leaves falls down ? When it looks ugly why should I not pull it down. Of course it is so bad a thing to do. When time comes the leaf will fall by itself. And the other aspect is that plucking it out is not necessary when that itself is going to fall.

In the same sense you go towards the right place, towards the right attitude and look to be sincere to yourself. The other attitude is likely to come more naturally rather than imposed one. Therefore the kind of confusion in people's mind may arise that Swamy referred to is the Artha and Kama are bad and you must get rid of it. Such fact is very negative way of thinking, make the things more difficult than it need to be if you are in such a disposition then things may call off you, and they will call off you. But you don't have to say that it must be done first before you can ascend to the next, spiritual program.

It appears to me is a gradual process and it is a never-ending process and that they keep on happening all the time and not necessarily because they are not striving towards it because it is quite a natural thing to do. Water in the stream runs down the hill, naturally one need not say it, that cannot go the other way. you do not have to tell it. That is not the way to go this way. It automatically happens. So in the same sense should our performance be.

There are very many holy people who are so holy that they seem to be against all things elegant and things that are beautiful. There is a story about a young Namboodari who is invited to a gathering and he did not find many people there to talk and so he took a deck of cards and he involved himself by playing with the cards. The others nearly outraged. Eventually all of them commented, and that reached the Maharaja. Maharaja Samba told the youngster that he was playing the cards and he was wasting his time, instead of contemplating on appropriate things and studying good things. The youngster said, 'my Lord, Look at this deck of cards and I was simply pursuing the spiritual cards with it'. Maharaja was very angry. What is this stupid thing he said and looked at the ace. The ace is the highest card and why is it the highest card, because it is one. It is the beginning, without which there could be nothing else, it is the beginning with two that talks about, the sense of duality that you possess so far. Maharaja was so pleased that he immediately honoured him and decorated him..

In the same sense very often the things, which give you a very great deal of pleasure, are also the methods of passing on to the spiritual. It is not something that is inaccessible. Infact it is the realization of the things in its ultimate. And it seems to be that one must presume natural bent but always looking towards integration and further understanding and insight and automatically all the other things to reach.

Dr SHUBHADA JOSHI added

I would like to respond from the viewpoint of attitudes to which I referred earlier. You know theoretically, we know about spirituality and we know that is recommended and prescribed as it ought to be a pursuant. Selfishness should not be there and you know that whole theory by heart. When it comes to applications you always find them in a different situation and what is required then is a tremendous courage, understanding and then constant thinking is going on and developing a particular attitude, controlling and keeping the right track. This is what I find it especially as a teacher. When I interact with the students I find it that this world is full of competitions and students find that competitions can be won by analytical ways and means. They have so many problems and they want to have a robots view of attitude in their life. They don't want pleasures of the life to be sacrificed completely and at the same time they have some vague notions about good life. I think, sharing with young generations is nearly not preaching, not teaching but discussions entering into a dialogue is very essential and then try to communicate the right type of attitude. I just give you one example. This is what I tried with the school children and it was a simple mathematical example given for calculating loss and profit. A shopkeeper purchased Basumathi rice and also purchased a rice of inferior quality mixed them together. He sold that mixture to the exact rate of Basumathi rice I asked the students not to give the answer right now whether the shopkeeper has earned a profit or suffered a loss. Give a thought over it and then tell

me that in a long time do you think this is profitable act and if you say so, tell me why and if you don't think so tell me why do you think so. This is because young people to whom I am addressing as a teacher, when I dialogue with them and when I asked about their aspirations and I also know the aspirations of our own children. With regard to the aspirations, always they first think about material and they are not wrong in that. But material for what cause and I was really taken by surprise and I was literally shocked when I just asked the school children and a school boy of 9th standard. And I asked about what he would like to do in life and I was expecting at least either some innocent answer or some answers he would like to be a professional and so on. Very bluntly he said, 'I want to be a smuggler'. Now this answer when came to me I was not really trespassed to take it but then I had to give a thought that in a society where there is a long heritage of spirituality and the quality of life. And this student got up and said openly without any hesitation that He want to be a smuggler. This shows that there is definitely something wrong with our thinking. Therefore really this is the time for all of us to think about and that's why I said it will require tremendous courage.

We will have to give up hypocrisy and I am sorry that I am using a word which is not very fair but it is the case that we talk in one way but when it is put into practice it is twisted and is given a different shape. There are some ways where we either find out ourselves in a very helpless situation. Swarni Vivekananda when he taught practical Vedanta he said inner space and outer space are really one. And because we are born as the sons of immortality we are free and that freedom should not be the inner freedom only but the freedom must first expressed as the outer freedom and then there will be possibility of the experiences in the inner freedom. I think we will have to concentrate on the social, individual, material and spiritual aspects. We just cannot neglect material and concentrate on spiritual and at the same time we cannot say that material is the last thing and also is not possible.

Well, modern advertisements are always manipulating our own desires results. When once it is seen new wants take its birth and new desires are created. Previously we use to carry our luggages in a bag or in such containers. But advertisement have made it compulsory that we should carry our luggages in a branded suitcase. It may be VIP or something else. In this direction to what an extent we may proceed? I always try to communicate such things in the form of a dialogue because I don't consider myself capable of giving prescriptions and recommendations. I try to understand the way in which students are thinking and whenever possible I try to communicate the right type of attitude. It is not the case that always succeed but at least, I think that out of some situation I will be making sense of quite a few and that probably that one can do if one thinks in that way.

Prof N V C SWAMY added

Sanatana Dharma talks of four purusarthas, Dharma, Artha, Kama and Moksa. Dharma is code of conduct without which a society will simply not survive. Artha is associated with a social life for which one requires the method of production. No society is possible unless the society in productive. Kama implies the desires. Krishna in the Gita says that I am that kama which is not against the dharma. In other words legitimate desires Moksa. The 4th one is liberation which is the goal of human existence. Artha and kama, economics and the culture of communism should always be subdued to Dharma and Moksa. Only then one can talk of individual health, personal health or the health of the entire world. There are the untamed demonstrations of this not only in the west but also in India. There have been many instances where civilization or culture in India grew up under an attitude of pure Artha and kama. It is because of these reasons the Sanatana Dharma is always insisted upon Artha and Kama in the frame work of Dharma on one hand and moksha on the other.

Unfortunately from the 8th century onwards there has been a tendency to save or think that the

entire world is unreal - Artha is bad. Kama is bad and so the best thing is ,0 look for moksa irrespective of whether there is Dharma or not. As a matter of fact this is an abuse of philosophical way of life of Sanatana Dharma whether a person follows a particular path towards a liberation. Each one of the paths is associated with rest of the three. Therefore in Dharmic way of life an ethical way of life has been insisted upon by practically all major religions. Whether they are followed or not is a different story. In this context if you look at the modern world we find that Dharma underlines for a very happy existence on this earth purely within the frame work of Artha and kama, the consciousness we have already seen. It is mainly because of this that more than a decade ago the united nations, the UNESCO decided then recognise Yoga as a new dimension of health. Yoga is not restricted in the terms, yoga in the broader aspect of life and it is that which gives the scope to Swami Vivekananda Yoga Research Foundation to take up the study of yoga from the point of health in a serious way. I still remember that a seminar we had long back when 'puspa' dormitory was getting ready. In a small hut we had discussions. And that was the pace setter and trend setter which gave us an idea that holistic view of life is something conducive to the health at all levels. Some persons take into consideration the 4 kinds of health - health at bodily level, health in the intellectual level, health at the moral level and health at the spiritual level. So this is the point one has to recognise. Now here comes the question of consciousness. The question of consciousness comes mainly because spiritual health is possible only when we have understood our own real nature and that is where the study of consciousness becomes important. And that is also where they have to get very clear as to how far one can go in material welfare. Material welfare has never been looked down upon Sanatana Dharma. In ancient culture of India material welfare has never been looked down upon. As a matter of fact that we must live for 100 years happily, contentedly, enjoy life and not outside the paradigm of Dharma.

Dr C R MUKUNDAN added

I have mixed comments and don't have any solutions. They are just the opinions. So we find that we are at a very difficult Junction. As long as you think of being cojiscious of some thing you find that you have a window to study consciousness. If it becomes very difficult to define nothing difficult to say what you are being conscious of, there is nothing. It is a myth to think that the religion practices whether the yoga or any other religion advises few to arrive you in an enlightened yourself or taken to stage where you are conscious of nothing. That is why all the religions say that becomes conscious of God or God can be replaced by any other concept like consciousness itself. Now there are different ways of coming to this stage, this is what we call a spiritual pursuit of life, religious values of life which you all should practice as a way of living in the society - that is difference. This is only to focus a self-attainment self-confidence but this is how you find that whatever you do in the modern science does not help you to travel in both the boats. You cannot put one foot in materialism and other in spirituality. It is a very important thing that we are pursuing one of the most important things in meditation is the control of our soul and thought. Now this is accomplished by trying to concentrate on something else. You have a concept, it is applicable to all religions. You have something to concentrate on by concentrating on that, you and your other thoughts become lesser and lesser. If you really want to do a serious exercise you find that the only way that the thoughts can be reduced is by withdrawing them. Some type of renunciation is very important. It may have different connotations in the past and in the ancient times or today you can't live in the middle of the material life and think that you don't need it . You have to renounce when you have to change your life style. This is really for those who wants to practice seriously to go through something paralleled that is described in ancient scriptures.

When it comes to aspects of health, there are several layers in awareness modulations within the framework of verbal awareness, chanting prayer, read any scriptures - all this can modulate

awareness and it may have lasting effect on the motor systems and behaviour and have tremendous implications. It is proud but through simple suggestions the physiology within the brain can be changed and so why people can try out not more serious form of awareness modulation. If it can be made a part of educational curriculum ,well, one should think of it. But if one wants to produce at individual levels, I find this a tremendous merit.

Prof A S N SASTRY added

Why should I drop the materialistic urges that I have? It is so natural and that is the quick way to happiness. The one weakness of Dharma as understood by Indian thinkers is that word modulations, restraint, Samyama, Prema, Tyaga, Indriyanigraha. It is so valuable that one could voluntarily accept that on the face of it. But here is a materialist who raises an objection which is reasonable. This point we have to appreciate. The objection he has is that Bhoya gives me Joy, then more of Bhoya should give more of joy. If you preach me more that kills this ethical value, you are a joy killer.

After teaching ethical values a student trends up and asks, 'why should I not steal, rob etc?' He also says, 'these things give me joy, variety gives me joy and if you come in the way by religious proposition, then you are a joy killer, and I object'. That is what is happening in the whole world. The world is passing through this phase and now shouting that religion is foolish. Then the teacher had no answer up to his level. 'I could not answer this question of the students', said the teacher. Religion orders restraint. 'What a seemingly reasonable conclusion! Where classical religion and conversion religions fail, vedanta comes to our rescue. Vedanta can be a defender of all religious of the world met out of Hinduism which has given all the precious values of life forgiveness, tolerance loving sharing etc. How does it tackle the question and cover the subject? It is this way the vedantic teachings in all the upanisads which say 'why don't you examine sukha in depth or study of Ananda.' And shankara comes out with an extraordinary comment - Is Ananda a thing born when the object of enjoyment touches the corresponding sense centre, the grateful thing for the eye. Is it born of the contact between the 'Ista vastu - enjoying sense centre' or is it very different and your very nature is so. This is the investigation to be made why not go deeper into the question and reexamine your cherished axiom. Mindless state is your Nija Swaroop and that is 'Anandavrata.' Every upanishad is proclaiming this truth where listening thinking, serving, hearing feelings are not there in the seat of ANANDA. Whenever you do this there is unlimited joy without any external objects. By this the world may be a happier place to live in.

Dr E C G SUDARSHAN added

Enlightenment borders on mysticism ! How to separate them? - Mysticism is akin to mystery. Mystery is one that one is not familiar with. But all direct experiences and all the use of spirituality tells us that there is nothing unfamiliar. There is only something more familiar than anything else. It is like walking on a dark night, and it is raining and does not know the direction. Suddenly there is a flash of lightening and then you know you are near home. Enlightening appears as some-thing mystical and unfamiliar to somebody who is observing it not really understanding it. But to the person who is being enlightened here is nothing mystical about it. They feel it is most natural, familiar thing they have.

Dr C R MUKUNDAN

I would draw a line between spirituality and ethics of the society. Many of the social laws lack important preservation of the mankind. Suppose we become dishonest all of a sudden, we start robbing each other and the society will auto-matically perish. You do not have to find a relationship with spirituality. Many of the rules of living are mainly meant to preserve the society

and mankind. They are sociological principles, important for survival of man. When you come to spirituality you find that. There is a priest in every person and it is part of pursuitful truth. We have been doing this since long. The pursuit has not changed here as no contradiction is there in the pursuit. But the methods are changed.

There is a definite role of spirituality for modulating the lifestyle so that it brings happiness for mankind. Be happy with small things about life. So far, we have been analysing either from a religious view point or a materialistic view point. We have to compromise.

Dr SHUBHADA JOSHI added

Does consciousness look, speak out by itself ? Since it is said that it goes with 'Niskriyatvam.' Upanisads don't agree with this view. In our conscious, when it is disembodied it may not act or speak, but when it is within the body it acts, and speaks only within the body. When it is without body then like Purusha and Atman then one can say that it does not speak. But it definitely requires sense organs, motor organs, mind, Prana and upanisads speak of it. In Chandogya upanisad there is a story about the fighting of the sense organs where each of them claims superiority over the over. The Prajapati said to the organs, 'You leave the body one by one and if you come across that the body cannot sustain without you then you are superior'. Then one by one leaves - ears leak and one becomes deaf, eye sores and becomes blind etc. and when it comes to prana all the sense organs were helpless and said the prana is superior. But prana itself requires the mediam of sense organs and the Manas. Manas has the material base and that is consciousness within the body. So Niskriyatvan does not mean 'without action'.

CONCLUDING REMARKS BY Dr NAGENDRA

Dharma is of real practical help to spiritual health and to knowledge base of the total reality the pre consciousness or the silence and bliss brought it to picture to bring great creativity for wonderful growth of our powers and solve the problem of dreaded disease.

2.3 ORAL PRESENTATIONS

A FORMAL APPROACH TO THE STUDY OF SPACE, TIME AND CONSCIOUSNESS

E G Rajan

Pentagram Research Centre Pvt. Ltd.,Hyderabad

ABSTRACT

Consciousness in its deepest home of an observer seems to oscillate without any will and reversibly between stillness and sensation. It appears to me that only the state change in sensation allows an initial phenomenon called movement of time to cause such a transition of consciousness. It is the consciousness that glides over changes in sensations and thus it retains all the past sensations. It is the consciousness that accounts for both the past and the present in terms of sensations experienced and that being experienced. Consciousness recedes from past, present and of course from the stillness and becomes mind. So, it is clear that consciousness based mind is an entity. In this paper I am trying to view these physical phenomena space, time and consciousness in a logical

framework. In this section, we shall study the concept of time in model theoretic terms. Model theory refers to the logical approach to algebraic formulation.

THE POWER OF 'PRANA'

Acharya Upendra Roy

Director, Yoga Centre, Sydney, Australia. Ph:61-2-92643705

ABSTRACT

A few techniques to enhance the pranic energy in the body have been described in this article. After warming up practices (vinyasa), movement of different parts of the body by 3 exercises, are used to help the participants to recognise the prana. The next set of practices help to bring out the healing powers of prana by feeling the rhythm of prana in the body and harmonising the same.

Enhancing Pranic-energy through breath control with graceful and meditative movements. All the practices are in the standing position. Specially suitable for outdoor workout in early morning.

LIMBER UP AND WARM UP (VINYASA)

1. **Rotation of the upper body:** Stand with feet 12" apart, arms down by the sides. Rotate the upper body side to side with the arms swinging gently side to side in such a way that as you inhale the arms come up, as you exhale the arms come down by the sides. Rotate upto 10 times.
2. **Rotation of the hips:** Place the hands on the hips and rotate the hips in circular motion, 10 times from the right and 10 times from the left. Inhale as you push the hips forward and exhale as you push the hips backward.
3. **Rotation of the knees:** Bring the feet together, bend at the knees to bend forward with the hands on the knees.
Now rotate the knees in circular motion, 10 times from each sides. Inhale as you bend the knees to bring them forward, exhale as straighten the knees by pushing them backward.
4. **Rotation of the shoulders:** stand with feet 12" apart. Place the thumbs on the tips of the shoulders and inhaling raise the elbows up, exhaling drop the elbows down and rotate the shoulders this way 10 times; stop with elbows down and inhaling lift the elbows up from the front and exhaling drop them backward. Rotate the shoulders this way also 10 times. Stop and relax the arms and shoulders.
5. **Rotation of the neck:** Place the hands on the hips. Exhaling drop the head down, inhaling start to rotate the head from your left and exhaling bring the head down from your right. Rotate 5 times this way from the left and 5 times from the right. Stop, lift the head up and relax the head by turning gently side to side twice.

ENHANCING "PRANA" TO THE WHOLE BODY : (balancing the five vayus outside the body).

Exercise 1.

Circular movement of the arms. Stand with feet 12" apart, arms down by the sides:

Inhaling raise the right arm from the front and complete one circle, holding the breath, continue

three more circles, stop and exhale, Practice the same with the left arm. Now, practice one round of the same with both arms raised from the front, stop and exhale. Then practice the same with both arms raising from the back.

Exercise 2.

Backward, forward and sideway movement of the whole body: Stand with feet 12" apart, arms resting by the sides of the body. Stand upright, balanced and steady. Inhaling raise the arms by the sides of the body over your head; exhaling bend backward, looking up towards the hands; inhaling come up straight and then exhaling bend forward to touch the toes or feet; inhaling come up with arms forward to stand straight; palms facing each other, exhaling bend to the left, inhaling come up straight, exhaling bend to the right and inhaling come up straight. This is one round. Practice 4 rounds.

Exercise 3.

Circular movement of the whole body: Stand with the feet 3" apart. Exhaling bend down to touch the floor with the tips of the fingers or with the palms. Inhaling circle from the left, come up backward holding the breath and exhaling come down from the right and continue two more rounds from the left; stop with hands on the floor. Repeat three rounds from the right just the same way. Stop. Inhaling raise both the arms forward and stand up straight. This is one complete round.

After these three exercises practice three rounds of "Ha" breaths to clear out stale air from the lungs. Then practice the special cleansing breath as follows:

Stand with feet 12" apart. Close both fists and place them on the upper chest. As you breathe in, push the chest up and tap the chest from side to side, keep on tapping as you hold the breathe stop, and breathe out through the mouth vigorously as if you are blowing out a candle. Repeat 4 times.

This is the preparation for the main practice of the "POWER OF PRANA" in the pranic body.

Enhance the prana in the Pranic-body and feel the energy in your Hands'. The breathing: 4:4:4:4 (same-matra). Sound of the breath, as in ujjayi pranayama.

1. Stand with feet together, arms by the sides. Stay steady, firm, alert and relaxed. Feel the prana all over the body like tingling sensation specially on your hands.

2. Inhaling raise both arms by the sides over your head and bring fingertips together; as you hold the breath, imagine that the Prana is charging in through the hands and the feet and energising the whole body.

3. Exhaling bring the hands down by the sides to the shoulder level, the arms extended straight to the horizon, palms facing up.

Stop exhaling (1 to 4) and feel the prana in your hands.

4. Inhale strong and imagine that the prana is charging through the hands to the whole body from the horizon. Hold the breath, turn the palms down.

5. Exhaling lower the arms down slowly by the sides, do not move the fingers and do not touch anything. Hold the breath out [1 to 4] and feel the energy of prana on the fingertips and the palms. This is one round. Practice 6 rounds. At the end raise the hands in front of the chest with finger tips facing each other as if you are holding a ball of energy between the hands. Feel the prana in your hands.

FEEL THE 'PRANA'AS HEALING ENERGY IN YOUR HANDS. 1st level of Practice :

1. Stand with feet 12" apart. From 'holding the ball of energy between your hands', keep the palms facing down.

2. As you breathe out slowly, bend slightly at the knees and lower the hands down to the level of your navel point.

3. As you breathe in slowly, raise the hands up to the chest level and straighten up the knees to

come up straight.

4. Continue this way moving the hands softly like the wings of a bird as you move them up and down. Bend only slightly at the knees as you breath out and lower the hands, come up gently as you breath in and raise the hands.

Continue this way for a while to feel the rhythm of the movement of body and the 'breath'.

2nd level of Practice :

1. With the movement of the body, keep the head upright and look straight to the front. Now form the shape of the figure 8 at a horizontal level in front of you with a gradual up and down movement of the hands from side to side by shifting the weight of the body to the sides, eg. when you move the hands down to the left (exhaling), shift the weight of the body on your left foot, bending slightly; inhaling as you raise the hands, bring the weight in the middle and exhaling as you lower the hands to your right, shift the weight on your right foot, bending slightly.

2. As you shift the weight of the body to one side, you start to lift the other foot up slightly without losing balance always keep the head upright. Do not reach out to the sides with arms over extended and the body leaning.

3. Use the horizontal 8 symbol in front of you about chest high, about three feet long and a foot wide. The colour of the symbol is silvery white; it represents the 'infinity', the eternal energy and concentrated power of prana in it.

As you move the hands, you gently touch the eternal pranic energy with your fingers and receive the energy.

As you continue, start to lift the foot higher and bring the foot in front of the other leg about knee high. Like, as you inhale and raise the arms to the right, lift the left foot in front of the right knee; exhaling as you bring the arms down, put the left foot down to the left and inhaling as you raise the arms to the left, bring the right foot up in front of the left knee. Build up a good rhythm and continue this way for a while.

The "**Dance of Siva**" - Dance rhythmically in the form of the statue of 'Dancing Siva'. Feel the rhythm, feel the energy and let go.

As you raise the hands to the right, lift the right hand as high as your shoulder with palm facing to the front. The left hand a bit lower, the palm facing down. At the same time, lift the left knee higher with the foot moving over to the right side of the right side of the leg at a downward angle. The same as you move the hands to the left; lift the left hand higher with palm facing to the front, right hand a bit lower with palm facing down and the right foot moving over to the left side of the left leg. You can move around by stepping forward and turning around with slow rhythm.

LET THE TOWER OF PRANA' BE WITH YOU

THE ROLE OF ELECTROMAGNETIC RADIATION IN UNDERSTANDING THE PRACTICE OF YOGA

S Shobha

Lecturer in chemistry, S.J.R. College for Women Rajajinagar, Bangalore - 560 010.

ABSTRACT

This paper attempts to delineate the process of yogic 'samadhi' by considering available elementary

neurological understandings of altered states of consciousness, induced through yoga and electrophysiological process of 'interactions of endogenous electromagnetic fields of human body with environmental electromagnetic fields'. This happens when oscillators of electromagnetic field of the body system vibrate at their lowest natural frequency of vibration of electromagnetic field of cosmos. This explanation for Samadhi process has been substantiated by experimental reports available in scientific literature on biophoton emission of human body by sophisticated instrumental techniques and study of electromagnetic fields of biological system on study of electro-magnetic fields of biological systems on coherency of life supporting systems in living organisms and resonance absorption of electromagnetic radiation by organisms and macromolecules.

'Yoga Sastra' is the supreme science of Atma Vidya. In order to understand the process of yoga practice through science, it is essential first to understand the aim and meaning of yoga according to Indian philosophy.

The basic meaning of the word yoga is 'union'. Brahman is the basic reality behind the whole universe and described as 'SAT (pure existence), 'CIT' (pure consciousness) and 'ANANDA' (pure bliss). This state of knowing Brahman is called 'Samadhi'.

Majority of people practice yoga to get better mental and physical health and concentration of mind, which obviously increases the rate of process 'general evolution'. This process of spiritual evolution, we have to achieve by purifying individual consciousness to get perfect concentration to experience 'Brahman'.

Patanjali, the great Indian sage, in his yogic text Tatanjala Yogasutras' explains the methodical way of the yoga practice and defines yoga as

'Yogah citta-vritti-nirodhah'

which means '**Yoga is inhibition of citta vrittis**'.

Here, 'vritti' (1) is way of existence of citta, the mind stuff. When we consider the ways in which 'citta' the mind stuff exists, we have to consider its states of activities as waves in mind stuff (citta-vrittis). Since it is known that the nature of mind is to constantly change and rise in the form of vrittis or thought waves, they are obstacles to yoga samadhi. Therefore, yoga is inhibition of thought waves, i) Savikalpa Samadhi (ii) Nirvikalpa Samadhi. It is ultimate reality of inner world of human existence.

i) Savikalpa Samadhi : This is proof of 'atman' of vedanta and similar to 'purusa' of 'sankhya' in many ways, where we experience the unchanging principle of consciousness the 'atman', as distinct from all changing phenomenon of mind and body. Here along with the perception of 'atman', there is also awareness of oneself and the awareness of process of contemplation.

ii) Nirvikalpa Samadhi : During this samadhi, a yogi will experience the Brahman only (the pure consciousness) and the other aspects of awareness being vanished. Thus, by '**knowing**' Brahman, a person will '**become**' Brahman. He / She becomes one with all pervading consciousness. All his/her doubts dissolve completely. This is called 'enlightenment'. It is the ultimate reality of inner world of human existence. This is the final goal of meditation in yoga and all types of religious practices of all traditions of the World.

NEUROPHYSIOLOGICAL BASIS OF YOGA

To attain the samadhi state through practice of yoga, one has to build control over material state of our existence i.e., either we have to control the body through mind or control the mind through body. This relaxed state of mind and body can be achieved through practice of meditation.

Neurophysiological and neuropsychological experimental data reported from various researches (2'18'21' - show that due to meditation, one should get coherent low frequency cerebral activity

i.e., low frequency of electrical activity of brain, decrease of oxygen consumption, decrease of heart beat, decrease of respiration rate, decrease of body temperature, decrease of cortisol (a major stress hormone), decrease of muscle tension, normalisation of blood pressure, increase of galvanic skin resistance etc. Due to these changes, the autonomic nervous system which regulates vital internal processes becomes more stable integrated and adaptable, as indicated by its increased ability to recover rapidly from effects of stress. Brain functions more orderly as indicated by physiological correlates of creativity and intelligence. This condition of the body allows cosmic rhythms to penetrate the body.

Neurophysiologists have extensively studied and differentiated the remaining altered states of consciousness which can be obtained 'without wakeful awareness' such as sleep, hypnotic states, consciousness induced by drugs and anesthetics, brain injury cases such as confusion, stupor, coma and cerebral death.

INTERACTION OF ELECTROMAGNETIC RADIATION WITH MATTER

We know that the universe along with the existing matter, galaxies etc. also contains electromagnetic radiation from low frequency radio waves to high frequency g- rays and it also contains 'matter radiations'. All matter including human beings are constantly surrounded and interacted by electromagnetic radiations.

Electromagnetic radiation is produced whenever a charged particle, such as an electron, changes its velocity, the energy of the electromagnetic radiation thus produced comes from the charged particle and therefore lost by it. This energy can be regarded as waves propagated through space involving oscillating electric and magnetic fields at right angles to each other and to the direction of propagation.

In doing so, it becomes a source of electromagnetic radiation, of the same frequency. This scattering is the fundamental process for understanding the interaction of electromagnetic radiation with matter, which contains large number of charge oscillators. Since, electromagnetic wave is produced from oscillating charges, each oscillator at a particular frequency can be considered like a tiny 'antenna' that emits and receives electromagnetic radiation of same particular frequency according to principle of resonance absorption of electromagnetic radiation given by Robert Kirchoff. Everyday, these types of interactions of human body with environmental electromagnetic fields will be taking place.

ELECTROMAGNETIC FIELDS IN LIVING ORGANISMS

Scientists have discovered frequency components of such oscillations and systems of electromagnetic regulation at various levels of organisations in organisms. Examples for electromagnetic regulation systems are the complex system of electromagnetic regulation of heart rate in vertebrates and the electromagnetic oscillatory systems of the brain which can control both rhythmicity of behavior and rhythms of physiological processes etc.

The experimental results¹³ of electrophysiological investigation of effects of lower frequency ranges on the human body and the data indicating the generation and reception of electromagnetic fields of various frequencies in biological systems available in scientific literature suggests the existence of endogenous electromagnetic interconnections in biological systems.

The experimental evidences on sensitivity of organs, cells and macromolecules to electromagnetic fields of different frequency ranges based on resonance absorption of various frequency ranges in biological media (6)(Shnol 1967) and Piezoelectric resonance (7) in biopolymers (Tulskii et.al 1965) and generation of such fields in these

systems indicates the existence of endogenous electromagnetic fields in living organisms.

The known methods of transmitting information along nerves by bioelectric impulses is different

from this special 'electromagnetic communication' which not only involves radio-frequency range but also electromagnetic fields of low and infra-low frequencies between different systems in the organisms. The frequencies of these oscillators are controlled by physiological and psychological processes of the human body. The period of variation of electromagnetic fields is an important factor when natural electromagnetic fields synchronize the rhythms of biological processes.

SAMADHI IS RESONANCE PROCESS

Now, we shall try to understand the process of yoga samadhi by considering the concept of resonance absorption of electromagnetic radiations and frequencies of oscillations of endogenous electromagnetic fields of human body.

Our elementary neurobiological and electrophysiological understandings of altered states of consciousness induced through yoga gives us the direct indication that due to practice of yoga as the electrophysiological activities of body decreases the oscillations of electromagnetic oscillators of human body also decreases. This happens when oscillators of electromagnetic field of the body system vibrate at their lowest natural frequency of vibration of electromagnetic field of cosmos.

'Resonance' is an oscillation of the system of oscillators at its natural frequency of vibration as determined by physical parameters of the system. This property of resonance is a feature of an organised system as a whole and it has characteristic of large amplitude vibrations.

Prior to practice of meditation, the electromagnetic radiations emitted by the body will be having random fluctuations of frequencies. At each stage of meditation, the inward journey of mind towards samadhi state our body processes and mental activities are going to tune the oscillators of the endogenous electromagnetic fields of human body to become 'sensitive' to resonance absorption of electromagnetic radiation, from the environmental electromagnetic field.

Now, experiments are available in science literature to show the emission of biophotons from endogenous electromagnetic fields of human body. Now to understand the ultimate state of meditation, the nirvikalpa samadhi,

I propose hypothesis that - 'When a person attains nirvikalpa samadhi state, electromagnetic oscillators of human body system may acquire zero frequency or very near to zero frequency of vibration showing no changes in oscillations of electric and magnetic components of waves.' In case, we observe the expected zero frequency oscillation of electromagnetic field oscillator of human body, it seems to deny the basic physics concepts of 'zero point energy' and 'Heisenberg's uncertainty principle' showing the static state of the charge without vibration.

CONCLUSIONS

We have seen that one of the aims of spiritual evolution and hence the practice of yogic samadhi is to tune the delocalised electromagnetic oscillators of the human body to lowest frequencies which absorb those resonance frequencies of environmental electromagnetic fields. The role played by endogenous electromagnetic field of the human body for attaining the transcendent state of consciousness gives a direct clue for important role of these fields in 'consciousness field formation', neural correlate of conscious experience and role of subtle signals of biophotons behind coherent perception and biophoton cellular communication etc.

Though here, I have discussed only the role of electromagnetic radiation in the process of evolution, it is also important to consider the role of 'matter radiation' such as a-rays, b-rays neutron fluxes of both cosmic and terrestrial origin. It is also important from particle physics point of view to investigate the interaction of matter radiation with human body and its changes due to practice meditation.

REFERENCES

1. Swami Harshananda: A Dictionary of Advaita Vedanta, Pub.: Ramakrishna math, Bangalore, April (1995).
2. David Orme-Johnson (Editor): Summary of Scientific Research on Maharshi's Transcendental Meditation and TM Siddhi programme, Maharshi International University of Management, U.S.A (1995).
3. Presman A.S. : Electromagnetic Fields and Life, edited by Frank .A., Brown J.R., Plenumpress, New York -London(1970)
4. Becker et al.,: The Direct Current Control System- A Link Between Environment and Organism, N.Y.State J.Med.62 (1962) 1169
5. Shoogo Ueno (Editor) : Biological Effects of Magnetic and Electromagnetic Fields, Plenum Publishing Corporation , January (1996).
6. Shnol S.E. : Confirmation of Vibrations of Molecules in Vibrational Processes in Biological and Chemical Systems, Nauka, Moscow (1967).
7. Tulsikii S.V. et al., : The Peizo Electric Resonance Spectra of Biopolymers in Molecular Biophysics.Nauka, Moscow, p41 (1965).
8. Lednyiczky G., Zhalko-Tytarenko O.: The endogenous electromagnetic oscillation in consciousness field pattern formation in Conf. on "Toward a science of consciousness 1996" (Tucson II), Arizona 8-13, April (1996).
9. Cohen.S., Popp B.A.: Biophoton Emission of the Human Body, J.Photochem. Photobiol. B(1997) Sep: 40(2): 187-189.
10. F.A. Popp, K.H.Li, W.P. Mei, Galle and G.Neurohr: Physical Aspects of Biophoton, Experientia 44 (1988) 576 -584.
11. Kobayashi M., Devaraj B., Usha, Tanno .Y., Takeba M., Inaba H. : Development and Applications of New Technology for two dimensional Space - Time Characterisation and Correlation Analysis of Ultra weak Biophoton Information , Front Med. Biol. Eng. 7(4), (1996); 299 - 309.
12. Konstantin Korotkov: Aura and Consciousness, A Stage of Scientific Understanding; Petersburg Division, Russian Ministry of Culture, State Editing & Publishing Unit, Kullara (1998).
13. Dorfman, Ya.G. : The Physical Mechanism of Action of Static Magnetic Fields and Living Systems, Izd. VINITI , Moscow (1966)
14. Topping .S , Zhalko - Tytarengo O., Lednyiczky .G. : Deliberate Alteration of Genetic Expression in : Society for Anthropology of Consciousness (1997), Annual Meeting, University of Berkley, California, 26-30 March (1997)
15. Lednyiczky .G : Biological Resonance and State of Organism - Functional Electrodynamical Testing in : Conf. Oenkatesh et al.: A Study of Structure of Phenomenology of Consciousness in Meditation and Non-meditation, Ind. J. Physio, and Pharmacol., Vol.41, (1997) 149-153.

EFFECTS OF TONES AND PHONETICS ON THE HIGHER FUNCTIONS OF THE BRAIN

Patil Anita

No.864, Sadashiv peth, RamNivas, Joshi Wada, Pune-411 030

ABSTRACT

The whole day we are engaged in one or the other activity with the help of the brain. We have desire to enhance the capacity of brain for making our behaviour more precise. Brain generates

electrical activity, which can be altered by external stimuli such as light, physical exercises etc. One such stimulus is sound. In that 6 Hz pure tone is thought to be responsible for activation of memory and calming effect. 'Mantras' which were introduced by ancient researchers, are nothing but sounds of different frequencies. Among the 'mantras', 'Aum' has been given more importance. It is claimed that along with effects on body it also improves intelligence and brings mental balance. With this background investigator got interested in studying the effects of 6 Hz tone and 'Aum' of different frequencies on the higher functions of the brain with the aim - to study effects of tones and phonetics on the higher functions of the brain.

In the beginning a trial study was conducted. It was tried to see the effects of the phonetic sound 'Aum' and a pure-tones-pair (400 Hz-406 Hz) on the stable EEG power spectrum. The temporal region of the brain is associated with retrieval of memory and alpha waves with calmness.

Guilford's SOI Model of psychological tests enable us to select the tools to assess functions of different parts of the brain. After selecting the proper tools, a trial study was conducted to see the effects of 6 Hz tone on the memory for nonsense-syllables and numbers. Improvement on the post-test was found statistically significant. So similar study was conducted on a larger sample. To what extent the improvement in memory is due to the 6 Hz tone (Expt. 1)? To answer this question, in Expt. 2, 12 Hz tone was superimposed on 400 Hz and in Expt. 3, no tone was superimposed on 400 Hz. Results indicated that 6 Hz has its special function and so there is more improvement in Expt.1 than Expt. 2 and Expt. 3.

For investigating the effects of phonetics, a second study consisting of two experiments were conducted. In Expt. 1 effects of Aum containing low frequency (Aum -1) and in Expt. 2 effects of Aum containing low and high frequencies (Aum-2) were studied. Results indicated that Aum-1 showed increase in the test of evaluation of semantic production, logical and analytical thinking, concentration and helped to reduce anxiety. Aum -2 increased evaluation of semantic production, behavioural and visual production and helped to reduce anxiety. In short, it can be said that specific change with higher brain function depends on the structure of sound used.

2.4 POSTER PRESENTATION

PHYSIOLOGICAL EFFECTS OF YOGA BREATHING

P Raghuraj, Shirley Telles

Vivekananda Kendra Yoga Research Foundation Bangalore, India.

ABSTRACT

Pranayama is voluntary regulation of the breath which makes respiration rhythmic and calms the mind. This paper summarizes the effect of pranayama on (i) sensory information processing which is better following pranayama practice, (ii) autonomic and metabolic activities - where surya anuloma viloma (breathing exclusively through right nostril) has been shown to be sympathetic activating (with increased heart rate and systolic BP, increased peripheral vasoconstriction) and increased metabolic rate, (iii) muscle strength - which increases following pranayama and also the possible application of pranayama in treating metabolic, psychosomatic and psychiatric disorders. Hence pranayama practice optimizes physical involuntary functions and higher nervous functions.

As long as there is breath in the body, there is life. When breath departs, so too does life.

Therefore, regulate the breath - Hata Yoga Pradlpika, Ch 2, V:3.

Yoga practices were devised in ancient times to aid in realizing the capability of highest possible functioning harmony in body and mind. Pranayama regulated yoga breathing are one of the yoga practices which are a preparatory step for advanced practices such as meditation. Unlike meditation, pranayama is an observable external indicator to know whether the subject is being engrossed in the conscious control process of regulated breathing which makes possible to study the effects of pranayama on sensory information (to understand brain mechanisms), involuntary functions (autonomic) and other aspects of physiological functions. Ten male volunteers with ages ranging from 21 to 33 years were studied, out of them, six subjects were trained in ujjayi pranayama and the remaining 4 subjects were trained in bhastrika pranayama. The subjects practiced pranayama for an average of 21.8 months (range 18 - 26 months). They were assessed at baseline, during the test period (pranayama and non pranayama [control]) and after the test period. Based on electroencephalographic studies, forced unilateral breathing modified EEG activity over the two hemispheres, with a greater amplitude on the side contralateral to the patent nostril. This was also believed to influence performance on hemisphere specific tasks such as verbal memory and spatial memory (Beubel, 1977; Klein, Pilon, Prosser & Shannahoff-Khalsa, 1986; Jella & Shannahoff-Khalsa, 1993). There are specific pranayama which involve breathing through a particular nostril and these techniques can be practiced effortlessly for prolonged periods and allow the effects of unilateral nostril breathing to be studied. A study on three different pranayama viz, Suryanulomaviloma (SAV), which requires breathing exclusively through right nostril, Chandranulomaviloma (CAV), which requires breathing exclusively through left nostril, and Nadi Suddhi (NDS), which requires breathing through alternate nostrils, and breath awareness practiced four times a day for ten days. All 4 trained groups SAV, CAV, NDS, and breath awareness showed a significant increase in spatial test scores at retest, whereas the control group showed no change. The average increase in spatial memory scores in all pranayama trained groups was 84% (Naveen, Nagarathna, Nagendra & Telles, 1997). It appears that yoga, specifically pranayama increases spatial memory than verbal memory, without a lateralized effect. The nasal cycle is controlled by sympathetic/parasympathetic innervation of the nasal mucosa. This led to further studies on uninostril breathing influencing autonomic status and metabolism based on heart rate and plasma catecholamines. Backon (1988) showed that right unilateral forced nostril breathing significantly increases blood glucose levels and left unilateral forced nostril breathing lowers blood glucose levels. In a single subject, heart rate was studied in different types of pranayamas viz, Savitri Pranayama (SP), Nadi Suddhi Pranayama (NP), Mahatyoga Pranayama (MP) and Vibhaga Pranayama (VP). Heart rate showed an overall increase during VP and MP of the four pranayama, compared to respective pranayamic baseline values. In another study, the effect of three different types of pranayamas viz, SAV, CAV and NDS, on autonomic and respiratory measures were studied in adults who practiced the above mentioned pranayama for one month. Heart rate showed a significant increase in both SAV and NDS group. The volar galvanic skin resistance showed a significant increase in CAV. There was a significant increase in baseline oxygen consumption by 37% in the SAV group and there was a decrease in body weight, whereas the body weight has increased in the CAV group (Telles, Nagarathna & Nagendra, 1994). These findings were similar to the findings of uninostril breathing in terms of autonomic changes mentioned elsewhere. Following SAV pranayama there was a significant increase in the oxygen consumption by 17%, in systolic blood pressure (mean increase by 9.4mmHg) and a significant decrease in digit pulse volume by 45.7%. Other variations of pranayama deserve further study regarding therapeutic merits in a wide range of disorders. In another study of ujjayi pranayama which is a timed breathing that includes breath holding phase (kumbhaka) in each cycle

of respiration, 10 male subjects who were experienced in pranayama, were divided into 2 groups. One group practicing the short kumbhaka with the ratio of 1:1:1 for inspiration :kumbhaka: expiration. Oxygen consumption was recorded at the baseline, during pranayamic breathing and post pranayama breathing period using the closed circuit Benedict-Roth apparatus. The results revealed that the short kumbhaka pranayamic breathing caused a significant increase (52%) in the oxygen consumption (and metabolic rate). In contrast long kumbhaka pranayama decreased oxygen consumption reduced significantly by 19%. To understand the autonomic control over the heart, heart rate variability is being currently used in assessing autonomic status rather than recording heart rate alone. A recent study on the effect of alternate nostril breathing (NDS) pranayama and yoga high frequency breathing (kapalabhati) on heart rate variability showed that there was a non significant increase in the high frequency component (HF) which corresponds to efferent vagal activity of heart rate variability spectrum. In contrast to this, yoga high frequency breathing showed a significant increase in low frequency (LF) component (sympathetic activation) of the heart rate variability and also an increase in LF/HF ratio which corresponds to sympathovagal balance (Raghuraj, Ramakrishnan, Nagendra & Telles, 1998). Further studies using heart rate variability on different pranayamas practiced for long periods would be useful to understand the autonomic nervous control of the heart.

Another aspect of yoga studies was the effect of pranayamas on physical and muscular strength, Ray and colleagues (1986) reported that yoga exercises (including pranayamas) produce a significant increase in muscle endurance time and delay in the onset of fatigue. Though all groups of children were given different aspects of yoga practices such as physical postures, meditation, devotional sessions, cleansing techniques, they were practicing the group specific pranayamas, breath awareness or mudras four times a day for a specific time duration. Results showed that there was a significant increase in hand grip strength of both right and left hands, ranging from 4.1% to 6.5%, whereas the breath awareness and mudra groups showed no change in spite of having other yoga practices as for the other three groups of children. The practice of pranayama has a significant effect in increasing hand grip strength. Woods (1993) studied perceptions of physical and mental energy and positive and negative mood states in 71 normal volunteers with ages ranging from 21-71 years using relaxation, visualization and yoga breathing with stretch (pranayamas). Left nostril yoga breathing with voluntary manipulation for half an hour was given along with other yoga practices.

REFERENCES

1. Backon, J. (1988) Changes in blood glucose levels induced by different forced uninostril breathing, a technique which affects both brain hemisphericity and autonomic activity. *Medical Science Research*, 16:1197-99.
2. Beubel, M.E. (1977) Changes in cortical hemispheric dominance with Kundalini yogic breathing techniques. Unpublished master's thesis, Catholic University., Washington.
3. Eccles, R. (1978) The central rhythm of nasal cycle. *Acta Otolaryngologia*, 186: 464-68.
4. Jella, S.A. & Shannahoff-Khalsa, D.S. (1993) The effects of unilateral forced nostril breathing on cognitive performance. *International Journal of Neuroscience*, 73(1-2):61-68.
5. Kennedy, B., Zeigler, M.G. & Shannahoff-Khalsa, D.S. (1986) Alternating laterality of plasma catecholamines and nasal latency in humans. *Life Science*, 38:1203-14.
6. Keuning, J. (1968) On the nasal cycle. *International Journal of Rhinology*, 6: 99-136.
7. Klein, R., Pilon, D., Prosser, S. & Shannahoff-Khalsa, D.S. (1986) Nasal airflow on pupilloptic electrographic abnormalities in the human EEG. Evidence for the reflex organ of the phenomenon. *Physiologia Bohemoslovaca*, 30: 73-7.
8. Prakash, M. & Malik, S.L. (1988) Effect of smoking on anthropometric somatotype and grip

- strength. *Indian Journal of Medical Research*, 87: 494-99.
9. Naveen, K.V., Nagarathna, R., Nagendra, H.R. & Telles, S. (1997) Yoga breathing through particular nostril increases spatial memory scores without lateralized effects. *Psychological Reports*, 81: 553-561.
 10. Raghuraj, p., Nagarathna, R., Nagendra, H.R. & Telles, S. (1997) Pranayama increases grip strength without lateralized effects. *Indian Journal of Physiology and Pharmacology*, 41(2): 129-33.
 11. Raghuraj, P., Ramakrishnan, A.G., Nagendra, H.R. & Telles, S. (1998) Effect of two selected yogic breathing techniques on heart rate variability. *Indian Journal of Pharmacology and Physiology*, 42(4): 462-72.
 12. Ray, U.S., Hegde, K.S. & Selwamurthy, W. (1986) Improvement muscular efficiency as related to a standard task after yogic exercise in middle aged men. *Indian Journal of Physiology and Pharmacology*, 83: 343-48.
 13. Shannahoff-Khalsa, D.S. & Beckett, L.R. (1996) Clinical case report: Efficacy yogic techniques in the treatment of obsessive compulsive disorders, *International Journal of Neuroscience*, 85:1-17.
 - 14 Shannahoff-Khalsa, D.S. & Kennedy, B. (1993) The effects of uninostril breathing on the heart. *International Journal of Neuroscience*, 73: 47-60.
 15. Stocksted, P. (1953) Rhinometric measurements for determination of the nasal cycle. *Acta Otolaryngologia (Stockholm)*, 42:175-79.
 16. Telles, S., & Desiraju, T. (1991) Oxygen consumption during pranayama type of very slow breathing. *Indian Journal of Medical Research*, 94: 357-63.
 17. Telles, S., & Desiraju, T. (1992) Heart rate alterations in different types of prnyamas. *Indian Journal Physiology and Pharmacology*, 36(4): 287-88.
 18. Telles, S., Joseph, C., Venkatesh, S. & Desiraju, T. (1992) Alteration of auditory middle latency evoked potentials during yogic consciously regulated breathing and attentive state of mind. *International Journal of Psychophysiology*, 15:147-52.
 19. Telles, S., Nagarathna, R. & Nagendra, H.R. (1994) Breathing through a particular nostril can alter metabolism and autonomic activities. *Indian Journal of Physiology and Pharmacology*, 38(2): 133-37.
 20. Telles, S., Nagarathna, R. & Nagendra, H.R. (1996) Physiological measures of right nostril breathing. *Journal of Alternative and Complementary Medicine*, 2(4): 479-84.
 21. Vivekananda, Swamy. (1973) *Raja-yoga or conquering the internal nature*, Advaita Ashrama, Calcutta, pp280.
 22. Wernitz, D.A., Bickford, R.G., Bloom, F.E. & Shannahoff-Khalsa, D.S. (1983) Alternating cerebral hemispheric activity and the lateralization of autonomic nervous function. *Human Neurobiology*, 2: 39-43.
 23. Wood, C. (1993) Mood change and perceptions of vitality: a comparison of the effects of relaxation, visualization and yoga. *Journal of Royal Society of Medicine*, 86(5): 254-58.

NEUROPHYSIOLOGICAL EFFECTS OF YOGA PRACTICES

Naveen K V and Shirley Telles

Vivekananda Kendra Yoga Research Foundation Bangalore, India.

ABSTRACT

"Through restraining the prana, thought is retrained and through restraint of thought prana (air) is restrained" - Hata Yoga Pradipika, 4:21

Traditional yoga texts and present day science recognize the interaction between yoga and brain functions. This paper describes how yoga practice influences such function?. Functioning of several neural centers, was studied based on recordings of middle latency auditory evoked potentials. For example, certain pranayamas and 'OM' meditation facilitate neural functioning at the mesencephalic and diencephalic levels. The same meditation technique practiced for longer duration influence the neural processing at the level of association, complex cortical areas. In general, the results show that yoga practice optimizes neural functions at peripheral and central levels.

Yoga, an ancient Indian science of living described by sages provides an exhaustive literature on its basis, systematic practices, and goals. These ancient seers recognized "the mind & its modifications (mindstuff)" as the root cause for all the inefficiencies and miseries. Hence the seers like sage Patanjali proposed 'science of yoga' to restrain the mind from its modifications (yogah citta vritti nirodhah); Vasistha in his Yoga Vasistha presents the practice of yoga as a tool to calm down the mind (Manah prasmanah upayah yogah); and, Lord Krishna in Bhagavadgita proscribes yoga practice to be skillful in action (Yogah karmasu kausalam)¹. Hence the primary goal of yoga is to be calm, free from mental modifications and skillful in action and thus realize the capability of highest possible functional harmony in body and mind. This comprehensive understanding of the mind with its modifications and yoga as a solution elicited the scientific investigations to understand the effects of yoga practices and underlying neural mechanisms involved.

Two yogis performing Raja yoga meditation during which attention is supposedly focused inward (on a sound or word called 'mantra') and withdrawn from the outside world, showed no alpha blocking to diverse (visual, vibratory, thermal and sensory) stimuli². This provides an indication that experienced meditators exhibited neurophysiological alterations corresponding to a specific state of attention during meditation. Transcendental Meditation (TM) was described as 'fourth major state of consciousness' based on the fact that the practice of TM showed some similar changes to those of sleep i.e., a decrease in heart rate and oxygen consumption and an increase in the level or stability of the electrodermal response. However, there was also an increase in the electroencephalogram (EEG) alpha wave amplitude and regularity, normally seen while awake³. Another study on TM showed the increase in alpha amplitude with decreased frequency anteriorly, posterior theta, rhythmic beta waves and synchronization of anterior and posterior channels. The synchronization between anterior and posterior channels implies better harmony and optimal functioning⁴.

These early studies demonstrated the different state of mind attained through yoga practice in general and meditation in particular. This triggered a series of scientific investigations on the neurophysiological effects of yoga practice. The research conducted at Vivekananda Kendra Yoga Research Foundation, Bangalore is presented under the following categories:

- (a) Neural centers modified by yoga practice
- (b) Neural regulation of visceral functions

NEURAL CENTERS MODIFIED BY YOGA PRACTICE

Some pranayama practices involve considerable exercising of conscious control processes with precision and regulation of breathing rhythm⁵. This training in concentration is claimed to create, in the long run, a steadying effect on the mind⁶.

A study comparing trained subjects practicing consciously controlled rhythmic breathing involving timed breath-holding in each cycle of breathing (Ujjayi and Bhastrika type of pranayama) and

untrained subjects focusing their attention on on-going tidal breathing (n = 10 each), using middle latency auditory-evoked potentials (AEP-MLRs), revealed increase in Na wave amplitude and decreased latency during the pranayamic practice. This change is interpreted as an indication of a generalized alteration caused in information processing at the primary thalmo-cortical level during the concentrated mental exercise of inducing modifications in neural mechanisms regulating a different functional system (respiratory). The baseline of the Na wave obtained before and after the 21 months of pranayama practice showed no permanent functional changes in the auditory pathway at the level of generators of the Na wave, but the change occurred only during the pranayama practice. Hence, the change in Na wave was thought to be related to the process of acquisition of specialized skills through training in pranayama to be able to hold the attention and generate consciously the sensorimotor signals that produce the specific breathing rhythm and associated thoughts of sensation proficiently without letting in distractions or breaks⁷.

Another study examined AEP-MLRs in 7 proficient (5-20 years of experience) subjects during the practice of meditation on the syllable 'OM'. This meditation practice is claimed to attain a single thought state, in deep relaxation. The single thought is the syllable 'OM' (the force behind all thoughts) which is chanted aloud during the initial training in meditation, which subsequently leads to an effortless mental chanting of the syllable. This was done by comparing AEP-MLRs at baseline and during meditation and also with that of 7 matched subjects involved in sitting eyes closed with no instructions for focusing their thoughts. Considerable inter subject variability observed was thought to mask subtle changes. However, during meditation a small but significant change in the latency of Nb wave was observed consistently in 3 repeat sessions of each subject. This change was attributed to neural processing at the level of the association cortices (other than at the prethamic/thalamic/primary cortical areas)⁸.

Following these changes during 'OM' meditation, two groups of nine male subjects each, were compared for changes in AEP-MLRs. The first group (senior) had over 10 years of experience in 'OM' meditation. The other (naive) were motivated to undergo 10 day intensive retreat to learn 'OM' meditation. All the subjects were tested in both test session ('OM' chanting) and control session (chanting the syllable 'one'). The senior subjects showed a significant increase in the amplitude of the Na wave during meditation (chanting 'OM') compared to a significant decrease in the Na wave amplitude during a control (repeating 'One') period. In contrast, naive subjects had a significant reduction in Na wave amplitude during meditation, and a nonsignificant trend of reduction during the control period, as well. The changes in Na wave (at the mesencephalic or diencephalic level) occurred in both senior and naive subjects (in opposite directions) during meditation and control session which reveals that repeating 'OM' or 'One' appears to alter neural processing at the same level. However, the nature of change was dependent on the experience i.e., opposite directions during the two sessions in senior subjects and in the same direction during both sessions in naive subjects. An increase in amplitude of MLRs has been interpreted as an indicator of better efficiency in activating the neural generator. Hence it appears that in senior subjects meditation facilitated the neural activity (thalamic level), similar to that of subjects practicing regulated breathing⁷. Whereas, in naive subjects meditation inhibited neural activity (similar to that of the control session in seniors). These results can be objectively correlated with altered mental state during meditation i.e., seniors found meditation on 'OM' less effort than on 'One' and naive subjects needed effort for both the practices, i.e., chanting and repeating⁹.

A single case study on cerebral blood flow using transcranial Doppler ultrasound (TCD) following rapid yoga breathing at 120 times per minute showed significant decrease in diastolic blood flow velocity (dbfv in cm/sec) for right middle cerebral artery. This suggests that rapid yoga breathing reduces cerebral blood flow, possibly by carbon dioxide washout¹⁰.

NEURAL REGULATION OF VISCERAL FUNCTIONS

With the existing reports on voluntary control of yogis on heart and pulse 11,12 a senior yogi who claimed that he achieved control over his mind and could change from 'single thought' to 'no thought state' at will, was assessed using the EKG of standard limb lead II and respirogram around the chest. On instruction he changed from a normal sitting condition to 'single thought' to 'no thought state' and vice versa 4 times with 5 minutes of relaxation in savasana in between the 4 times. There was a progressive increase in heart rate in 'single thought' and in 'no thought state'. Whereas, increase in respiratory rate during 'single thought' and decrease during 'no thought' was observed. This provided a classical example of changes in heart rate and respiration accompanying a yogic subjective activity intended to alter the state of mind alone¹³.

18 male Brahmakumaris Raja yoga (BK) meditators with 5-25 years of experience were studied in test (meditation) and control (random thinking) sessions, each repeated thrice. This meditation unlike 'OM' meditation requires the subject to meditate in eyes open condition with considerable concentrated thinking (Dharana). Group analysis showed a small (but consistent) increase in the heart rate during meditation, compared to the preceding and the nonmeditation period. This increase in heart rate during BK meditation suggested cardiosympathetic activation and was a possible sign of psychophysiological arousal. There were consistent individual differences (in opposite directions) for respiratory rate, finger plethysmogram amplitude and skin resistance values. These differences did not correlate to the differences in age, duration of meditation. Hence, no conclusion was made about the effects of this meditation on the autonomic nervous system, other than the cardiosympathetic activation¹⁴.

The changes in autonomic and metabolic functions were studied on seven experienced 'OM' meditators, whose neural responses to the meditation were described in the previous section. They were studied in both the 'test' and the 'control' sessions with two 6 minute periods of relaxation which preceded and followed the 20 minute period of meditation. The meditators showed a significant reduction in heart rate during meditation compared to the control period. During both types of sessions (test and control) there was a comparable increase in the cutaneous peripheral vascular resistance. This was interpreted as a sign of increased mental alertness, even while being physiologically relaxed (as shown by the reduced heart rate)¹⁵. In a separate group of 'OM' meditators, (n=12, 20 days of meditation experience) studied in 3 types of sessions i.e., test-meditation on 'OM', control-repeating 'one', and random thinking, a decrease in heart and breath rates during test and control sessions (conventional sign of relaxation) was observed. There was also a decrease in skin resistance in meditation alone, taken to mean that the subject recognized the significance of the syllable. No such changes were seen during random thinking¹⁶.

SUMMARY

Hence to sum up the effects of yoga practices in general and meditation in particular, (i) a decrease in heart rate, respiratory rate (conventional indicators of relaxation) follow the mental repetition of any syllable,

(ii) subjects who have brief (20 days) experience of meditation on a meaningful

syllable (COM'), show a significant decrease in skin resistance level (SRL) during repetition of that syllable, but not while repeating a neutral syllable or during non targeted thinking. Subjects with longer meditation experience do not show this change,

(iii) experienced meditators show significant facilitation of sensory neural processing at mesencephalic/diencephalic levels while repeating the syllable on which they meditate. Non-meditators do not show this change. These results suggest that the process of understanding the significance of a meaningful syllable may be continuous, and is significantly influenced by the

duraion of meditation. The decrease in SRL was observed in nanve meditators but not in experienced meditators, hence this change may represent an intermittent stage during which changes in sensory evoked potentials (EPs) are not yet obtained. The ability of meditators to ignore or attend to a given stimuli at will needs further investigations.

REFERENCES

1. Vivekananda Kendra Patrika. Yoga: the science of holistic living. Vivekananda Kendra Prakashan, Chennai, 1988.
2. Anand BK, Chinna GS, Singh B. Some aspects of electroencephagraphic stidies on yogis. *Electroencephalography and Clinical neurophysiology* 1961; 13: 452-456.
3. Wallace RK. Physiological effects of transcendental meditation. *Science* 1970; 167:1751 -1754.
4. Banquet J-P. Spectral analysis of the EEG in meditation. *Electroencephalography and Clinical neurophysiology* 1973; 35:143-151.
5. Vivekananda Swami. Raja-yoga or conquering the internal nature, Advaita Ashrama, Calcutta, 1973, 280 pp.
6. Behanan KT. Yoga: a scientific evaluation, Dover publications, New York, 1937, 27 pp.
7. Telles S, Joseph C, Venkatesh S, Desiraju T. Alterations of auditory middle latency evoked potentials during yogic consciously regulated breathing and attentive state of mind. *International Journal Psychophysiology* 1992; 14:189-198.
8. Telles S, Desiraju T. Recording of auditory middle latency evoked potentials during the practice) of meditation with the syllable 'OM'. *Indian Journal Medical Research* 1993; 98[B]: 237 - 239.
9. Telles S, Nagarathna R, Nagendra HR, Desiraju T. Alterations in auditory middle latency evoked potentials during meditation on a meaningful symbol-'OM'. *International Journal of Psychophysiology* 1994; 76: 87 - 93.
9. Naveen KV, Nagendra HR, Telles S. Transcranial Doppler ultrasound studies of middle cerebral artery blood flow following different test conditions. *Neurology India* [In Press].
10. Anand BK, Chinna GS. Investigations on yogis claiming to stop their heart beats, *Ind Indian Journal Medical Research* 1961; 49: 90 - 94.
11. Wenger MA, Bagachi BK, Anand BK. Experiments in India on "voluntary" control of the heart and pulse. *Circulation* 1961; XXIV: 1319 -1325.
12. Telles S, Desiraju T. Heart rate and respiratory changes accompanying yogic conditions of single thought and thoughtless states. *Indian Journal of Physiology and Pharmacology* 1992; 36[4]: 293 - 294.
- Telles S, Desiraju T. Autonomic changes in Brahmakumaris Raja yoga meditation. *International Journal of Psychophysiology* 1993; 15: 147 - 152.
14. Telles S, Nagarathna R, nagendra HR. Autonomic changes during "OM" meditation. *Indian Journal of Physiology and Pharmacology* 1995; 39[4]: 418 - 420.
16. Telles S, Nagarathna R, Nagendra HR. Autonomic changes while mentally repeating two syllables-one meaningful and the other neutral. *Indian Journal of Physiology and Pharmacology* 1998; 42[1]: 57 - 63.